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Editors

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Determining Top Managements' "Value": Pre/Post Acquisition

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Employing an acquisition is one of the primary methods of growth utilized by organizations. In 2005, an estimated \$2.9 trillion worth of acquisitions were made globally. One of the critical factors in valuing an acquisition is the determination of the value of intangible assets held by the company. This paper will explore the value of one of these key intangible assets that the top management team maintains in regard to pre and post-acquisition performance of the organization.

“As organizations move into the 21st century, past measures of organizational performance based largely on accounting and financial statements will be insufficient to meaningfully assess value, particularly relative to human capital valuation.”

(Lusch, Harvey & Speier, 1998, P. 715)

A focus on alternative management accounting methods (Baxter & Chua, 2003) relative to intangible assets (Mueller, 2004) continues to be an ongoing concern of management, accountants, as well as external stakeholders. The role of accounting in the post Enron era is attempting to preserve their value-added role in the governance of global organizations. At this time, accurately accounting for intangible assessment during acquisitions appears to be of paramount importance, especially since the 1980's takeover-rich world where traditional accounting did not consistently capture the economic value of many firms (Power, 2001).

In what appears to be an unrelenting quest for limited resources, the need to capture unique combinations of human resources (i.e., management team tacit knowledge) to gain competitive advantage, the necessary speed of getting products to a market to remain competitive, the growing importance of relational marketing efforts and the resulting synergistic marketing channel strategies, an ever increasing number of firms are focusing on acquisitions to address these marketplace challenges more than ever before. As evidence, in 2005, global mergers and acquisitions transactions with an estimated worth of \$2.9 trillion were announced, which was a 38 percent growth from 2004 (*Wall Street Journal*, 2005).

The challenge accountants must now address is how to value resources for key production factors that take on different immaterial/intangible form (Lusch, Harvey, & Speier, 1998; Harvey & Lusch, 1999; Grojer, 2001). The relevance of accounting 'numbers' in an acquisition is intensified as the gap between book value and market value continues to grow (Lusch, Harvey & Speier, 1998; Power, 2001). Fortunately, managers, as well as academics, are becoming keenly aware of the intangible value of a firm as they attempt to address the intricate issues associated with the valuation of an acquisition in the global knowledge economy of the 21st century (Johanson, Eklov, Homgren & Martensson, 1999; Johanson, Martensson, & Skoog, 2001). These attempts at valuing intangible human resources are sometimes referred to in annual reports so as to allow investors to gain a clearer understanding of the 'soft' value of assets in the firm (Erhvervsudviklingsradet, 1997; Guthrie, Petty, Ferrier & Wells, 1999).

Currently, the unallocated residual of fair market value over the book value of the acquired firm's recognized net assets (e.g., goodwill) is recorded without regard to specific intangible asset valuation. Some researchers suggest that this difference is intellectual capital, or intangible assets such as human capital, relationships, quality of management, market power (e.g., market share) and the like (Brown, Osborn, Chan & Jaganathan, 2005). However, goodwill is typically not identified as a 'specific' intangible asset, thereby increasing the difficulty in the final determination of a value of a potential acquisition. This reluctance and inability to break goodwill into its component parts makes the valuation process significantly more subjective. For example, the banking industry's intangible assets account for 30% of their equity, which is up from 8 percent a decade ago (Davenport, 2005).

This research suggests that the top management team (TMT) is an intangible asset of a successful firm that should be recognized, as the loss of these managers potentially could have a negative effect on the financial performance of the firm. In the case of acquisitions, potential loss of these successful managers could be considered an accrued intangible liability. Our research empirically examines an intangible human resource asset and its valuation in acquisitions; that of the TMT of a successful target firm (the firm being acquired) and post-acquisition performance. We utilize the resource based theory and the upper echelon theory as foundations for our research.

In essence we will explore the value of the retention of the TMT after acquisition (intangible asset) versus the valuation of a target firm in regard to a contingent intangible liability at their loss. A survey of 102 top executives of acquiring firms suggests that in acquisitions, the TMT of a successful firm is a valuable intangible asset. On the other hand, any potential loss of top managers will hurt post-acquisition performance and

accountants should (theoretically) record an intangible accrued liability when it is probable that this intangible asset had been impaired (loss of the valuable TMT) and the amount of loss can be reasonably estimated (FASB Statement #5).

What are Intangible Assets?

Balance sheet assets, liabilities and owners equity are relatively determinable through an accurate accounting system, although accounting valuations and classifications differ globally (e.g., asset depreciation methods and/or fair market valuations). However, intangible assets (e.g., knowledge process, personnel, TMT, patents, brands, and networks) and the related intangible liabilities (e.g., a weak strategic planning process, unsafe work conditions, potential environmental cleanup, potential product tampering, and/or poor corporate reputation) are significantly more difficult to evaluate (Harvey & Lusch, 1999).

Specific to each successful company is a core competency, or a unique amalgam of skills, resources, technologies and people that make a company a leader in a specific area (Valentino, 1992; *Planning Review*, 1994). Core competencies are described as unique, sustainable and inimitable by competitors. These core competencies are frequently composed of intangible assets that allow a company to effectively compete in the marketplace and differentiate itself from other competitors (Willens, 1993; Prahalad & Hamel, 1990). Loss of these intangible assets after an acquisition will hurt post-acquisition performance of the target firm. For example, nearly 40 percent of the financial advisors (or over 200) of Advest Group Inc., decided to leave the firm rather than work for the acquirer, Merrill Lynch & Co. Although Merrill has over 14,000 financial advisors of their own, this loss of target firm key employees suggests that Merrill Lynch paid too much (*Wall Street Journal*, 2005).

Some of the most admired companies in the world (ex: General Electric, Starbucks, Nordstrom, Microsoft) are thought of as industry leaders due in large part to their intangible capabilities. These capabilities are the collective skills, abilities and expertise of an organization that are the outcome of investments directed by top managers in staffing, training, communication and other human resource areas (Ulrich, 2004). Intangible assets may be as much as 60% of a company's market value (Hurtado, Heredia & Calatayud, 2005) and proper management of these intangibles can represent a significant increase in a company value (Zabala, et al., 2005).

There are two sides to the valuation of a potential acquisition: the hard-side and the soft-side. The hard side considers the financial statements of the target firm (e.g., balance sheet, income statement, cash flow, as well as a variety of financial ratios) and the soft side considers all intangible assets and liabilities. There is no absolutely clear definition of what constitutes an intangible asset; but from an accounting viewpoint, intangible assets do not have physical substance; they may grant rights and privileges to a business, they are inseparable from the enterprise, or they are assets whose determination and timing of future benefits is very difficult.

Offsetting intangible assets is an intangible liability. Potential intangible liabilities have been broken into internal and external groups with four categories:

- 1.) Process issues (ex. inadequate R&D, low commitment/trust of suppliers/distributions system,
- 2.) Human capital issues (ex. high employee turnover, negative word-of-mouth among customers),
- 3.) Informational issues (ex. lack of adequate information structure, decreasing corporate reputation) and,
- 4.) Configuration issues (ex. lack of flexibility in organizational structure, lack of strategic alliances to leverage resource base) (Harvey & Lusch, 1999).

Many of these intangible liabilities are likely to occur after firm acquisition (ex. information structure breakdown, strategic alliance failure to leverage resource base, loss of the TMT, loss of boundary spanners, low commitment/trust of supplier/distribution system, etc.).

Why Use a Resource-Based View/Upper Echelon Theory to Examine the Valuation of Intangible Assets?

The intangible value of the TMT of a successful firm and the importance of their strategic decisions has been researched extensively. Prompting some researchers calls for an off-balance sheet controller to 'manage'/account for the intangible assets such as TMT (Lusch & Harvey, 1994). Many researchers focus on a managerial view of acquisitions with a focus on how goals are developed, resources are allocated, and individual's efforts are coordinated to build congruence in the overall direction adopted by the company (Doz, 1991).

Upper echelon theory develops a linkage between the TMT and the development of strategic assets. This concept puts the focus on TMT behavior, rather than a single individual such as the CEO (Hambrick & Mason, 1984). This research suggests that the organization becomes a reflection of the TMT and assists in explaining the competitive behavior of the firm. As much as the strategic knowledge is tacit (e.g., TMT experience, TMT guidance, etc.), loss of the TMT from a previously successful target firm after acquisition could negatively affect post-acquisition performance. Perhaps the most important group in an organization is the TMT. The TMT of an organization ranges from as little as three to ten people and is at the apex of the organization where it provides strategic leadership (Finkelstein & Hambrick, 1996). Successful firms owe their success to these small groups of executives that develop strategy and direct the resources that combine both the tangible and intangible facets.

In a broader sense, organizations have developed certain rules and processes that determine who holds the power and how it is executed. This is based on social values developed on agreement amongst the participants (Pfeffer, 1981; Salancik & Pfeffer, 1977). A bounded rational TMT affects a firm's strategic choice and the subsequent performance of the firm due to these decisions. The TMT's decisions direct the firm

towards higher or lower performance. For example, when AOL's Robert Pittman in 2000 took over Time Warner, he argued that the online upstart and venerable media conglomerate could win more advertising dollars by working together. He set overly ambitious growth targets and derided seasoned Time Warner executives, who pointed out that the package deals involved giving advertisers discounts that were too deep (*Wall Street Journal*, 2002). Mr. Pittman's strategy collapsed due to corporate infighting and disinterest among advertisers in this strategy of cross-media deals. Mr. Pittman eventually quit after his growth targets were discarded and investor credibility was at an all time low.

The dynamic capabilities perspective provides another useful theoretical perspective for examining the TMT's behavior and helps one develop a more comprehensive perspective (Madhok & Osegowitsch, 2000). Dynamic capabilities refer to the development of management capabilities and difficult-to-imitate combinations of organizational, functional and technological skills to gain/sustain a competitive advantage (Teece, et al., 1997). The TMT can play a major role in this process.

Dynamic capabilities necessitates having the TMT develop overall organizational coherence. Such coherence must recognize the unique features of the internal and external environment to facilitate customization of strategies while focusing attention on the adaptation, integration and reconfiguring of both internal and relational resources to match the opportunities in the global and local marketplaces (Teece, et al., 1997).

Dynamic capabilities theory is derived from the resource-based theory of the firm that focuses on firm-level resources (internal factors semi-permanently linked to the organization) that provide the firm with a unique competitive posture (Barney, 1991; Dietrick, Cool & Barney, 1989; Wernerfelt, 1984). Resource-based theory of the firm theorizes that the accumulation of resources, that are: 1.) valuable; 2.) rare; 3.) imperfectly imitable; and 4.) for which there are not strategically equivalent substitutes creates resource position barriers to deter competition, and competitive advantage resulting in above-normal returns (Barney, 1991; Peteraf, 1993; Wernerfelt, 1984).

Alternatively, the dynamic capabilities perspective argues that capabilities are more substitutable across different contexts as well as equifinal, thus rendering inimitability and immobility irrelevant to sustained competitive advantage (Eisenhardt & Martin, 2000). As such, the dynamic capabilities perspective is focused on the strategic employment of key resources, as opposed to the ownership of the resources themselves and application in a stable environment. The TMT's decisions as to the direction and employment of strategically key resources are often what create value for firms and performance. Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resource reconfigurations as markets emerge, collide, split, evolve, and die (Eisenhardt & Martin, 2000). The firm's internal resources are not considered stable, but must be bought, sold and developed by the TMT as the strategy changes to compete in the dynamic environment.

Why is it Important to Retain TMT Intangible Asset?

TMT retention as a group is important as in accordance with the idea of bounded rationality, that the creation of new knowledge, acquisition of existing knowledge, and storage of knowledge cannot be performed by one individual. Therefore, the TMT are experts that specialize in particular areas of knowledge. Knowledge-based theory suggests that the TMT develops rules and directives to facilitate knowledge integration based upon specialist expertise (Grant, 1996). Also, knowledge assets remain with individual employees and cannot be readily transferred with the most complex tacit knowledge resident in the TMT. From this argument, it would follow that the greater the pre-acquisition performance of the firm, the greater the intangible asset value of the TMT and the more likely this intangible asset will be retained.

The TMT of a successful target firm is an important intangible asset and even more important after the acquisition process is completed (Lusch, Harvey & Speier, 1998). Before acquisition, these managers prepare the firm's employees for the transition, establish ties between the two firms, and assist in due diligence. After acquisition, top managers continue to work to integrate the firm into the acquiring company and continue their strategic leadership. Ongoing post-acquisition performance of the firm may decrease by the loss of these integral leaders.

After acquisition, top managers of the target firm are viewed as critical to enhancing post-acquisition performance as the TMT possesses knowledge critical to ongoing business operations. Their departure may subsequently heighten the level of disruption and uncertainty in the firm (Cannella & Hambrick, 1993; Krishnan, et. al., 1997; Singh & Zollo, 1998). The organization's culture, strategy, and dynamics are all dependant upon the TMT (Cyert & March, 1963; Pfeffer, 1981b; Salancik & Pfeffer, 1977).

Development of the organization's culture, strategy and dynamic capability by the TMT are assumed to be performed with the objective of building the economic value of the firm and to develop the cognitive capability to create economic value, therefore needing to be maintained and/or protected (Harvey & Lusch, 1997). This process will occur through the integration of complementary human resources and development of a synergistic environment (Seth, et. al., 2000; Eun, et. al., 1996). Through the guidance of the TMT, corporate culture development, employment practices, and deployment of human resources have all been influenced by these internal factors. Decisions have been made by the TMT to align the human resource skills and strategy affecting performance (Wright, McMahan & Smart, 1995). Also, the TMT, through their strategic choices, is a main component that determines the success or failure of an organization (Andrews, 1971; Ansoff, 1988; Child, 1972; Priem, 1994). Strategic leadership theory holds that companies are reflections of their top managers and that the specific knowledge, experience, values and preferences of top managers are reflected not only in their decisions, but also in their assessment of decision situations.

Loss of the TMT can be compared to the morale decline associated with the downsizing of a firm. The downsizing literature suggests that firms undergo a deterioration of communication at many levels even though communication is particularly important at the time of downsizing, as well as during acquisitions.

Dismissal of the TMT during the acquisition period will also affect the communication within the firm and aggravate the high levels of uncertainty. In addition, the loss of the acquired TMT could affect creativity or innovation, negatively affecting the post-acquisition performance of the acquired firm. Some of the environmental factors that are considered important for creativity and innovation in organizations are an open information flow and support for new ideas at all levels of the organization, from top management, through immediate supervisors to work groups. Potential loss of the TMT as a result of a successful loss after acquisition could well be considered an intangible liability (Harvey & Lusch, 1997, 1999).

To alleviate potential post-acquisition problems, many purchasers may be more inclined to make changes and increase governance (Krug & Hegarty, 1997). After acquisition, the purchasing organization strives to create a situation where all the internal and external resources are joined, working together towards the mutual goals and objectives. The target TMT's participation in the buy-in, development and implementation of known monitoring systems is essential to engender cooperation (Cartwright & Cooper, 1993).

Following an acquisition, some degree of inter-organizational integration is necessary. However the level of integration to implement must be decided, as under- or over- integration can result in failure to create value, or have value destruction. The realization of potential synergies could fail with an insufficient level of integration, while excess reconfiguration can hurt as executives depart in unfavorable circumstances (Cannella & Hambrick, 1993; Hambrick & Cannella, 1993).

In summary, retention of a successful target firm's TMT after acquisition will facilitate the integration of the acquired firm and these individuals could be the intangible asset that attracted the acquisition and gave rise to the valuation of the target firm. From a resource-based perspective, these individuals lead the firm, direct resources, motivate, and are aware of the resources to develop the synergies that may arise between two firms. Positive pre-acquisition performance could indicate their importance by acquiring the firm that will attempt to retain them. Therefore;

H₁: The greater the pre-acquisition performance of the acquired firm, the more likely the intangible asset, TMT, of the acquired firm will be retained

Why Retain TMT Intangible Asset Post-Acquisition?

A successful TMT's strategic decisions will positively affect performance (Child, 1972; Volberda, 1996; Fiol, 1991; Lado & Wilson, 1994; Lee & Miller, 1999). These individuals develop goals, allocate resources, and coordinate individuals' efforts to build congruence in the overall direction adopted by the company (Doz, 1991; Doz and Prahalad, 1986). Therefore, loss of the TMT may impair the development of the new goals and role the acquisition will perform, and becomes an intangible liability, as this loss of the TMT in turn will negatively affect the performance of the acquisition.

From the strategic choice perspective, Child (1972) claims that managers have discretion and that the decisions they make are of vital importance to the success of the organization. Top management is often viewed as critically involved in

formulating and implementing strategy to provide superior performance for the organizations. The task of management is to provide dynamic capabilities for organizational flexibility and to configure an organization for the preservation and control of technology, structure, and culture (Volberda, 1996). Thus, the TMT is an integral part of the value of the acquisition by developing its strategy, organization, and leadership.

The human dimension (the TMT in this instance) is critical to effective execution of strategy (Fiol, 1991; Lado & Wilson, 1994; Lee & Miller, 1999) as well as the development and dissemination of knowledge and organizational learning within the organization (Fiol, 1991; Hall, 1992; Miller & Shamsie, 1996). A study by Lengnick-Hall and Wolff (1999) using three perspectives in strategy (resource based, hypercompetitive and high-velocity, plus ecosystem and chaos theory-based views) established common themes concerning this human capital dimension. These concepts include: developing effective exchange relationships (e.g. Porter, 1985), understanding that strategy and context are dynamic (e.g., Barney, 1991), and emphasizing the performance “numerator” rather than the cost “denominator” (e.g., Eisenhardt & Tabrizi, 1995). The performance “numerator” suggests a superiority of product or service that will require a talented TMT for continued post acquisition performance of the acquired firm. In effect, loss of the TMT of the acquired organization may directly affect post-acquisition performance of the acquired firm, exchange relationships (within and without the organization), and strategy regarding the specific market context. Thus we propose:

H₂: There is a positive relationship between post-acquisition performance of the acquired firm and degree of retention of the intangible asset, TMT, of the acquired organization.

The Study

Data Collection

We considered several factors before conducting the empirical tests of the proposed relationships in our model. First, the model does not lend itself to a study using secondary (archival) data. Due to the perceptual nature of the evaluation of target firms' post- and pre-acquisition performance and TMT retention, survey data collection is most appropriate. Also, for most firms, acquisition financial performance information is consolidated if reported publicly, hence, specific acquisition performance data would not be available and secondary data likely will not be available at all. As such, to ascertain post-acquisition performance of the acquired firm, perceptual data from key informants likely would provide the best test of the model. Insider (key) informants have been used extensively in a variety of research (Dean & Sharfman 1996).

Sample

The individuals we surveyed came from an Ernst and Young database of top executives who have participated in Mergers and Acquisitions. The database contained 807 names, 610 of which were usable. Examples of the titles of the

individuals that were sent the surveys were Vice Presidents (110), Senior VP (23), CEOs (24), CFOs (25), Director (49), etc. These are senior managers who have been directly involved in a recent acquisition and are aware of the post-acquisition performance of the acquired firm. We received a sample of 102 useable responses for a response rate of 17%. Response rates for surveys of senior management are typically very low, so we were pleased with the number of responses we obtained, as it is consistent with similar surveys. A total of 72 Industries were represented in the data. Surveys were mailed to the final list in three separate waves to elicit as many responses as possible.

Measures

Post-Acquisition Performance: There is no agreement on the best way to measure acquisition success, or at what point in the process a measure should be taken. The results of acquisitions are difficult to assess accurately, both in terms of the indices used and the appropriate time span over which to judge acquisition performance (Lubatkin, 1983; 1987). Prior acquisition research has focused on such variables such as potential growth rate and target evaluation, communication effectiveness (Schweiger & DeNisi, 1991), achievement of merger goals (Cartwright & Cooper, 1992), organizational culture fit (Buono, Bowditch & Lewis, 1995), and retaining the TMT (Hambrick & Cannella, 1993).

However, narrowly focused financial analyses of acquisitions frequently fail to recognize that acquisitions have important intangible aspects as well. In focusing only on financial results such as income statement ratios and balance sheet issues, the role of people, knowledge gained, or other subtle goals are often overlooked (Hunt, 1987). We measured acquisition performance at the level of the acquisition, not at the level of the combined firm. Organizational performance metrics have been criticized in the past for not measuring what the researcher is attempting to measure. The rationale for measuring at the acquisition level results rather than with organizational level indicators is that the TMT of the acquisition is the focus of our research. As such, though the acquisition itself is an organizational phenomenon, we focus on acquisition performance as it is more closely linked to the performance and importance of TMT.

The three areas of acquisition performance examined were: perceived financial acquisition performance, goal attainment, and satisfaction with employees. These three scales represent financial plus non-financial outcomes and a comparative method is more effective in eliciting responses than asking respondents directly to provide exact numbers for acquisition performance (such as dollar amount of sales, market share, etc.) (Lau & Ngo, 2001; Tomaskovic-Devey, Leiter & Thompson, 1994). We developed our scale by adapting pre-existing measures from Lau and Ngo (2001), plus those from Cannella and Hambrick (1993) based on suggestions from our expert panel and the information we acquired from pilot testing.

TMT Retention: This construct refers to the extent to which the acquiring firm was able to retain the target firm's TMT. We measured retention in two ways: 1.) as a proportion of executives that were retained, similar to Cannella and Hambrick (1993), and 2.) the perceived volume of valuable executives retained. As suggested by the

responses we received during pilot testing and from the expert panel, simply examining the number of executives retained for small to medium sized firms would not provide a full picture. Although we argue the TMT is valuable it is also true that there are also those individuals in smaller firms that may be (for example) relatives with an executive title (or similar situations), but of no value. Therefore we explore both the number of executives retained and whether or not the valuable executives were retained.

Pre-Acquisition Performance: For our measure of pre-acquisition performance, we asked respondents to evaluate performance with regard to other firms in the target's industry. The items included financial performance as well as success factors relative to other firms in the industry.

Control Variables: Several key variables have been identified in the literature as potentially affecting the performance of a target firm after acquisition. Our review of the literature suggested that size, type of purchase, and ownership structure of the target firm were likely to explain the most variance in post acquisition performance. As such, we included each one in our analyses.

Size: Size differences between acquiring and acquired firm may influence acquisition performance. Increases in organizational size add complexity with attendant increases in structural elaboration and formalized systems for planning, control, and resource allocation. As a result, increases in organizational size can create progressively stronger resistance to fundamental change. Some researchers suggest that the smaller an acquired firm is relative to an acquiring firm, the greater an acquired executive's propensity to depart. Consistent with previous work in the acquisition literature, we calculated size by dividing the sales of the acquired firm before acquisition by the sales of the acquiring firm (Hambrick and Canella, 1993).

Type of Purchase: Our second control variable was the method by which the firm was purchased. From the acquirer's perspective, they can use their cash holdings, increase their debt by borrowing, sell more equity, or a combination of these with managerial ramifications for each option. However, as our focus is on the target firm's TMT, their retention and value to post-acquisition performance, we are concerned with what the target firm receives and in what form. For example, a cash purchase may unduly enrich the target firm TMT (assuming they are stock holders) who then may wish to exit the situation while a stock purchase may encourage the target TMT to continue their association. As these were nominal measures all were incorporated into the regression as dummy variables.

Ownership of Target Firm: We also controlled for the ownership structure of the target (i.e., privately owned, publicly owned with dispersed stockholders, or publicly owned with few majority stockholders). Privately owned firms will also typically be managed by an owner who is also a member of the TMT. Purchasing a privately owned firm may or may not suggest that the owner is either retiring or going to pursue other interests. Consistent with the RBV, the owner may only be seeking resources from the acquiring firm with which to continue and be more successful. A publicly owned firm with diverse investors will be managed by a TMT of experts. These also were nominal measures and were included in the regression as dummy variables.

Response Bias and Subjectivity: Given the necessity to use a survey approach with

perceptual data for this study, it is essential that we assess issues of response bias and subjectivity in the data. Managers that are familiar with mergers and acquisitions are typically TMT members who may not readily respond to surveys unless complete confidentiality is guaranteed. As such we could not compare respondents to non-respondents to see if bias existed.

Given the number of responses that that we received, we were able to use extrapolation methods to examine non-response bias. Extrapolation methods are based on the assumption that subjects who respond less readily (late responders), are more like non-respondents rather than early responders. The most common type of extrapolation is carried over successive waves of a questionnaire. We used wave analysis employing MANOVA to check for non-response bias by examining selected scale items from each construct. Each of the major survey waves was counted as a separate data collection, totaling three waves. We performed a wave analysis, in the form of MANOVA, and found no significant differences between each wave. Because prior research in the survey research suggests that late responders are more similar to non-responders than early responders, this result increases our confidence that any results we discover do not stem from non-response bias.

To limit the potential for response bias within the survey, we switched anchors on items throughout the instrument. Specifically about 60% of the items indicated in the stem would be phrased "strongly agree," so as to indicate agreement with a positive statement. In approximately 40% remaining items, "strongly agree" would indicate agreement with a negative statement. By switching items in an unbalanced way, respondents are much less likely to fall into a response pattern, as reading each item carefully is ideal before responding.

Key informant survey methodology is championed in having individuals most knowledgeable about the phenomenon of interest respond to the survey. The approach also has some potential drawbacks, that of informant bias and random error. Since our sample used key informants that occupy roles that make them knowledgeable about the issues being researched plus were both able and willing to communicate with the researcher, we suggest that key informant bias is not a major consideration. Retrospective reports in regard to perceptions have been researched (Huber & Power, 1985) utilizing executive's retrospective accounts to identify firm strategy (Boeker, 1989), planning processes (Eisenhardt & Bourgeois, 1988) and strategic and organizational change (Smith & Grimm, 1987). Using sole informants at high levels such as CEOs may actually increase the validity of, or one's confidence in results due to the comprehensive knowledge such informants possess (Sharfman, 1998). Additional research concludes that retrospective reports are an effective technique for management research.

Analysis

We began our analysis with an assessment of the multivariate and univariate normality of the data as well as its skewness, kurtosis, and outliers which we performed using Q-Q (P-P) plots and standard tests for each indicator. Review of the skewness and kurtosis statistics suggest that no transformations were required as all

the skewness and kurtosis numbers fall below 1.96, which corresponds to a .05 error level (Hair, Anderson, Tatham & Black, 1998). In addition, one can also use the skewness and kurtosis values as statistical tests to assess normality. For example, a calculated value exceeding ± 2.58 indicates we can reject the assumption about the normality of the distribution at the .01 probability level. Another commonly used critical value is ± 1.96 , which corresponds to a .05 error level (Hair et al., 1998). As all our values are less than 1.96 we can conclude that no variations of multivariate or univariate normality are present.

We utilized Harman's one-factor test to assess the degree of common method variance due to the fact that all data came from the same survey. The result of this procedure suggests that a single factor did not emerge, nor did one general factor account for the majority of variance indicating no effect of common method variance.

For construct validity, we performed exploratory factor analysis to see if a unidimensional solution came out of the exploratory analysis. Our sample size was not sufficiently large for us to have confidence in a confirmatory factor analysis. Utilizing SPSS, we took the items for each of the constructs and ran factor analysis. For each of our independent and dependent variables we found that each construct's items were all significantly correlated ($p < .001$) in accordance with the Bartlett test of sphericity. The Kaiser-Meyer-Olkin measure of sampling adequacy (MSA) suggested high intercorrelation among the items for each of the constructs. A review of the correlation matrix suggests that the correlations among the independent variables are low enough to indicate divergent validity as well.

Results

Tables 1a and 1b present the means, standard deviations and correlations for our variables. Tables 2a- 4b presents the results of the tests of hypotheses:

Table 1a: *Descriptive Statistics*

	Mean	Std. Deviation	N
Post_Acquisition Performance	4.66013	1.42500	102
RET-TOT	4.4036	1.96199	102
Pre_Acquisition_Performance	4.740	1.5423	102
Size	.3081	.91733	102
Ownership_of_firm	1.99	.724	102
Type_of_Purchase	2.33	1.437	102

Table 1b: Correlations

		Post_ Acquisition_ Performance	RET-TOT	Pre_ Acquisition_ Performance	Size	Ownership of_firm	Type of Purchase
Post_Acquisition_ Performance	Pearson Correlation	1	.403**	.096	-.165	-.163	.086
	Sig (2-tailed)		.000	.336	.096	.101	.390
	N	102	102	102	102	102	102
RET-TOT	Pearson Correlation	.403**	1	.464	.070	-.030	-.036
	Sig (2-tailed)	.000		.000	.483	.763	.716
	N	102	102	102	102	102	102
Pre_Acquisition_ Performance	Pearson Correlation	.096	.464**	1	-.100	.033	.089
	Sig (2-tailed)	.336	.000		.318	.741	.376
	N	102	102	102	102	102	102
Size	Pearson Correlation	-.165	.070	-.100	1	.038	-.023
	Sig (2-tailed)	.096	.483	.318		.708	.822
	N	102	102	102	102	102	102
Ownership_of_Firm	Pearson Correlation	-.163	-.030	.033	.038	1	.060
	Sig (2-tailed)	.101	.763	.741	.708		.548
	N	102	102	102	102	102	102
Type_of_Purchase	Pearson Correlation	-.086	-.036	.089	-.023	.060	1
	Sig (2-tailed)	.390	.716	.376	.822	.548	
	N	102	102	102	102	102	102

** Correlation is significant at the 0.01 level (2-tailed).

H1: Pre-Acquisition Performance and TMT Retention

Stage	Variable	Equity Beta Standardized Coefficients	
		Beta	t Value and Significance Level
1	(Constant)		7.151 (**)
	Size	.151	.701
	Type of Purchase	-.045	-.327
	Ownership of Target Firm	-.084	-.307
	Initial R-Squared	R-Squared	F Value and Significance Level
	.007	.234	
2	(Constant)		2.482 (*)
	Size	.254	1.329
	Type of Purchase	-.101	-.828
	Ownership of Target Firm	-.125	-.521
	Pre-Acquisition Performance	.615	5.403 (**)
Test of the Change in R-Squared	R-Squared Change	F Value and Significance Level of the R-Squared Change	
	.230	7.524 (**)	
Total R-Squared		.237	

* = p<.05 ** = p<.001

H2: TMT Retention to Post-Acquisition Performance

Stage	Variable	Equity Beta Standardized Coefficients	
		Beta	t Value and Significance Level
1	(Constant)		12.054 (**)
	Size	-.251	-1.647
	Type of Purchase	-.080	-.819
	Ownership of Target Firm	-.299	1.549
	Initial R-Squared	R-Squared	F Value and Significance Level
		.058	1.477
2	(Constant)		8.042 (**)
	Size	-.296	-2.124 (*)
	Type of Purchase	-.101	-.828
	Ownership of Target Firm	-.275	-1.556
	Pre-Acquisition Performance	.298	4.567 (**)
Test of the Change in R-Squared		R-Squared Change	F Value and Significance Level of the R-Squared Change
		.167	7.044 (**)
Total R-Squared		.225	

* = p<.05 ** = p<.001

TMT Pre-Acquisition Performance to Post-Acquisition Performance

Stage	Variable	Equity Beta Standardized Coefficients	
		Beta	t Value and Significance Level
1	(Constant)		12.054 (**)
	Size	-.251	-1.647
	Type of Purchase	-.080	-.819
	Ownership of Target Firm	-.299	1.549
	Initial R-Squared	R-Squared	F Value and Significance Level
		.058	1.477
2	(Constant)		8.381 (**)
	Size	-.237	-1.543
	Type of Purchase	-.088	-.896
	Ownership of Target Firm	-.305	-1.578
	Pre-Acquisition Performance	.087	.949
Test of the Change in R-Squared		R-Squared Change	F Value and Significance Level of the R-Squared Change
		.009	1.745
Total R-Squared		.067	

* = p<.05 ** = p<.001

To examine all the hypotheses, we used hierarchical linear regression. This is the most appropriate approach to test the hypotheses for two key reasons. First, as the

literature is clear on the potential effects that the control variables could have on post acquisition performance, it is essential that the analyses partial any of these effects out before a test of the hypotheses can be performed. Secondly, this method allows us to determine whether our theoretical variables make a marginal (material) difference in the overall level of explained variance beyond that of the control variables which provides a stronger test of the hypotheses. We ran separate regressions for each theoretical variable because their inter-relationships caused co-linearity when all the theoretical variables were included in a single path model.

For H_1 (see Tables 2a and 2b), which predicted a relationship between TMT Retention and Pre-acquisition Performance, the addition of the control variables (e.g., size, type of purchase and ownership of the target firm) was not significant. The addition of the pre-acquisition performance variable to the control variables proved to be significant. The marginal addition in R-squared was .230. The effect of the Pre-acquisition Performance variable was positive, significant and in the predicted direction. Therefore H_1 is supported.

For H_2 (see Tables 3a and 3b), which tested the effect of retention of the TMT of the acquired organization and the target's post acquisition performance, the addition of the set of control variables was not significant. The addition of TMT Retention to the control variables proved to be significant with a marginal addition in R-squared of .167. The effect of the pre-acquisition performance variable is positive, significant and in the predicted direction. Therefore, H_2 is supported.

We did not find any correlation between pre-acquisition performance and post-acquisition performance. (See Tables 4a – 4c)

Discussion and Implications

Accounting, finance and management academicians and practitioners are focusing on intangible assets and intangible liabilities, as these are becoming the most valuable competency to a firm in today's global market. This focus is heightened in regard to acquisitions where goodwill is recorded, assets are revalued, and potential intangible liabilities lie hidden. Although much of the value may be recorded as non-human resource assets (e.g., copyrights, trademarks, networks of relationships), the key contributors to the development, coordination, and management of these intangible assets is the TMT.

Our results suggesting that the TMT of a previously successful firm will be retained, facilitates the notion that the acquiring firm will pursue these individuals due to their intangible value. Past research suggests that top managers will leave the firm after acquisition, but managers in today's marketplace understand the need to retain target firm's TMT and will either develop relationships in attempts to retain these individuals, and/or place incentives to assuage their departure.

The fact that firms retaining the TMT of a good performing target firm had better post-acquisition performance than those firms that lost the TMT, suggests (in line with upper echelon and resource based theories) that these individuals are an intangible asset. Thus, identification and recording the transaction as an economic variable is the role of accounting. Assignment of value will require agreement amongst global

regulatory bodies for uniformity.

The accounting profession in their role of translating economic value/transactions into numbers will find their discipline continuously evolving. As the intangible value of firms in the global marketplace become more prominent, they will have to develop consistent and accurate methods to value firms. In particular, with regard to acquisitions, the intangible value of the TMT of a target firm needs to be taken into account, especially if the loss of these individuals affects future performance. Goodwill recorded and asset revaluation will need to be reconsidered in the focus of identifying the true nature of a premium paid for the intangible assets of acquisitions.

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Top Management Team Social Processes And Changes In Organizational Strategy

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One stream of research on top management teams examines how the demographic characteristics of top managers influence changes in organizational strategy. The study reported in this paper adds to this research by examining how the socio-political processes of trust and conflict within a top management team, in addition to team demographic characteristics, influence changes in organizational strategy. Results from a study of one hundred and eleven top bank management teams indicate that the depth of cognitive resources present in a top management team negatively influences changes in strategy, while trust among members of the team positively influences changes in strategy.

Why do some organizations make strategic changes faster than others in response to changes in their external environment? This question is important because organizations that adapt faster to changing conditions in their external environment have a better chance of survival than slow adapters. One stream of research on this topic has examined the role of top managers in changing organizational strategy (Boeker, 1997; Wally & Becerra, 2001; Wiersema & Bantel, 1992). A central idea supporting this research is that top managers make the key decisions for their firms. Hence, examining top managers' cognitions can help us understand organizational propensities for change (Hambrick & Mason, 1984). Studies in this stream generally use top manager demographics as proxies for measures of managerial cognition (Boeker, 1997; Wally & Becerra, 2001; Wiersema & Bantel, 1992).

Results from empirical studies adopting this approach, however, indicate contradictory influences of team demography on strategy change (e.g., Wiersema & Bantel, 1992; Wally & Becerra, 2001). One reason for this may be that we can make relatively accurate predictions about the influence of team demographics on strategy change only after accounting for interactions among team members (Lawrence, 1997). In this study, this issue will be addressed by examining whether the three socio-political processes of task and relationship conflict and trust, in conjunction with team demographics, can account for changes in strategy. Second, I will focus on conflict and trust since previous research finds that not only do these issues influence top management team decision quality and performance, but also they may have a critical influence on organizational change efforts (Chen, Liu, & Tjosvold, 2005; Goodstein & Burke, 1991). Finally, this will be examined in a field study of one hundred and eleven community bank top management teams over a two-year period.

Studies on top management teams have examined the influence of top management team demographics on changes in firm strategy (Grimm & Smith, 1991; Wally & Becerra, 2001; Wiersema & Bantel, 1992). By focusing on top management team socio-political processes in addition to team demographics, this study provides a more detailed understanding of the role of the top team in initiating strategic change in organizations. A detailed understanding of this role is critical since it may help us better understand why top management teams may differ in their decisions about the need for changes in strategy, and the effect of these decisions on firm survival and profitability.

Theory and Hypotheses

The fundamental idea underlying many studies on strategic change and top management teams is that top management teams with more diverse and higher levels of cognitive resources should be better at changing their organizations' strategies than teams with less diverse and lower levels of cognitive resources (Hambrick & Mason, 1984). A manager's cognitive base consists of his or her knowledge or assumptions about future events, knowledge of alternatives, and knowledge of consequences attached to alternatives (Hambrick & Mason, 1984). Cognitive resources are defined as type and variety of cognitive bases represented by top team members in the strategic decision-making process (Wiersema & Bantel, 1992). Collectively, these bases provide the team with an assorted stock of knowledge and capabilities that the team can draw upon when making complex decisions (Hoffman & Maier, 1961). Since managers' cognitive bases are formed as a result of their experiences both within and outside of their organizations, top management team demographics should capture the diversity and depth of cognitive resources available to the team (Hambrick & Mason, 1984).

The results from many studies on top management teams, however, indicate a rather more complex reality about the relationship between top management team demographics and strategic change (Boeker, 1997; Grimm & Smith, 1991; Wally & Becerra, 2001; Wiersema & Bantel, 1992). Wiersema and Bantel (1992), for instance, find that diversity, with respect to educational specialization, is related to strategic

change, but not diversity with respect to age, organizational tenure, or team tenure. Wally and Becerra (2001), in contrast, find that while the organizational tenure of top management team members influences strategic change, their educational level does not.

One reason for these conflicting findings may be that different studies use different definitions and measures of demographic composition and strategic change. Thus, researchers claim that these results do not really contradict the fundamental reasoning underlying these studies (Wally & Becerra, 2001). Another reason may lie in the fact that diversity has very different effects on the functioning of the top management team, depending on the type of diversity and on the interactions that occur among the team members. On the one hand, diversity provides a top management team with a range of different viewpoints. Exposure to these different viewpoints causes a cohesive team to be more receptive to the need for change (Hambrick & Mason, 1984). On the other hand, diversity reduces team cohesion and increased miscommunications, thereby leading to slower decision making, and correspondingly, a slower pace of strategic change (Hambrick & Mason, 1984). At the same time, however, while low levels of diversity (or greater homogeneity) lead to faster decision making, it may also lead to insular thinking, and therefore, to strategic persistence in conditions when strategic change is appropriate (Finkelstein & Hambrick, 1990; Hambrick & Mason, 1984).

In this study, different effects of diversity are captured by distinguishing between the dispersion and depth (or average amount) of team cognitive resources. Teams will have diverse cognitive resources if members of the team come from different functional backgrounds, or have worked in their organization for different lengths of time, or belong to different age groups. Differences on these dimensions indicate unique work experiences and socialization processes for individual members, leading to a diversity of cognitive resources available to the team. Teams with members having higher industry, organizational, and team tenures, on average, should have deeper cognitive resources than teams whose members have shorter average industry, organizational, and team tenures (Smith et al, 1994).

In maintaining the fundamental idea behind top management team and strategic change research, it is proposed that teams with a diverse range of cognitive resources will be more likely to initiate strategic change in their organizations. As mentioned earlier, a team with diverse cognitive resources can look at issues from many different perspectives. This, in turn, may direct their attention toward initiating strategic change in their organizations (Cho & Hambrick, 2006).

It is also proposed that teams with a lower depth of cognitive resources will be more likely to initiate strategic change than teams with a greater depth of cognitive resources. Teams with a greater depth of cognitive resources may have smoother interactions as a result of their members' long term and organizational tenures than teams with a lower depth of cognitive resources. Therefore the former teams may be better at implementing strategic changes than the latter teams. At the same time, however, the very smoothness of the interactions in the former teams may also make them more prone to the complacency or insular thinking that leads to strategic inertia, than the latter, leading to a lesser likelihood of initiating strategic change (Finkelstein & Hambrick, 1990; Wiersema & Bantel, 1992). Of course, one could make the counter argument that teams with a lower depth of cognitive resources, such as,

inexperienced teams (teams whose members who are relatively new to the team and / or to the organization), may be more likely to maintain the status quo precisely because of their inexperience and lack of knowledge. Existing empirical evidence, however, supports the former notion. Top management teams with a greater depth of cognitive resources are more likely to retain current strategies, because of a lower tolerance for risk, or because of a greater commitment to the current strategy, than top management teams with a lower depth of cognitive resources (Wally & Becerra, 2001; Wiersema & Bantel, 1992). It is therefore hypothesized that:

H1: The diversity of cognitive resources in an organization's top management teams will positively influence the extent to which that organization changes its strategy.

H2: The depth of cognitive resources in an organization's top management team will negatively influence the extent to which that organization changes its strategy.

The above diversity related arguments suggest that the interactions among the members of a top management team are important in determining the decisions regarding strategic change for the organization. In this study, the influence of three critical team level socio-political processes, namely, task conflict, relationship conflict, and trust within top management teams are examined (Amason & Schweiger, 1994; Mishra, 1996).

Task conflict constitutes disagreements among group members about the content of their decisions, and involves differences in viewpoints, ideas, and opinions. Relationship conflict, in contrast, is perceived as interpersonal incompatibility and typically includes tension, annoyance, and animosity among group members (Jehn, 1995).

The two types of conflict have different consequences for groups. Task conflict is beneficial for groups working on non-routine tasks that involve a high degree of uncertainty, and require a variety of information for problem solving. Task conflict improves the ability of top management teams to formulate and implement a strategic change for their organizations by allowing team members to discuss diverse perspectives, increasing the members' understanding of the issues being discussed (Amason & Schweiger, 1994). Task conflict may also reduce groupthink (Janis, 1972) by allowing consideration of alternatives, and helping people to identify and develop new organizational strategies.

It is important to remember, however, that task conflict need not always be beneficial for all groups. The nature and type of task plays an important role in determining the effects of task conflict on group outcomes. Groups working on routine tasks, for example, may not benefit much from task conflict because task conflict may interfere with efficient information processing. For these groups, task conflict may be interruptive and counterproductive, since members can usually rely on simple operating procedures to complete their tasks (Gladstein, 1984). Although high levels of task conflict have proven to have positive effects, extremely high levels of task conflict can cause inertia, in groups working on non-routine tasks. This is because groups are unable to move into the next stage of productive work efficiently (Gersick, 1989; Jehn, 1995). Given the evidence documenting the importance of task conflict

for groups working on non-routine tasks, however, and given that this study represents a preliminary attempt to identify the types of interactions that may influence top management teams decisions to change their firms' strategies, it is hypothesized that:

H3: Task conflict among the members of an organization's top management team will positively influence the extent to which that organization changes its strategy.

When group members experience relationship conflict, they work less effectively and produce sub-optimal products leading to poor performance (Jehn, 1995). Staw, Sandelands, and Dutton (1981) suggest that the threat associated with relationship conflict inhibits peoples' ability to process complex information. For a top management team considering a change in their organization's strategy, relationship conflict should negatively influence the extent to which they can successfully formulate and implement a change in their organization's strategy. It is hypothesized that:

H4: Relationship conflict among the members of an organization's top management team will negatively influence the extent to which that organization changes its strategy.

The challenge facing a top management team considering a change in strategy is to encourage at least some amount of task conflict without simultaneously triggering relationship conflict among team members. Intra-group trust allows group-wide expectations of truthfulness, integrity and a sense of shared respect for group members' to amplify perceptions of competence among one another. When team members trust each other, they may be more likely to accept stated disagreements at face value and less likely to attribute hidden agendas to task conflict behaviors (Mishra, 1996). As a result, the team as a whole may successfully plan and implement a change in strategy by benefiting from the positive effects of task conflict while avoiding the negative effects of relationship conflict. It is hypothesized that:

H5: Trust among the members of an organization's top management team will positively influence the extent to which that organization changes its strategy.

Note that previous research finds that task conflict, relationship conflict, and trust are interrelated. Studies have found that teams that experience task conflict also typically experience relationship conflict (Amason, 1996; Jehn, 1995). Another study finds that trust moderates the relationship between task conflict and relationship conflict (Simons & Peterson, 2000). It is possible, therefore, that interactions between trust, task conflict, and relationship conflict may influence changes in organizational strategy by top management teams. Given the small amount of evidence regarding the exact effects of these interactions on organizational outcomes, however, it is explored (but not formally hypothesized) whether interactions between trust and task conflict, and trust and relationship conflict influence changes in organizational strategy by top management teams.

Methodology

Sample

The population from which the sample in this study was drawn consists of 487 community banks present in an upper mid-western state in the United States at the time of this study (2000-2001). Community banks are defined as commercial banks that serve a local community and have less than \$1 billion in assets (Critchfield, et al., 2005). The list of these banks was obtained from the Bankers Association of that state. There were two advantages to using this sample. First, selecting banks in a single area standardized on industry and geographic location. This eliminated some variance in the types of strategic issues handled by the top management teams, and in the forces in the external environment facing these teams. It is reasonable to expect that all top management teams would have to make similar strategic decisions about the loan mix of their banks based on some common economic indicators. Second, the size of the population was large enough that it had the potential to generate a reasonable sample size, even assuming that the survey would meet with low response rates.

The timing of this study was also particularly appropriate to studying issues of strategic change. FDIC reports on the outlook for the banking industry indicate that the year 2000 was the last year of a long period of economic expansion. Most banks reported record profits, healthy capital cushions, and good asset quality. By the end of the fourth quarter of 2000, however, imbalances were beginning to appear in the economy, and just a year later, by the fourth quarter of 2001, banks were responding to a mild economic recession. The specific challenges that banks faced included increasing competition, pressures on net interest margins, and a change in the yield curve environment from inverted to normal. In addition, the banks in this study faced the additional challenge that, as a result of their location, they were exposed to the risk resulting from poor conditions in the agricultural industry at the end of 2000. In response, many banks tried to attract higher-yielding assets by changing their portfolios, and increasing loan-to-asset ratios to historically high levels (FDIC National Edition Regional Outlook, Fourth Quarter 2000, & Fourth Quarter 2001; FDIC Outlook, 2006, from www.fdic.gov).

Data Collection

This study used two major sources of data. Individual responses to a questionnaire in the first quarter of 2000 provided data on top management demographics, task conflict, relationship conflict, and trust. The Federal Deposit Insurance Corporation (FDIC) provided data on bank strategy from 2000 to 2005 (www.fdic.gov).

The CEOs of the 487 banks belonging to the Bankers Association were contacted over the phone and asked for their top management teams' participation in the study. If the CEO of a bank agreed to participate in the study, he or she was asked to provide a list of members in the bank's top management team. After cross-checking against the list provided in the bank directory of the Bankers Association, additions or deletions of names were re-confirmed with the CEO or the president. Finally, the CEO or the president was requested to forward the survey to other members of his or her team. Where the president or CEO declined to provide the names of the members of the top

management team, they were asked to specify the total number of questionnaires they would like sent to them for completion by team members. In all, the CEOs of 148 banks agreed to participate, and CEO's of 339 banks either declined or could not be contacted after at least two attempts.

The study yielded usable responses from 468 individuals belonging to 126 top management teams. Of these teams, 111 had at least two or more of their team members respond to the survey (representing a minimum response rate of 40% per team; of the 111 teams, 21 teams provided 2 responses per team, 30 teams provided 3 responses per team, and the remaining 60 teams provided 4 or more responses per team). The analysis used data only from these 111 teams with at least two respondents. The average team size was 5.05 (s.d. = 2.2). On average, 86.2% of team members per team responded to the questionnaire. A large sample means test indicated that the 111 banks in the data set did not differ significantly in either size or profitability from banks not included in the data set.

Measures

Dependent variable: Change in organizational strategy

Organizational strategy was measured as the loan mix of a bank. Loan mix is a critical indicator of the bank's strategic scope, and more specifically, of the extent to which the bank is involved in different markets such as agriculture, real estate, etc. (Mehra, 1996). Loan mix was measured by five variables namely, commercial loans, real estate loans, individual loans, agricultural loans, and other loans, each measured as a percent of total assets. Following previous research on organizational change (Boeker, 1997; Wiersema & Bantel, 1992), these five measures of loan mix were condensed into one measure using Jacquemin and Berry's (1979) entropy measure of diversification. Change in strategy was measured as the absolute percentage change in the banks' loan mix over one year (between the years 2000 and 2001). In addition, since one year may not be enough time to determine whether or not a strategic change has occurred, also measured was change in loan mix over a period of 2, 3, and 5 years.

Change in loan mix is an appropriate indicator of change in strategy since this study examines community banks. The loan portfolios of community banks are linked to the local economies in which they are located and are stable indicators of bank strategy, with even a 4% change in loan mix representing a major change in strategy for these banks. Data on community banks, for example, indicate that the loan to asset ratio for community banks increased from 57% in 1994 to more than 63% in 2003. This increase in loan-to-asset ratio reflected more lending from commercial community banks, and other types of real estate lending. From 1994 to 2003, commercial community banks increased their commercial real estate lending (and their risk taking) from 9.2 to 15.2% and construction lending from 2.5 to 5.2%, while farm operating loans declined from 2.5 to 2.3% and multi family loans remained constant at 1.9%. While these changes in loan mix undoubtedly reflect the lending opportunities associated with the economic expansion of the 1990s, they also reflect community banks' need to change strategies in order to continue to generate earnings and maintain profitability in the face of competition from large and midsize banks (Critchfield, et al., 2005).

Dependent variables

Top management team diversity: Dispersion and depth of team cognitive resources

Multiple measures, many of which have been used in previous research on change (Boeker, 1997; Wally & Becerra, 2001; Wiersema & Bantel, 1992), were used to capture the dispersion and depth of cognitive resources. The dispersion of cognitive resources was measured as dispersion in functional background, organizational tenure, and age of team members. Functional background was measured as a categorical variable (primary functional responsibilities coded based on self-report by respondents (Chattopadhyay, Glick, Miller, & Huber, 1999)). Dispersion in functional background was calculated using Teachman's index (1980). Dispersion in organizational experience and age were measured by the coefficients of variation (standard deviation divided by mean) for the two variables (Allison, 1978). The depth of cognitive resources available to the team was measured by average industry experience, organizational tenure, and team tenure.

Two team composite indices were created using principal components factor analysis (with varimax rotation) on the six composition variables. These two indices explained 58% of the variance of the original six measures. The first index loaded on the three measures of the depth of cognitive resources (average industry experience, organizational tenure, and team tenure). The second index loaded on the measures of the diversity of cognitive resources (dispersion in functional background, organizational experience, and age). The factor scores, or estimated values of the common factors, were calculated for each bank in the sample using the regression method, and in subsequent analysis.

Task conflict

Task conflict was measured with a four-item scale from Jehn (1995) (see Table 2). This scale had a coefficient alpha of .82, indicating sufficient reliability.

Relationship conflict

Relationship conflict was measured with a four-item scale from Jehn (1995) (see Table 2). This scale had a coefficient alpha of .94, indicating sufficient reliability.

Trust

Trust was measured with a seven-item scale from Robinson (1996) (see Table 2). This scale had a coefficient alpha of .85, indicating sufficient reliability.

In order to mitigate the issue of social desirability in survey responses (Huber and Power, 1985), the identity of the respondents was kept partially anonymous. In addition, respondents signed confidentiality agreements before completing the survey. While a survey like this one could not overcome cognitive limitations of respondents as well as a lab study, this shortcoming was mitigated by limiting respondents to the banking industry. Finally, the average tenure of team members within the team was about 8 years. Such long tenured teams should have members who can respond to the questions about task and relationship conflict and trust within the team.

Controls

The study controlled for the past performance of the organization and organizational size (Boeker, 1997; Boss & Golembiewski, 1995; Tushman & Romanelli, 1985), leadership style, and the banks' ratio of time deposits to total deposits, since this measure captures a critical dimension of the strategic scope of a bank, namely, the time horizon of a banks' funding base (Mehra, 1996).

Past performance and organizational size

Past performance as the coefficient of variation of return on assets (ROA) for the three years preceding the study, weighted by the average asset size of the banks (to account for variations in performance due to differences in bank size) was used. The coefficient of variation instead of the average past performance measure used in prior studies (e.g., Wiersema and Bantel, 1992) to account for dispersions of past performance around the mean was used. This is important because two banks with the same average past performance may differ in their decisions to change strategies depending on the amount of variation or unpredictable change they observe in their performance (see, for example, Snyder & Glueck, 1982). Data for 3 years preceding the study was used since banks may not ordinarily change strategies immediately in response to poor performance in any one year (Wiersema & Bantel, 1992). In order to increase the comparability of the results of this study with previous studies, a regression analysis with separate measures of average past performance and organizational size was run.

Leadership style

Research on organizational change indicates that the extent to which a CEO encourages participation influences the success of any change effort in an organization (Boss & Golembiewski, 1995). The study controlled the extent to which the leader used a participative leadership style (Bass, 1990) with the following scale from Module 5 (Supervision) of the Michigan Organizational Assessment Questionnaire: a) My team leader encourages team members to participate in important decisions; b) My team leader encourages people to speak up even when they disagree with a decision; c) My team leader makes most decisions without asking team members for their opinions (reverse scored); and d) My team leader makes important decisions without involving team members (reverse scored). The coefficient alpha of this scale was .84, indicating sufficient reliability.

Results

Table 1 presents the mean, standard deviations, and correlations for the variables used in this study.

Table 1 indicates that, as expected, task conflict and relationship conflict are significantly correlated with each other ($r = .719, p < .01$), and that trust is negatively correlated with both ($r = -.564, p < .01$ for task conflict, and $r = -.676, p < .01$ for relationship conflict). This is consistent with the reasoning behind Hypothesis 5. By reducing conflict, trust may allow the team to accept and discuss different viewpoints

at face value. The dependent variable, change in strategy after 1 year, negatively correlates with the index measuring the depth of cognitive resources available to the team ($r = -.213$, $p < .05$).

Table 1: Correlations, Means, and Standard Deviations

	Mean (Standard deviation)	1	2	3	4	5	6	7	8
1. Depth of cognitive resources	3.17x10 ⁻¹⁶ (1.000)	1.000							
2. Dispersion of cognitive resources	-7.43x10 ⁻¹⁶ (1.000)	.000	1.000						
3. Task conflict	12.329 (1.985)	-.236*	.006	1.000					
4. Relationship conflict	10.742 (3.172)	-.061	-.048	.719**	1.000				
5. Trust	41.996 (3.707)	.097	-.208*	-.564**	-.676**	1.000			
6. Leadership	21.628 (2.912)	-.143	-.037	-.320**	-.411**	-.520**	1.000		
7. Weighted past performance	1.513x10 ⁻¹ (2.666x10 ⁻³)	-.264**	.155	.188*	.101	-.088	.199*	1.000	
8. Time deposits / Total deposits	.505 (.108)	.117	.101	.028	.022	-.123	-.177	-.009	1.000
9. Change in strategy (1 year)	3.245 (3.123)	-.213*	-.057	.152	.103	.040	-.094	-.132	-.277*

* $p < .05$; ** $p < .01$; $N = 11$

Since task conflict, relationship conflict, and trust were correlated, an exploratory factor analysis (extraction of factors with maximum likelihood and oblimin rotation) was carried out to check if the respondents to the survey could distinguish among the three constructs. Table 2 presents these results.

The analysis extracted three distinct factors with Eigen values greater than 1, corresponding to task conflict, relationship conflict, and trust. Then individual responses for task and relationship conflict, trust, and leadership to the team level were aggregated. These aggregations were justified by the value of the eta-squared statistic (.439 for task conflict, .527 for relationship conflict, .397 for trust, and .376 for leadership). These results exceed Georgopoulos' (1986) minimum criterion of .20 for aggregating individual responses to the team level.

Hypotheses 1 through 5 posit different types of influences (positive and negative) of the dispersion and depth of top management team cognitive resources, task conflict, relationship conflict, and trust on the extent to which an organization changes its strategy. These hypotheses were tested using multiple regression analysis. Task conflict, relationship conflict, trust, and leadership were centered before carrying out the analysis in order to reduce multicollinearity (Neter, Kutner, Nachtsheim, & Wasserman, 1996). Table 3 presents the results of the regression analysis for changes in strategy over 1, 2, 3, and 5 years.

Table 2: Results of the Exploratory Factor Analysis: Pattern Matrix

	Relationship conflict	Trust	Task conflict
a. I believe my team members have high integrity.	5.183E-02	.771	4.636E-02
b. I can expect my team members to treat me in a consistent and predictable fashion.	-5.443E-02	.681	2.481E-02
c. My team members are not always honest and truthful ^R .	-6.744E-02	.531	-8.939E-02
d. In general, I believe my team members' motives and intentions are good.	8.862E-02	.714	9.952E-03
e. I don't think my team members treat me fairly ^R .	-5.458E-02	.686	-2.333E-03
f. My team members are open and upfront with me.	1.663E-02	.729	-1.996E-02
g. I am not sure I fully trust my team members ^R .	-.123	.672	-3.990E-02
a. How often do people in your team disagree about opinions regarding the work being done?	3.790E-02	2.149E-02	.676
b. How frequently are there disagreements about ideas in your team?	-7.555E-02	6.403E-02	.912
c. How much do your team members disagree about the content of your team's decisions?	1.618E-02	-7.827E-02	.692
d. To what extent are there differences of professional opinion in your team?	7.850E-02	-7.744E-02	.574
e. How much personal friction is there among members in your team?	.824	-5.890E-02	1.784E-02
f. How much are personality clashes evident in your team?	.891	3.976E-02	2.888E-03
g. How much tension is there among members in your team?	.919	-3.318E-02	-1.392E-02
h. How much emotional conflict is there among members in your team?	.883	1.606E-02	3.063E-02

Extraction method: Maximum likelihood, Rotation method: Oblimin with Kaiser Normalization.

$X^2 = 171.072$, $df = 63$, $p=0.000$

Cumulative percentage of explained variance = 66.591%

^RReverse scored

For changes in strategy over 1 year, the model explained 22% of the variance in changes in strategy ($F = 3.546$). Results of this model are discussed below (column 1 of Table 3).

Hypothesis 1, stating that the diversity of a top management team's cognitive

resources should positively influence the extent to which their organization changes its strategy, is not supported ($b = .18, p > .05$). Hypothesis 2, stating that the depth of a top management team's cognitive resources should negatively influence the extent to which their organization changes its strategy is supported ($b = -.80, p < .01$). This result is consistent with that of previous studies on organizational change indicating that teams whose members have long organizational and industry tenures are less likely to initiate strategic change, possibly because of a reluctance to challenge the status quo (Grimm & Smith, 1991; Wiersema and Bantel, 1992).

Table 3: Regression Results
Dependent variable: Change in organizational strategy

	1 2000-2001	2 2000-2002	3 2000-2003	4 2000-2005
INDEPENDENT VARIABLES				
Constant	7.633 (1.369)	13.615 (2.376)	20.499 (4.028)	24.130 (5.874)
Depth of cognitive resources	-.800** (.302) -.256	-.689 (.523) -.132	-.503 (.887) -.059	-.614 (1.299) -.052
Dispersion of cognitive resources	.180 (.298) .057	-.117 (.518) -.022	-.615 (.878) -.071	.236 (1.290) .020
Task conflict	.172 (.213) .110	-.079 (.373) -.030	-.294 (.633) -.068	.757 (.947) .124
Relationship conflict	.169 (.151) .168	.222 (.263) .132	.086 (.445) .031	.970 (.664) -.253
Trust	.236* (.117) .278	.271 (.203) .192	-.177 (.344) -.076	-.074 (.498) -.023
CONTROL VARIABLES				
Leadership	-.194 (.119) -.181	-.386† (.212) -.212	-.126 (.360) -.042	-.563 (.522) -.137
Past performance weighted by firm size	-253.620* (113.504) -.217	5.044 (197.358) .003	-260.322 (334.534) -.081	-212.643 (522.767) -.045
Time deposits / Total deposits	-7.904** (2.614) -.276	16.154** (4.539) -.337	-23.371 (7.694) -.298	-18.244 (11.153) -.169
R-square	.221	.165	.103	.064
N	109	108	108	102
F	3,546**	2,443*	1,422	.792

Regression parameter appears above the standard error (in parenthesis) and then the standardized coefficient. † $p < .10$, * $p < .05$, ** $p < .01$

Hypotheses 3 and 4 are not supported. The extent to which team members experience task or relationship conflict does not influence the extent to which their organizations change their strategies ($b = .17$, $p > .05$ for both task and relationship conflict). Instead, supporting Hypothesis 5, the amount of trust among the members of a team positively influences the extent to which their organization changes its strategy ($b = .24$, $p < .05$). The power of this test is approximately .80 at $\alpha = .01$, for an effect size (f^2) of .10 (Cohen, 1988). The power of the overall regression is approximately .61 at $\alpha = .01$, for an effect size (f^2) of .13 (Cohen, 1988).

In order to increase the comparability of these results with those of previous studies, the above regression was rerun with two separate measures for average past performance and organizational size (instead of a single control for the coefficient of variation of return on assets weighted by asset size). The results presented above did not change significantly ($b = -.693$, $p < .05$ for depth of cognitive resources, and $b = .255$, $p < .05$ for trust).

For changes in strategy over 2 years (2000-2002), neither top management team cognitive resources nor socio-political processes influenced the extent to which an organization changed its strategy (refer to the second column in Table 3). Instead, the extent to which the CEO used a participatory leadership style had a marginally significant effect on strategy change ($b = -.386$, $p < .10$). For changes in strategy over 3 years (2000-2003) and 5 years (2000-2005), neither cognitive resources nor socio-political processes influenced changes in strategy (see columns 3 and 4 of Table 3). In addition, the regression equations were not significant ($F = 1.422$ and $F = .792$, respectively). These results are discussed in the next section.

In addition to examining the direct effects of task conflict, relationship conflict, and trust, it was also explored whether the interactions between trust and task conflict, and trust and relationship conflict influence the extent to which an organization changes its strategy over one year. The results indicate that neither of the interaction terms was significant ($b = -.028$ for the trust x task conflict term, and $b = -.016$ for the trust x relationship conflict term, $p > .05$ for both), and that including these terms did not substantially change the results presented in Table 3.

Discussion

From a top management team perspective, this study explored the reasons why some organizations change their strategies faster than others in response to changes in their external environment than others. The results of this study indicate that teams whose members have, on average, fewer years of industry, organizational, and team tenure, and higher levels of trust change their organizations' strategies faster, in the short term, than teams whose members have more years of experience and lower levels of trust. These results are consistent with previous studies on change that find that firms are more likely to change their strategies if they have top management teams whose members have short organization and team tenures and less industry experience (Boeker, 1997; Wiersema & Bantel, 1992). In addition, by highlighting the importance of trust among the members of a top management team, the results of this study

provides some empirical evidence in support of assertions about the criticality of trust by earlier researchers (Goodstein & Burke, 1991). Trust among the members of a top management team may encourage participation in change, eliminate unnecessary risks or pressure, and lead to fewer dysfunctional interactions, leading to successful changes in strategy (Goodstein & Burke, 1991).

Taken together, the results indicate the intriguing possibility that trust among team members can help overcome the resistance to change generated by long tenure. A post hoc correlation analysis of average team tenure, leadership, conflict, and trust hints at how this might happen. Average team tenure correlates negatively with task conflict ($r = -.19, p < .05$), suggesting that longer tenured teams may resist change, perhaps as a result of some form of groupthink (Janis, 1972). Average team tenure, however, does not correlate significantly with trust ($r = .14, p > .10$). One explanation for this lack of correlation is that tenure may result in trust only for some kinds of teams (e.g., teams with low levels of conflict and high levels of participation and involvement). Alternatively, it may be that the measure of tenure used in this study (the average length of time for which members of the team have been part of the team) is not fine grained or sensitive enough to capture the effects of tenure on trust. What may matter, instead, is the length of time that the team as a whole has been together. Developing a measure of team tenure that captures this data, and at the same time is not too sensitive about missing data, may clarify this issue. The data suggest one other explanation for the lack of a significant correlation between tenure and trust. The correlation data reveal that participatory leadership style is positively correlated with trust ($r = .52, p < .01$). This suggests that by simply working together for a long time, by itself, is not sufficient to generate trust. Instead, the extent to which the leader asks for suggestions from the group, and treats everyone as equals, helps develop trust within the group. This, in turn, may allow the group to consider a change in their organizations' strategies.

Related to the above, the results of regression for changes in strategy over two years suggest another intriguing possibility, that participatory leadership, in and of itself, may not necessarily lead to a change in organizational strategy. Indeed, the results of this regression indicate that the extent to which a CEO uses a participatory leadership style has a significant but negative influence on the extent to which the organization changes its strategy over a two-year period. One explanation of this result is that while participatory leadership may help to elicit suggestions from team members, it may also lead to team members perceiving the CEO as providing inadequate leadership or direction, especially over a longer time period in an increasingly hostile environment. A perception of inadequate direction is a leading cause of the unsuccessful implementation of strategic decisions in small community banks (Kargar & Blumenthal, 1994).

This study finds a non-significant influence of dispersion of cognitive resources on changes in organizational strategy. Recent research provides one potential explanation for this result. Cronin and Weingart (2007) suggest that functional diversity in teams, while potentially beneficial, increases the likelihood that individual team members will perceive the team's task differently, leading to gaps between teammates' interpretations of what is needed for the team to be successful. In the context of this study, this suggests that while the dispersion of cognitive resources within a team may

direct the attention of the team toward the need for strategic change, it may also hinder the team from actually taking steps toward initiating change. An alternative explanation for the non-significant results relating to the dispersion of cognitive resources is that more fine-grained measures of functional background may be necessary to capture the effects of dispersion in cognitive resources. Other measures of cognitive dispersion, for example, dispersion in educational backgrounds, may also better capture the effects of dispersion in cognitive resources than the measures used in this study.

The non-significant influence of team demographics and socio-political processes on strategy change over a longer time period (3 years and 5 years) observed in this study is also noteworthy. These results suggest that while top management team demographics and processes have an effect on the extent of strategy change in the short term (one year period), over a longer period of time, the effect of previous changes in strategy on firm performance may matter more. In other words, top management team characteristics influence the decision to change strategy, and therefore, performance. The change in performance resulting from the change in strategy may influence the team's decision about whether any further changes in strategy are needed. This explanation is consistent with Boeker's (1997) finding that although managerial characteristics may themselves cause organizations to change strategy, poor performance increases their motivation to do so.

The results of this study need to be interpreted in the context of the community banking industry. Community banks are, by nature, small banks that are dwarfed by the giants of the banking industry. Though the number of community banks has declined as a result of changing industry conditions, these banks still account for 94% of all banks in the U.S. Many community banks have survived primarily because of their ability to handle soft information and provide personal customer service (Critchfield et al, 2005). While this study did not examine the sources of competitive advantage of the banks in the sample, the results of this study suggest that the adaptability and competitiveness of community banks depends to some extent on the demographic characteristics and interactions among the members of the top management teams of these banks (Hambrick & Mason, 1984).

It is interesting to note that the amount of task conflict and relationship conflict among team members did not significantly influence the extent to which the organization changes its strategy. Prior studies discovered that these constructs influence decision quality and performance (e.g., Amason & Sapienza, 1997). One reason why this study did not find a significant influence may lie in the different effects these constructs exert on different types of decisions. Thus, while task conflict may encourage superior performance by allowing team members to explore different issues and avoid groupthink (Amason, 1996), it may also signal that not all team members are convinced of the need for change. Indeed, some research suggests that it is not conflict per se that is important; rather, it is the way that conflict is handled that determines a top management team's effectiveness (Chen, Liu, & Tjosvold, 2005). This also suggests a reason why trust matters for organizational change efforts.

As with all research, this study has some limitations. Confining the sample to a single industry in a single region helps control for differences in external environments, but limits the homogeneity of the results to other organizations in other

industries. Second, this study focused on the magnitude of change in a firm's strategic position in certain product market domains. Other dimensions of strategic change (e.g., the nature of change, whether radical or incremental) may be influenced by other types of top team social processes than those identified in this study. Finally, the scope of this study was limited to identifying some critical top management team related causes of change. While the results of this study suggest a causal link between top management team demographic characteristics and social processes, proving this link would require explicit theorizing and measurement of the influence of demographics on social processes. Future research could perhaps approach this issue using a combination of research techniques such as case studies and surveys.

This study has some important practical implications. The results of this study indicate that top management teams of organizations considering a change in strategy should develop high levels of trust among the members of their team. A number of interventions are available for this purpose (Woodman & Sherwood, 1980). The results of this study also indicate that CEOs of organizations contemplating changes in their organizations' strategy should consider inducting some new team members to their teams, since teams whose members have relatively less experience in their industry, organization, or team are more likely to change strategy than teams whose members have a greater depth of expertise. However, it is important to note that "less" and "more" experience is relative. The respondents to this survey had, on average, 22 years of experience in the industry, 15 years of experience in their banks, and 8 years of experience in their top management teams. This is comparable to the respondents in Wiersema and Bantel's (1992) study, where "short" organizational tenures referred to tenures of 11.5 years or less.

Taken together, the results of this study have one other important implication: Top executives may need to pay attention to the timing of strategic change (Huy, 2001). Inducting new members into the top management team may make it more difficult for the team to develop the trust that is needed to change strategy successfully. In order to implement this strategy successfully, CEOs need to coordinate the two actions (inducting new members and developing trust) to ensure that these actions precede any attempts to change organizational strategy.

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Faculty Perceptions of Problems with Merit Pay Plans in Institutions of Higher Education

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The purpose of this study was to provide some much needed empirical data regarding problems associated with the design and implementation of merit pay plans in higher education institutions. The sample consisted of approximately five hundred faculty members drawn from different academic disciplines from four-year universities in the U.S. This study identified four significant problems typically associated with merit pay plans. The current study also revealed that some individual-level and organizational-level variables moderated or influenced faculty members' perceptions of problems with their merit pay plans. The implications of the current findings are discussed, and some recommendations are offered.

The current research study investigates faculty members' perceptions of problems with merit pay plans in higher education institutions. While a good deal of empirical research has been conducted on merit pay plans in the private sector, very few studies have focused specifically on the problems of faculty merit pay plans in four-year colleges and universities. It is likely that the use of merit pay plans in academia is associated with some rather unique design and implementation problems not common to the private sector.

Perceived problems with merit pay plans may lead to feelings of inequity and unfairness among faculty members, which, in turn, may lead to negative organizational outcomes such as low performance, dissatisfaction, high turnover rates, grievances, and pay-related litigation. The current study will attempt to provide some much needed empirical data regarding perceived problems with the design and implementation of merit pay plans in higher education institutions. The identification of such problems may eventually lead to the use of more equitable and effective merit pay plans that are able to positively affect faculty performance, satisfaction, and retention.

Brief Literature Review

The Influence of Merit Pay on Important Organizational Outcomes

Within the private sector, a sufficient amount of empirical evidence exists that indicates that merit pay plans generally have a positive impact on employee performance and organizational productivity (Heneman, 2002; Heneman, 1992; Huselid, 1995; Jenkins, Mitra, Gupta, & Shaw, 1998; Locke, Feren, McCaleb, Shaw, & Denny, 1980). Very little empirical research has been conducted regarding the influence of merit pay plans on faculty performance in four-year colleges and universities. However, one recent study found that faculty perceived their merit pay plans to have a somewhat positive effect on teaching effectiveness, service levels, and research quantity and quality (Terpstra & Honoree, in press).

Despite the empirical evidence that shows that merit pay can positively impact performance, these plans remain somewhat controversial. Problems with the design or implementation of merit plans may interfere with employees' perceptions of either distributive equity or procedural equity (Folger & Konovsky, 1989; Terpstra & Honoree, 2003). Perceived pay inequity may lead to decreased motivation and performance, lower overall job satisfaction, higher absenteeism and turnover, and more pay-related grievances and lawsuits (Milkovich & Newman, 2005).

Potential Problems with Merit Pay Plans

Negative perceptions of pay equity may occur if an employee feels that the amount of merit pay he or she received is trivial or too small in relativity to his or her effort and performance. One recent study in the private sector found that the average merit pay increase for white-collar workers was only 3.5 percent ("Pay Increases," 2003). Compensation scholars generally agree that larger percentage increases in pay are required to positively influence equity perceptions, and to motivate employees to perform at a higher level (Heneman, 2002; Milkovich & Newman, 2005; Mitra, Gupta & Jenkins, 1995).

The size of merit pay distinctions between varying levels of performance may also be important in shaping perceptions of equity. Merit plans that make small pay distinctions between varying levels of performance may lead to negative equity perceptions, whereas merit plans that make larger pay distinctions between their low, average, and high performers should lead to more positive equity perceptions and higher motivation and performance (Gerhart & Milkovich, 1992; Milkovich &

Newman, 2005; Mitra, Gupta & Jenkins, 1995).

Whether or not a merit system makes adjustments for past appraisal periods, when little or no money is available for merit distribution, may influence perceptions of equity. No empirical research has investigated the above-mentioned issue; however, the first author's experiences in academia suggest that this merit system feature may be an important influence upon perceptions of equity and fairness. For example, a faculty member with a high performance rating based upon several publications or 'hits' in a lean budget year may not receive any merit money that year. In the next appraisal period, the budget may be healthier (allowing for larger merit pay distributions), but that same faculty member may have a lower appraisal based on fewer publications or 'hits.' For most faculty members, the number of publications typically fluctuates from one year to the next. Merit systems that make adjustments for past appraisal periods may minimize the potential problem of the 'lottery effect' that can operate in universities with fluctuating annual budgets.

Negative perceptions of pay equity may also occur if the performance criteria that are chosen and used in the appraisal process are inappropriate. The performance appraisal literature stresses that the performance criteria employed should reflect all of the relevant and important aspects of the job. Important aspects of the job should not be omitted ('criterion deficiency'). Conversely, the criteria should not include job factors that are irrelevant, unimportant, or not under the control of the employees ('criterion contamination') (Bernardin & Beatty, 1984; Kleiman, 2007). For example, if faculty are rewarded primarily for research activity even though teaching effectiveness is formally touted as being the most critical faculty activity, some faculty may deem the criteria to be inappropriate. Another example might relate to the operational definition of research performance. If the performance criteria reflect research quantity rather than research quality, some faculty may feel that the criteria are inappropriate.

Negative perceptions of pay equity may occur if the performance criteria that are chosen do not lend themselves to accurate measurement (Bernardin & Beatty, 1984; Milkovich & Newman, 2005). If the performance criteria are difficult to operationalize and difficult to accurately measure, subjectivity and bias are more likely to distort the merit ratings. Teaching effectiveness, for example, is notoriously difficult to operationalize and measure. Typically, student evaluations are used to assess teaching effectiveness (Bates & Frohlich, 2000); however, students are not in a position to discern the quality or validity of the lecture content. Student evaluations are usually influenced more by the style of delivery than by the quality of the content. Peer evaluations of teaching are also problematic. In practice, these evaluations typically involve one or two faculty colleagues sitting in on and observing one or two classes. However, a large sample of teaching behavior is required before an accurate and valid evaluation can be made. For peer evaluations of classroom teaching to be valid, a number of knowledgeable peers (with the same disciplinary background) would have to observe the individual faculty member in the classroom over an extended period of time (Latham & Wexley, 1981).

Another example of the potential difficulty in accurately measuring criteria involves research quality. Measuring research quality in terms of whether or not an

article is published in a peer-reviewed journal ignores the fact that there is a tremendous amount of variability in the quality of peer-reviewed journals. Judging research quality with the use of published surveys that rank journals into tiers of varying worth could be done; however, good surveys are not always available for all academic disciplines. Counting the number of times articles are cited in the literature may also be an inaccurate measure of quality, at times. For instance, an article may be frequently cited as a bad example of some aspect of research.

Even if the performance criteria that have been chosen are appropriate and can be accurately measured, negative perceptions of pay equity may occur if there are problems with the standards that are used to represent varying levels of performance. Ideally, the performance standards that are employed as rating scale anchors should be as concrete and behaviorally specific as possible. Those standards should also be clearly communicated to the employees (Milkovich & Newman, 2005). For a merit pay plan to function effectively, the employees should know precisely what performance is expected of them in order to achieve rewards. If, for example, the most important performance criterion is research quality as measured by the number of articles published in “tier-one” journals, the faculty members need to know exactly how many publications per year in those journals will lead to an excellent appraisal and the highest possible merit pay increase.

Negative perceptions of pay equity could also occur if the performance standards vary from one year to the next. When merit or incentive plans begin to result in general increases in performance over time, some organizations may decide to raise the standards, making it more difficult for employees to earn the same amount of merit or incentive pay that they did in past years (Belcher, 1974; Bergmann & Scarpello, 2001). For example, if the initial standard for “excellent” research performance was one tier-one publication per year, that standard may be raised to two publications per year if a greater percentage of faculty members begin to publish at the rate of one tier-one article per year. Raising the standards (because the merit plan is working) inevitably lessens the potential of the merit plan to positively influence performance in the future.

Negative perceptions of pay equity may also be a function of the type of performance appraisal method or format that is used. A variety of appraisal methods exist, including employee comparison or ranking methods, standard or graphic rating scales, behavioral rating scale methods (such as “behaviorally anchored rating scales” or “behavior observation scales”), objectives-based methods (e.g., “management-by-objectives” or other “goal-setting” methods), or written essay methods. Some of these methods are generally more prone to rating errors and biases than others (Kleiman, 2007; Milkovich & Newman, 2005). Even some of the more popular methods such as management-by-objectives (MBO), however, may lead to perceived inequity in the appraisal process (Kleiman, 2007; Terpstra, Olson, & Lockeman, 1982). A basic tenet of MBO holds that individual employees should have some input into the type and difficulty level of the goals that they set. Thus, with MBO, no common yardstick is available for making relative decisions about performance. Who, for example, should receive the higher appraisal rating? The employee who achieved his moderately difficult goals or the employee who narrowly missed achieving her extremely difficult goals?

Finally, even when a good merit system has been designed and developed (i.e., the

criteria and the standards are sound, and an appropriate appraisal format has been selected for use), negative perceptions of pay equity may still occur if the performance appraisal ratings used for merit pay decisions are biased and unfair. Personal bias and politics can operate to undermine the best of merit pay systems. Some compensation scholars have argued that the raters must be motivated to conduct fair and unbiased appraisals. One suggestion involves 'rating the raters' or formally evaluating the raters in terms of the quality and accuracy of their performance ratings of their subordinates (Milkovich & Newman, 2005). Top management also needs to stress the importance of fair and unbiased performance ratings in the appraisal process.

Potential moderators of perceived problems with merit pay plans

It is possible that some individual-level variables and some organizational-level variables may moderate or influence employees' perceptions of problems with merit pay plans. Some types of individuals may be more sensitive to perceived inequity-related to pay. Similarly, some organizational features may heighten employees' perceptions of inequity. Little empirical research has been conducted on the potential influence of individual-level and organizational-level variables on perceived problems with merit plans in institutions of higher education. Some research, however, has suggested that individual-level variables such as sex, age, seniority, and tenure status may influence university faculty members' perceptions of pay inequity and their responses to pay inequity (Terpstra & Honoree, 2003; Terpstra & Honoree, 2005). Additionally, this research has suggested that organizational-level variables such as institutional size and the general salary level (market pay level) of the university can influence faculty members' perceptions of and responses to pay inequity (Terpstra & Honoree, 2003; Terpstra & Honoree, 2005).

Research Objectives

The primary objective of the current study was to identify some of the problems associated with merit pay plans in higher education institutions. Potential problems related to the design and implementation of merit pay plans may lead to negative perceptions of pay equity among faculty members; and these negative perceptions may, in turn, lead to serious organizational consequences including lower faculty performance and satisfaction, and more turnover, grievances, and pay-related litigation.

A secondary objective of this study was to investigate the potential moderating influence of selected individual-level (sex or gender, age, seniority, and tenure status) and organizational-level variables (institutional size and general faculty salary level). It is possible that some of these variables may influence faculty members' perceptions of problems with merit pay plans.

Method

Sample and Data Collection

A list of 1400 four-year colleges and universities in the U.S. was initially developed, and then a random sample of 600 institutions was selected from the original list. The administrators of these selected organizations were contacted and asked if they would

be willing to participate in this study, and 219 of the 600 agreed to participate (for a response rate of 37 percent at this stage). Of the 219 institutions, 135 (62 percent) employed merit or pay-for-performance systems for their faculty. Only the 135 institutions that used merit plans provided data for the proposed study. The e-mail addresses of 20 faculty members across all academic disciplines were randomly selected from each of the 135 institutions, and e-mails (which included a web-link to the on-line survey) were then sent to these 2700 individuals. Two weeks after the initial contact, a follow-up e-mail was sent to encourage their participation and completion of the survey. The faculty was assured of the anonymity of their responses. Of the faculty contacted, 490 individuals eventually completed and returned the survey. All of the respondents were full-time faculty members at their institutions. Sixty five percent of the respondents were male and 35 percent were female. The average age of the respondents was 50.37, and the respondents had an average of 14.77 years of seniority at their institutions. While a web-based survey may lead to possible sampling bias in some situations, this is not a concern in this particular study because all academic faculty have access to personal computers with e-mail capabilities. Prior to administering the survey, the actual questionnaire was pilot-tested by sending it to 20 faculty members. Minor changes were made to the survey instrument, based upon comments from those participating in the pilot-test.

Measures

Potential Problems with Merit Pay Plans.

The nine potential problems with the design or implementation of merit pay plans were assessed through the use of the following nine statements: 1) the merit pay increases that are given out are too small to motivate faculty, 2) the merit pay distinctions between poor, average, and high performers are not large enough, 3) no adjustments are made for appraisal years when little or no money is available, 4) the performance criteria used for determining merit pay are not appropriate, 5) the performance criteria are difficult to accurately measure, 6) the performance standards do not communicate specifically what is expected to achieve rewards, 7) the performance standards vary from year to year, 8) the performance appraisal method that is used is poor, and 9) the performance appraisal decisions are biased and unfair. For each of the nine problem statements described above, the respondents were asked to indicate the extent to which it was a problem with their specific merit pay plan. Five-point Likert scales were used for these nine statements, where 1 = “very much agree,” 2 = “agree,” 3 = “neutral,” 4 = “disagree,” and 5 = “very much disagree.”

Potential Moderators of Perceived Problems with Merit Pay Plans.

Four potential individual-level moderators (sex or gender, age, seniority, and tenure status) and two potential organizational-level moderators (institutional size and general faculty salary level) of faculty members' perceptions of problems were also assessed in the current study. Regarding the individual-level variables, the respondents were asked to indicate their gender, age, seniority (“How many years have you been a faculty member at this institution?”), and tenure status (“Are you tenured?”). The

organizational-level variable of institutional size was measured by asking the respondents the following question: "Please indicate the approximate student enrollment of your institution." The organizational-level variable of general faculty salary level was assessed by asking the respondents the question: "How would you characterize your college or university's overall salary level (market pay level)?" A five-point Likert scale was used for this question, where 1 = "much above average," 2 = "above average," 3 = "average," 4 = "below average," and 5 = "much below average."

Results

Potential Problems with Merit Pay Plans

Table 1 shows the nine potential problem statements ranked on the basis of the degree to which the faculty perceived them to be problems with their institutions' merit pay plans.

Table 1: *Problems with Merit Pay Plans in Higher Education Institutions*

Type of Problem	M ^a	SD	Rank ^b
1. Merit pay increases are too small to motivate faculty	2.25	1.17	1
2. Merit pay distinctions between poor, average, and high performers are not large enough	2.61	1.08	4
3. No adjustments are made for years when little or no money is available	2.32	1.14	2
4. The performance criteria used for determining merit pay are not appropriate	3.01	1.22	8
5. The performance criteria are difficult to accurately measure	2.32	1.12	2
6. Performance standards do not communicate specifically what is expected to achieve rewards	2.98	1.30	6
7. The performance standards vary from year to year	2.99	1.25	7
8. The performance appraisal method that is used is poor	2.87	1.19	5
9. The performance appraisal decisions are biased and unfair	3.09	1.20	9

^aThe faculty respondents were asked to rate the extent to which each of the statements was a problem with their merit pay plan, where "1" equaled "very much agree" and "5" equaled "very much disagree."

^bThe problems are ranked according to their significance, with "1" being the most significant problem and "9" being the least significant problem.

The analyses of the mean ratings of potential problems with merit pay plans indicated that the most significant problem was that the amount of the merit pay increase typically given out was too small to motivate faculty ($M = 2.25$). Two other significant problems with merit plans involved not making adjustments for past appraisal years when little or no money was available ($M = 2.32$), and the use of performance criteria that are difficult to accurately measure ($M = 2.32$). Another problem of note involved plans in which the merit pay distinctions between poor, average, and high performers were not large enough ($M = 2.61$). The means of the remaining potential problems (those ranked fifth through ninth) ranged from 2.87 to

3.09; thus, the respondents did not perceive them to be significant problems associated with their merit pay plans.

Potential Moderators of Perceived Problems with Merit Pay Plans

Analyses were also conducted to explore the potential moderating influence of four individual-level (sex or gender, age, seniority, and tenure status) and two organizational-level variables (institutional size and general salary level) on faculty members' perceptions of problems with merit pay plans. Table 2 shows the correlations between the six moderator variables and the nine types of problems with merit pay plans.

Table 2: Descriptive Statistics and Correlations between the Types of Problems and the Moderator Variables

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Size of increase	2.25	1.17	—														
2. Size of distinctions	2.61	1.08	.55**	—													
3. Adjustments for past	2.32	1.14	.20**	.16**	—												
4. Criteria inappropriate	3.01	1.22	.23**	.17**	.28**	—											
5. Criteria difficult to measure	2.32	1.12	.23**	.15**	.26**	.54**	—										
6. Standards unclear	2.98	1.30	.29**	.18**	.26**	.49**	.53**	—									
7. Standards vary yearly	2.99	1.25	.18**	.08	.26**	.53**	.58**	.64**	—								
8. Poor appraisal method	2.87	1.19	.26**	.19**	.33**	.70**	.58**	.58**	.61**	—							
9. Decisions biased	3.09	1.20	.05	-.01	.02	.02	.07	-.01	.13**	.01	—						
10. Faculty sex	1.35	.48	-.01	-.04	.00	-.07	-.04	-.11*	-.06	-.02	-.13**	—					
11. Faculty age	50.37	9.40	.07	.10*	.03	.08	.07	.12**	.03	.04	.01	-.23**	—				
12. Faculty seniority	14.77	10.26	.05	.12**	.06	.14**	.09*	.19**	.12**	.11*	.02	-.23**	.69**	—			
13. Tenure status	1.28	.45	-.06	-.02	.02	-.06	-.06	-.10*	-.04	-.01	-.03	.18**	-.47**	-.50**	—		
14. Institutional size	14,505.54	12,050.64	.16**	.11*	.14**	.03	.10*	.21**	.10*	.06	.01	-.06	.03	.13**	-.03	—	
15. General salary level	3.59	.88	-.27**	-.14**	-.17**	-.17**	-.14**	-.17**	-.11**	-.22**	-.06	.01	-.04	-.04	-.08	-.15**	—

* $p \leq .05$. ** $p \leq .01$.

General salary level (market pay level) emerged as an important moderator variable, as it significantly influenced faculty perceptions of eight of the nine potential problems associated with merit pay plans. Institutional size and seniority were also found to be important moderator variables, as each of these two variables significantly influenced the perceptions of six of the nine potential problems. Each of the two individual-level variables of sex and age were found to significantly influence faculty perceptions of two of the nine potential problems with merit pay plans. Faculty tenure-status was found to significantly influence the perceptions of only one of the nine potential problems. The specific findings regarding each of the six moderator variables are described below.

Correlation analyses indicated that sex was significantly related to the perceptions of the following two types of problems at the .05 level of significance: “the performance standards do not communicate specifically what is expected to achieve rewards” ($r=-.11$), and “the performance appraisal decisions are biased and unfair” ($r=-.13$). Female faculty were significantly more likely than male faculty to perceive these two types of problems as problems associated with their merit plans.

The analyses indicated that age was significantly correlated with the following two types of problems at the .05 significance level: “the merit pay distinctions between poor, average, and high performers are not large enough” ($r=.10$), and “the performance standards do not communicate specifically what is expected to achieve rewards” ($r=.12$). Younger faculty were significantly more likely than older faculty to perceive these two types of problems as problems associated with their merit plans.

The correlation analyses also revealed that seniority was significantly related to six of the nine types of potential problems with merit plans at the .05 level of significance. The six problems that were significantly influenced by faculty seniority were as follows: “The merit pay distinctions between poor, average, and high performers are not large enough” ($r=.12$), “the performance criteria used for determining merit pay are not appropriate” ($r=.14$), “the performance criteria are difficult to accurately measure” ($r=.09$), “the performance standards do not communicate specifically what is expected to achieve rewards” ($r=.19$), “the performance standards vary from year to year” ($r=.12$), and “the performance appraisal method that is used is poor” ($r=.11$). Faculty with less seniority were significantly more likely than faculty with more seniority to perceive these six types of problems as problems associated with their merit plans.

The analyses indicated that tenure status was significantly correlated with only one type of problem at the .05 significance level: “the performance standards do not communicate specifically what is expected to achieve rewards” ($r=-.10$). Non-tenured faculty were significantly more likely than tenured faculty to perceive this type of problem as a problem associated with their merit plans.

The correlation analyses revealed that the organizational-level variable of institutional size was significantly related to six of the nine types of potential problems with merit plans at the .05 level of significance. The six problems that were significantly influenced by institutional size were as follows: “Merit pay increases are too small to motivate faculty” ($r=.16$), “the merit pay distinctions between poor, average, and high performers are not large enough” ($r=.11$), “no adjustments are made

for years when little or no money is available" ($r=.14$), "the performance criteria are difficult to accurately measure" ($r=.10$), "the performance standards do not communicate specifically what is expected to achieve rewards" ($r=.21$), and "the performance standards vary from year to year" ($r=.10$). Faculty in smaller institutions were significantly more likely than those in larger institutions to perceive these six types of problems as problems associated with their merit plans.

The analyses indicated that the organizational-level variable of general salary level was significantly related to eight of the nine types of potential problems with merit plans at the .05 level of significance. The eight problems that were significantly influenced by general salary level are shown in Table 2. The only one of the nine problems that was not significantly influenced by general salary level was "the performance appraisal decisions are biased and unfair." Faculty in organizations with lower general faculty salary levels were significantly more likely than those in organizations with higher general faculty salary levels to perceive these eight types of problems as problems associated with their merit plans.

Discussion

Problems with Merit Pay Plans in Institutions of Higher Education

The primary objective of this study was to identify the problems associated with merit pay plans in higher education institutions. To date, little empirical research has centered on potential problems with merit pay plans in four-year colleges and universities, and it is likely that the nature of 'academic work' may lead to some unique problems associated with the design and implementation of merit plans. If problems with merit systems lead to faculty members' perceptions of inequity and unfairness, these negative perceptions may, in turn, lead to problems with faculty performance, satisfaction, retention, grievances, and pay-related litigation.

The results of our study indicated that the most significant problem with merit pay plans in higher education institutions was that the amount of the merit pay increase given out was too small to motivate faculty. Most compensation scholars believe that merit plans will not be effective if employees perceive the merit pay increases as trivial (Heneman, 2002; Lawler, 1990; Milkovich & Newman, 2005). Merit pay increases should be perceived as psychologically meaningful or significant in order to reinforce good performance in the past, and motivate workers to perform at a high level in the future (Krefting & Mahoney, 1977). For example, some compensation texts recommend merit pay increases of 4-6% for average performers, and merit pay increases of up to 10% for superior performers (Milkovich & Newman, 2005).

Very little information exists regarding the typical size or amount of merit pay increases in academia; however, it is likely that most merit pay increases in four-year colleges and universities are much less than the increases recommended by compensation texts. If institutions of higher education would increase the amount of merit pay distributed to faculty, it should result in enhanced teaching effectiveness and research productivity. Larger merit pay increases should also lead to higher pay and job satisfaction, and should reduce the significant monetary costs typically associated with faculty turnover and replacement.

Our analyses revealed two additional significant problems with merit pay plans in higher education institutions. One problem involved not making merit pay adjustments for past appraisal years when little or no money was available, and the second problem involved the use of performance criteria that are difficult to accurately measure. It is not surprising that merit plans that do not make adjustments for past appraisal periods when little or no money was available may be perceived as unfair by faculty members. In many higher education institutions, merit pay is primarily based on the number of research publications or “hits” per academic year. However, the number of research hits for faculty typically varies from one year to the next. For example, a faculty member may have had several research hits in a year when no money was available for merit distribution, but that same faculty member may have had no hits during the next year when there was a good deal of merit money available for distribution. This situation would surely be perceived as being unfair by that faculty member.

Institutions that have fluctuating annual budgets could minimize the problem of this potential “lottery effect” by making equitable adjustments for past years when little or no money was available for merit pay distribution. Such adjustments should help to preserve the motivating potential of the merit pay system, and should also serve to minimize the negative outcomes associated with perceptions of inequity.

Another significant problem involved the use of performance criteria that are difficult to accurately measure. This problem may be difficult to remedy, given the nature of academic work. Two primary faculty activities (teaching effectiveness and research quality) are notoriously difficult to conceptualize, operationalize, and measure. For example, teaching effectiveness is most commonly assessed by using student evaluations (Bates & Frolich, 2000). However, students are not fully aware of the faculty member’s teaching objectives. Furthermore, student evaluations are more heavily influenced by the professor’s style of delivery than by the quality and validity of the lecture content. Peer evaluations are also problematic. For peer evaluations of teaching effectiveness to be reliable and valid, a large number of faculty (with the same disciplinary background as the faculty member being evaluated) would have to observe the individual faculty member over an extended period of time in order to gather a large and representative sample of behavior. Supervisory evaluations (e.g., evaluations by the department chair) suffer from many of the same problems as do peer evaluations (Grant, 1998; Latham & Wexley, 1981; Milkovich & Newman, 2005).

The measurement of research quality is also difficult and controversial. For example, judging research quality by whether or not an article was published in a ‘peer-reviewed’ journal is problematic given the tremendous variability in the quality of existing peer-reviewed journal outlets. In fact, some editorially-reviewed journals are superior to many peer-related journals. Assessing research quality with the help of journal rankings based on discipline-wide surveys of faculty opinions could be done; however, good surveys are not always available for all academic disciplines. Even counting the number of times an article is cited in the literature may, at times, be a poor measure of research quality.

The problem involving the use of performance criteria that are difficult to accurately measure may be difficult, if not impossible, to remedy. Perhaps the best that

organizations can hope for is to achieve some degree of acceptance of the chosen methods of measuring teaching effectiveness and research quality. Allowing faculty to fully participate in the process of choosing and operationally defining the performance criteria might help to gain acceptance. New faculty members who had not participated in the original process might benefit from communication, explanation, and 'sales' of the existing system.

The final significant problem associated with merit pay plans in higher education institutions was that the merit pay distinctions between poor, average, and high performers were not large enough. Small merit pay distinctions across performance levels may lead to negative perceptions of equity, and they may have a truly deleterious effect on motivation and performance. For example, if a high-performing employee who received a five percent increase compares himself or herself with an average employee who received a three percent increase, that high-performing employee might feel justifiably upset, and might decide to expend less effort in the future or begin to look for another job.

Compensation scholars generally agree that large merit pay distinctions across different performance levels are critical to the success of merit plans (Gerhart & Milkovich, 1992; Milkovich & Newman, 2005; Mitra, Gupta, & Jenkins, 1995). Ideally, the high-performing employee should perceive his or her merit pay increase to be meaningfully larger than the merit pay increase received by the average performer, and the average performer should perceive his or her merit pay increase to be meaningfully larger than the merit pay increase received by the low-performing employee. The low-performing employee, in fact, should not receive any merit pay increase. The lack of a merit pay increase should signal to the low-performing employee that his or her performance needs to improve, or that he or she should seek employment elsewhere. A merit plan that makes large pay distinctions should help to motivate and retain the very best workers.

Moderators of Perceived Problems with Merit Pay Plans

A secondary objective of the current study was to investigate the potential moderating influence of selected individual-level (sex or gender, age, seniority, and tenure status) and organizational-level variables (institutional size and general faculty salary level). Some types of individuals may be more sensitive to perceived inequity related to pay. Similarly, some organizational features may heighten employees' perceptions of inequity.

One organizational-level variable, general salary level (market pay level), emerged as the most important moderator, as it significantly influenced faculty perceptions of eight of the nine potential problems associated with merit pay plans. Faculty in organizations with lower general salary levels were significantly more likely than faculty in organizations with higher general salary levels to perceive these eight types of problems as being problems associated with their merit plans.

Some previous research has also found that employees were more likely to react negatively to merit pay inequity when their organizations had lower general salary levels (Terpstra & Honoree, 2005). Relatively low general salary levels seem to heighten employees' perceptions of inequity. Conversely, employees may be more

likely to overlook potential problems with merit pay systems when the general salary level of their organization is relatively high. Perhaps employees who are generally dissatisfied with their work context because of low market pay levels or poor supervision, for example, are unwilling or psychologically unable to respond in a positive fashion to merit pay plans. On the other hand, employees who are relatively satisfied with their work context might respond more positively to merit pay systems.

In line with the above reasoning, organizations that pay salaries that are 'below the market' are likely to find that their merit pay systems are ineffective, and may create more problems than they are worth. Organizations that pay salaries that are 'competitive' or that 'lead the market,' however, are more likely to find that their merit pay systems lead to substantial increases in employee performance and organizational productivity.

A second organizational-level variable, institutional size, was also found to be an important moderator, as it significantly influenced faculty perceptions of six of the nine potential problems associated with merit pay plans. Faculty in smaller institutions were significantly more likely than faculty in larger institutions to perceive these six types of problems as problems associated with their merit plans. Some previous research has also suggested that institutional size can influence university faculty members' perceptions of pay inequity (Terpstra & Honoree, 2003).

It is not clear why faculty members in smaller institutions perceive more problems with their merit plans than faculty in larger institutions. However, it is possible that smaller organizations are actually less likely to properly develop and implement technically sound merit systems than larger institutions. Smaller organizations may lack the resources and the level of expertise required to develop and implement good merit pay plans. For example, research in the area of human resource management has found that larger firms are significantly more likely than smaller firms to use effective and scientifically sound staffing practices (Terpstra & Rozell, 1994).

Smaller institutions that lack the in-house expertise required to develop a sound merit pay plan might consider using the services of reputable consultants with experience in designing merit pay systems in higher education settings. Such an approach may cost more initially, but the significant long-term increases in performance and productivity that are typically associated with a sound merit pay plan should justify the initial financial outlay.

One individual-level variable, faculty seniority, was found to be an important moderator. This variable significantly influenced faculty perceptions of six of the nine potential problems associated with merit pay plans. Faculty with less seniority were significantly more likely than faculty with more seniority to perceive these six types of problems as problems associated with their merit plans. This finding seems to be consistent with previous research that suggested that employees with less seniority were more likely to quit their jobs or decrease their level of effort and performance in response to perceived merit pay inequity (Terpstra & Honoree, 2005).

Generally speaking, faculty in the earlier stages of their careers tend to be more competitive and achievement-oriented. Since merit pay increases serve as a mark of success and achievement, these individuals may be more focused on the fairness and equity of merit pay systems. Less experienced faculty may also be more idealistic than

more senior faculty members. Conversely, faculty in the later stages of their careers may be somewhat less competitive and achievement-oriented. Additionally, more experienced faculty may have become habituated and desensitized to pay inequities over the years. It is also possible that experienced faculty who were more equity-sensitive may have left the academic field, leaving behind those who are less sensitive to pay inequities. This possibility could also help to explain these findings.

A second individual-level variable, age, was found to significantly influence two types of problems: “the merit pay distinctions between poor, average, and high performers are not large enough,” and “the performance standards do not communicate specifically what is expected to achieve rewards.” Younger faculty were significantly more likely than older faculty to perceive these two types of problems as problems associated with their merit plans. Previous research has also suggested that age moderates faculty members’ perceptions of and responses to pay inequity (Terpstra & Honoree, 2003; Terpstra & Honoree, 2005). It is likely that the explanations for this ‘age effect’ are similar to the explanations for the ‘seniority effect’ described previously.

Taken together, the findings regarding seniority and age suggest that less experienced, younger faculty members may be especially sensitive to merit pay inequity. As such, higher education institutions with poorly designed and implemented merit pay systems are more likely to lose their young, talented faculty members to other institutions. Higher education institutions should strive to design and implement technically sound merit systems in order to retain these valuable young faculty members.

Another individual-level variable, sex, was found to significantly influence perceptions of the following two types of problems: “the performance standards do not communicate specifically what is expected to achieve rewards,” and “the performance appraisal decisions are biased and unfair.” Female faculty were significantly more likely than male faculty to perceive these two types of problems as problems associated with their merit plans. Perhaps female faculty have experienced more incidents of bias and discrimination over the years than male faculty, and these previous incidents may have sensitized female faculty members to potential pay equity problems. It is also possible that merit pay plans in which “the performance standards do not communicate specifically what is expected to achieve rewards” simply allow for more opportunities for sex bias to unfairly influence merit pay decisions.

One final individual-level variable, tenure status, was found to moderate the following problem: “the performance standards do not communicate specifically what is expected to achieve rewards.” Non-tenured faculty were significantly more likely than tenured faculty to perceive this type of problem as a problem associated with their merit pay plans. Previous research has also suggested that tenure status influences faculty members’ perceptions of pay inequity and their responses to pay inequity (Terpstra & Honoree, 2003; Terpstra & Honoree, 2005).

Since non-tenured faculty tend to be younger individuals with fewer years of

experience than tenured faculty, the explanations for this finding could be similar to the explanations that were previously offered for the 'seniority effect' and the 'age effect.' Additionally, the performance standards that are used for merit pay decisions are typically similar to the standards that are used for tenure decisions. Thus, it makes sense that non-tenured faculty members might be particularly troubled by a merit system in which "the performance standards do not communicate specifically what is expected to achieve rewards (and tenure)."

General Conclusions

To date, very little empirical research has focused specifically on the problems of faculty merit pay plans in four-year colleges and universities; and merit pay plans in the higher education sector are associated with some unique design and implementation problems not found in the private sector. The current study has attempted to provide some much needed empirical information regarding problems with the design and implementation of merit pay plans in higher education institutions. It is hoped that the initial identification of these problems might stimulate more research, and eventually lead to the development and use of more equitable and effective merit pay plans that are better able to positively affect faculty performance, satisfaction, and retention.

The current study also sought to identify individual-level and organizational-level variables that might moderate employees' perceptions of problems with merit pay plans. It was found that some types of individuals (e.g., less experienced, younger faculty) have a heightened sensitivity to potential merit pay problems. Similarly, some organizational features (such as the general salary level, and institutional size) were found to moderate employees' perceptions of problems with their merit pay plans. Knowledge of these moderating influences could be used to enhance the motivational potential of merit pay plans; and this knowledge could also prove useful in reducing dissatisfaction, turnover, grievances, and pay-related litigation.

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Gearing Multiple Cost Drivers of Activity-Based Costing Into Operating Leverage Model for Better Production and Profit Planning Decisions

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In traditional calculations of the operating leverage factor, only volume-based cost drivers are taken into consideration. The aim of this paper is to show how use of the traditional approach to calculating operating leverage factor could lead managers to make irrational or inaccurate profit and production planning decisions. In addition, this paper aims to explain how theoretical assumptions of activity-based costing can be combined with traditional ones to create a new model for calculating operating leverage factor. Furthermore; it will be shown, with the help of a numerical example, how the use of a revised model could lead to better production and profit planning decisions than those produced by traditional models.

Operating leverage factor is used to measure the firm's operating leverage at a particular sales volume (Hilton, 2005; Hilton, Maher, & Selto, 2000; Horngren, Foster, & Datar, 2003). Under traditional costing systems, the output level is the only cost driver (Horngren et al, 2003; Johnson, 1990; Cooper & Kaplan, 1991). Therefore,

traditionally, total costs are separated into a fixed component which does not change with the output level and a variable component which varies with respect to the output level (Hilton, 1999; Horngren et al, 2003; Hilton et al, 2000). This approach is consistent with the traditional costing systems which were designed for production systems with low levels of technology and overhead costs. (Chen, 1996).

A great deal of overhead costs comprises activity costs represented by non-volume-related cost drivers in new automated production environments (Cooper & Kaplan, 1988). This is due to the high cost of complexity caused when companies started to add capital-intensive and custom-made products with rapidly-growing varieties to their product lines as a result of changing needs of customers in the last forty years (Johnson, 1991). The rapidly growing overhead costs of companies after the 1950s were driven by the number of batches and number of product lines produced rather than units of output (Cooper, 1990).

Resources consumed by batch-level and product-level activities do not change at unit level. Whereas batch-level and product-level costs are accepted as fixed costs in traditional costing systems, they are accepted as variable costs in activity-based costing systems (Cooper & Kaplan, 1991). Nevertheless, the traditional approach to the calculation of operating leverage factor treats setup, inspection, material handling, engineering and similar batch-level and product-level activity costs as fixed with respect to the number of units produced. Since the traditional leverage model takes only volume-based cost drivers into account, the operating leverage factor is assumed not to change at different levels of sales volume within the relevant range of fixed costs. However, changes in batch and product-level cost-driver activity levels result in changes in the batch and product-level costs. Therefore, a modified model taking into account multiple cost drivers of activity-based costing (ABC) can be a better model than the traditional one used to calculate operating leverage factor.

Considering the importance of the issue, this paper, aims to show for the first time, the importance of integrating the multiple cost drivers of ABC into traditional operating leverage model. Thus, the motivation of pursuing such research is that it is unique in that it analyzes the effects of modified operating leverage model with a numerical example on particular managerial decisions. This study is organized as follows: The second section summarizes the related literature of activity-based costing; the third section explains formulation of the activity-based operating leverage model; section four shows, with a numerical example, how the enhanced activity-based operating leverage model yields different results when compared to the traditional one in calculating operating leverage factor; section five of the study suggests managerial implications of the revised formulation; and section six is devoted for the conclusions of the study.

Activity-Based Costing

Traditional costing systems employing volume-based cost drivers in allocating overhead costs have lost relevance in the automated production environments. These production environments have experienced a significant increase in overhead costs and subsequent decline in direct labor costs (Gunesekaran, Marri & Yusuf, 1999).

Activity-based costing was promoted by Cooper and Kaplan in the mid-1980s, based on their experiences with some production companies in the USA. Subsequent studies dealt with the deficiencies of traditional costing systems in the automated production environments (Russell, Patel, & Wilkinson, 2000; Innes, 1999; Baird, Harrison, & Reeve, 2004; Özbayrak, Akgün, & Türker, 2004). The activity-based approach to overhead costs is the extension of the traditional volume-based costing that treats manufacturing overhead as a complex set of costs with multiple cost-drivers (Drake, Haka, & Ravenscroft, 2001). ABC focuses on individual activities as the cost objects (Hicks, 1999).

The basic premise of ABC is that products consume activities, activities consume resources and resources consume costs (Cooper & Kaplan, 1988; Baxendale, 2001; Aderoba, 1997; Gosselin, 1997). One of the developments in the theory of ABC in the 1990s was the hierarchical classification of the activities performed at different levels such as unit, batch, product, and facility (Hilton, 1999; Lere, 2002; Colwyn & Dugdale, 2002; Ben-Arieh & Qian, 2003). The resources are consumed by the activities performed within an organization (Cooper & Kaplan, 1991; Schniederjans & Garvin, 1997).

Costs, like activities, may be classified as one of the many types depending on the kind of decision to use resources: unit, batch, product, and facility-level costs (Drake et al, 2001; Gunasekaran & Sarhadi, 1998). Classification of activities in this manner portrays the ability of ABC to recognize the causal relationship between the resources and activities. This, in turn, leads to an understanding that volume-based cost drivers are not the sole cost-drivers. In other words, some costs which are accepted as fixed with respect to the volume-based cost drivers under traditional costing systems are, in fact, variable with respect to some other cost drivers such as number of batches of products and number of design specifications (Hilton, 1999). As a result, operating leverage analysis with the multiple cost drivers of ABC is likely to provide managers with a much more complete picture of the behavior of the costs.

Activity-Based Approach to Measuring Operating Leverage

The traditional approach to measuring operating leverage is based on the assumption that only volume-based cost drivers determine how costs behave. Therefore; facility-level, product-level, and batch-level costs are assumed not to change at a specific level of sales within the relevant range. Theoretical assumptions on which the traditional operating leverage model is based are listed as follows (Horngren et al, 2003):

1. The number of output units is the only revenue driver and the only cost driver
2. Total costs are separated into a fixed component that does not vary with the output level and component that is variable with respect to the output level
3. The behaviors of total revenues and total costs are linear
4. Selling price, variable cost per unit, and fixed costs are constant
5. All revenues and costs can be added and compared without taking into account the time value of money

Based on the assumptions mentioned above, the traditional operating leverage model is derived as follows (Horngren et al, 2003):

$$\text{Traditional Operating Leverage Factor} = \frac{\text{Contribution Margin}}{\text{Net Income}} \quad (1)$$

That is;

$$\text{OLF} = \frac{\text{TR} - \text{TVC}}{\text{TR} - \text{TC}} \quad (2)$$

or,

$$\text{OLF} = \frac{[(P \times Q) - (v \times Q)]}{[(P \times Q) - [(v \times Q) + \text{FC}]]} \quad (3)$$

Where,

OLF = Operating leverage factor

TR = Total revenue

TVC = Total variable costs

TC = Total costs

P = Selling price per unit

Q = Number of units produced and sold

V = Traditional variable cost per unit

FC = Traditional fixed costs

Under activity-based costing theory, however, batch-level and product-level costs which are accepted as fixed under traditional approach may vary at different levels of sales volume with respect to factors such as number of production runs and number of design specifications, rather than the number of units of product produced within the relevant range. That is why predicting total costs in the analysis of operating leverage will require multiple cost drivers such as the number of setups, number of output units, and the number of design specifications. Based on that reality, therefore, activity-based assumptions on which the enhanced operating leverage model is to be based are considered as follows:

1. Only facility-level costs are accepted as real fixed costs which do not vary with any cost driver activity level within the relevant range.
2. Even though batch-level and product-level costs are assumed to be fixed with respect to number of units produced and sold which is the sole cost driver under traditional costing systems, they are variable with respect to cost drivers other than production volume such as number of setups or number of design specifications.
3. Selling price, variable cost per unit, facility-level costs, batch-level costs per batch cost driver activity level, and product-level costs per product cost driver activity level are assumed not to change within the period and relevant range.
4. All revenues and costs can be added and compared without taking into account the time value of money.
5. The behavior of total revenues and total unit-level costs are linear in relation to output level within the relevant range.

Based on the above assumptions, estimation of the costs under activity-based costing can be expressed as follows:

$$\text{Total Budgeted Costs} = [(\text{Number of Units} \times \text{Unit-Level Cost Per Unit}) + (\text{Batch Cost} \times \text{Batch CDA}) + (\text{Product Cost} \times \text{Product CDA}) + (\text{Facility-Level Costs})]$$

Where,

CDA = Cost driver activity (e.g., number of batches, number of design specifications)

Consideration of multiple cost drivers within the context of ABC, as shown in the above equation, will have a significant impact on the model used to calculate the operating leverage factor. As the traditional model shows, total costs are composed of total fixed costs and total variable costs. If we include the activity-based costs, on the other hand, by introducing unit-level costs, batch-level costs, and product-level costs to equation (3), equation (4) will emerge as Activity-Based operating leverage model as follows:

$$\text{Activity Based OLF} = \frac{[(P \times Q) - (ULC \times Q)]}{[[(P \times Q) - [(ULC \times Q) + (BC \times BCDA) + (PC \times PCDA) + FLC]]} \quad (4)$$

Where;

P = Selling price per unit

Q = Number of units produced and sold

ULC = Unit-level costs per unit

BC = Batch cost

$BCDA$ = Number of batch-level cost driver activity

PC = Product costs

$PCDA$ = Number of product-level cost driver activity

FLC = Facility-level costs

Due to the classification of costs under activity-based costing, batch-level and product-levels costs are separated from facility-level costs in an activity-based model while they are all combined and regarded as fixed costs in a traditional one. This is due to the fact that only batch-level and product-level costs are the parameters of the operating leverage model which are treated differently under traditional and activity-based costing systems. Facility-level costs are not expected to change with a change in the level of any CDA within the relevant range under both costing systems. Unit-level costs, likewise, are treated the same way under both models because under both traditional and activity-based assumptions, these costs are assumed to change in direct proportion solely to a change in volume. Calculation of contribution margin, therefore, is the same under both the Traditional and the Activity-Based models.

Since only the batch-level and product-level costs are the parameters which are treated differently under traditional and activity-based costing systems while the other parameters of the leverage model (selling price, unit-level costs, and facility-level costs) are treated the same way, they are the ones which constitute the basic difference

between the traditional and the activity-based operating leverage models. In other words, such activity-based parameters as unit-level and facility-level costs remain the same in the modified model as they are in the traditional one. However, batch-level and product-level costs are the activity-based parameters that should be modified in the new model.

If product and batch-level activities exist in the production environment, both batch-level and product-level parameters should be added to the enhanced model. If either of the batch-level or product-level activities does not exist in the production environment; batch or product-level parameters, whichever doesn't exist, can be eliminated from the enhanced model. If, on the other hand, batch-level or product-level parameters are eliminated from the enhanced model and they are combined with facility-level costs even though they exist, likely changes in the number of product or batch CDA are ignored. In this case, possible fluctuations in the OLF due to the changes in the batch-level and product-level costs are to be overlooked. Whenever the enhanced model taking into account the multiple cost drivers works better than the traditional one, managers are to be better equipped for more accurate production and profit planning decisions.

In the following section, a numerical example is used to show the difference between the traditional and the activity-based models in calculating OLF.

Numerical Example

In this section, a hypothetical example is used to show how the activity-based approach to calculating the operating leverage factor could provide managers with more realistic results. Table 1 is assumed to represent the actual costs classified with respect to activities, selling price per unit, number of batch and product CDA levels, number of units produced, total revenue, and total profit related to the subject period:

Table 1: Hypothetical data needed for calculating the operating leverage factor

Facility-Level Costs (a)	\$40,000
Product-Level Costs (b)	\$30,000
Batch-Level Costs (c)	\$20,000
Unit-Level Costs (d)	\$25,000
Number of units actually produced and sold (e)	5,000 Units
Number of batch-level CDA	200
Number of product-level CDA	100
Selling price per unit (f)	\$40
Total revenue (g) {e × f}	\$200,000
Total profit {g-[a + b + c + d]}	\$85,000

By using the data in Table 1, the operating leverage factor for the subject period can be calculated with traditional model as follows:

$$OLF = \frac{\text{Contribution Margin}}{\text{Net Income}} = \frac{TR - TVC}{TR - TC} = \frac{\$200,000^* - \$25,000^{**}}{\$200,000^* - \$115,000^{***}} = 2.058$$

* 5,000 units × \$40

** Unit-level costs

*** Facility-level Costs + Batch-level Costs + Product-level Costs + Unit-level costs

If the managers continue to use the traditional model, they are still likely to assume that facility-level, product-level, and batch-level costs will not change in the coming period at different levels of volume as long as production volume is within the relevant range. Thus, regardless of the budgeted number of batch and product CDA levels, batch-level and product-level costs are expected to be fixed in the coming period. In this case, the operating leverage factor at a specific volume of sales within the relevant range for the coming period is calculated as 2.058.

The calculations made above indicate that a one percent change in sales will produce a 2.058 percent change in profit at a specific volume of sales within the relevant range. For example, a 10% increase (from 5000 units to 5500 units) in sales is expected to increase profit by 20.58% (2.058 times the 10 percent sales rise).

As long as production volume is within the relevant range in the coming period, the operating leverage factor is expected to remain as 2.058 at different levels of volume.

In these calculations, however, non-volume-related cost drivers are omitted. That is, possible variations in the costs due to changes in the number of batch and product CDA levels are ignored. In this case, a 10% increase (from 5000 units to 5500 units) in sales volume is expected to yield a 20.58% increase in profit only if the number of batch-level and product-level CDA in the coming period will not be different from the one of the current period.

However, the number of batch-level and product-level CDA is independent of production volume. That is, the number of batch-level and product-level CDA may change regardless of the volume of sales within the relevant range. If the number of batch-level or product-level CDA, at a specific volume of sales, will be different in the coming period from the one of the current period, the amount of batch-level or product-level costs will also be different. As a result, a 10% increase in sales volume will not be able to produce a 20.58 % increase in the profit level due to changes in batch-level or product-level costs. In this case, the operating leverage factor should be re-calculated to reflect the changes in batch-level and product-level costs.

For example, if numbers of batch and product-level CDA levels at a specific volume of sales (e.g. 5000 units) are expected to be 240 and 130, respectively, in the coming period, calculation of operating leverage factor with activity-based model is shown below:

$$OLF = \frac{[(P \times Q) - (ULC \times Q)]}{[(P \times Q) - [(ULC \times Q) + (BC \times BCDA) + (PC \times PCDA) + FLC]]}$$

$$OLF = \frac{[(\$40 \times 5000) - (\$5^* \times 5000)]}{[(P \times Q) - [(ULC \times Q) + (BC \times BCDA) + (PC \times PCDA) + FLC]]}$$

* \$25,000 ÷ 5000 units

** \$20,000 ÷ 200

*** \$30,000 ÷ 100

As can be seen above, fixed costs (facility-level, product-level, and batch-level costs) are expected not to change despite the expected changes in the number of batch-level and product-level CDA. In this case, the activity-based model results in an operating leverage factor of 2.430. The traditional model, on the other hand, results in an operating leverage factor of 2.058 under the same circumstances. As a result, the activity based model predicts that a 10% increase in sales is expected produce 24.30% (2.430 times 10 percent sales rise) increase in profit.

These computations are based on the assumption that the numbers of batch and product CDA levels, in the coming period, are expected to be 240 and 130 respectively. Since product-level and batch-level costs change at different CDA levels, the operating leverage factor will vary at different batch and product CDA levels, provided that unit selling price, unit-level costs per unit, and facility-level costs are the same in the coming period (as seen in Table 2).

In Table 2, calculations of operating leverage factor with the traditional and the activity-based models at different product and batch CDA levels are shown:

Table 2: Calculation of operating leverage factor with activity-based and traditional models at different product and batch CDA levels

	Activity-Based Model	
Operating Leverage Factor	Number of Batch CDA Level	Number of Product CDA Level
1.966	220	80
2.397	200	140
2.083	180	110
2.651	240	150
2.011	210	90
1.923*	150	120
2.058	200	100
Traditional Model		
Operating Leverage Factor	Number of Batch CDA Level	Number of Product CDA Level
2.058	220	80
2.058	200	140
2.058	180	110
2.058	240	150
2.058	210	90
2.058	150	120
2.058**	200	100
$*OLF = \frac{[(P \times Q) - (ULC \times Q)]}{[[(P \times Q) - [(ULC \times Q) + (BC \times BCDA) + (PC \times PCDA) + FLC]]}$ $OLF = \frac{[(\$40 \times 5000) - (\$5 \times 5000)]}{[(\$40 \times 5000) - (\$5 \times 5000) + (\$100 \times 150) + (\$300 \times 120) + 40,000]}$ $**OLF = \frac{Contribution\ Margin}{Net\ Income} = \frac{TR - TVC}{TR - TC} = \frac{\$200,000* - \$25,000**}{\$200,000* - \$115,000***} = 2.058$		

As portrayed in Table 2, when the operating leverage factor is calculated with the traditional model, it is expected to be 2.058 regardless of the budgeted number of product and batch CDA levels at a specific sales volume within the relevant range. On the other hand, when the calculation is made with the activity-based model, the operating leverage factor varies at different product and batch CDA levels. For example, if the numbers of batch and product CDA levels are expected to be 150 and 120, respectively, in the coming period, the traditional model calculates the operating leverage factor as 2.058. The activity-based model, on the other hand, calculates the operating leverage factor as 1.923 under the same circumstances.

Even though the number of batch CDA level is expected to fall from 200 to 150 and the number of product CDA level is expected to increase from 100 to 120, the traditional model still assumes that batch-level and product-level costs will not change. If the number of batch and product CDA levels will not be different from those of the current period, there will not be any change in batch-level and product-level costs. In this case, both traditional and activity-based CVP analyses will find the equal budgeted amount of product-level and batch-level costs. Since the facility-level costs are assumed not to change within the relevant range under both of the methods, total budgeted amount of facility-level, product-level, and batch-level costs will be the same under both the traditional and activity-based CVP analysis. Thus, traditional and activity-based models will yield the same result.

In summary, the traditional and activity-based models produce different results if the following conditions are met in the production environment:

- Batch-level or product-level activities exist in the production environment.
- Number of batch or product CDA levels in the following period is to be different from that of the current period.

In order for the traditional and activity-based models to produce different results from each other, both of the above conditions must exist simultaneously. If the batch-level or product-level activities exist in the production system, it means that the batch-level or product-level costs also exist in the same production system. In this case, changes in batch or product CDA levels result in changes in batch-level or product-level costs. Whereas these changes are taken into consideration by the activity-based model, they are ignored by the traditional one. Different treatment of batch-level and product-level costs results in different procedures for budgeting costs.

On the other hand, both models yield the same results under the following conditions:

- Batch-level and product-level activities do not exist in the production environment.
- Even though batch-level or product-level activities exist in the production environment, the number of product and batch CDA levels, in the coming period,

If there is no batch-level and product-level activity performed within the production environment, the batch-level and product-level costs do not exist. In this case, there is no likelihood for the traditional and activity-based models to find different amounts of budgeted costs. If the number of batch or product CDA levels is

not to be different in the coming period from the ones in the current period, the batch or product-level costs are not likely to change. Thus, the traditional and activity-based models do not find different amounts of budgeted costs.

Decision Implications of the Activity-Based Operating Leverage Model

If the above conditions are met, use of activity-based operating leverage model could result in more rational and accurate profit and production planning decisions than the traditional model. As can be seen in Table 1, total amount of sales revenue and profit for the current period are assumed to be \$200,000 and \$85,000 respectively. If the managers of the above mentioned hypothetical company want to increase the level of production, they would want to see the net effect on profit of that increase in production and sales level so that they can make their plans accordingly. As calculated in Table 2, OLF is assumed to be the same (2.058) at different batch and product CDA levels. Therefore, expected change in profit will seem to be the same regardless of the number of batch and product CDA levels. On the other hand; if batch or product CDA levels are to change independent of the production level, calculation of OLF with traditional model could be misleading as explained above. Thus, as long as production volume is within the relevant range in the coming period, the operating leverage factor is expected to remain as 2.058 at different levels of volume.

In that case, managers could assume that a one percent change in sales will produce a 2.058 percent change in profit at a specific volume of sales within the relevant range. For example, a 10% increase (from 5000 units to 5500 units) in sales is expected to increase profit by 20.58% (2.058 times the 10 percent sales rise). In this case, managers would make production planning decisions accordingly. For example, managers would think that they should increase production level by 14.57% ($30\% \div 2.058$) if they want to increase profit by 30% in the coming period. Thus, they will increase production from 5,000 units to 5,728 $\{(5,000 \times 14.57\%) + 5,000\}$ units to achieve that 30% increase in the profit level. In this regard, production planning decisions and arrangements are to be made to produce 5,728 units to attain 30% increase in profit. In this sense, depending on the desired profit level, production planning decisions will mainly be based on the OLF. Therefore, inaccurate OLF could result in irrational production planning decisions.

As mentioned above, calculations under traditional model are made by assuming that batch-level, product-level, and facility-level costs do not change as long as production volume is within the relevant range. However; when the activity-based parameters are integrated into the traditional model, it is understood that even though facility-level costs remain the same within the relevant range, batch-level and product-level-cost may stray from their current amounts depending on the factors other than production volume which is the sole cost driver under traditional costing systems. Thus, if the quantity of the factors that result in changes in batch-level and product-level costs varies in the coming period, traditional model calculates inaccurate OLF. For example, as can be seen in Table 2, if the quantity of batch-level and product-level CDA levels in the coming period are expected to be 150 and 120 respectively, OLF is calculated as 1.923 with activity-based model. In this sense, managers would think

that they should increase production level by 15.60% ($30\% \div 1.923$) if they want to increase profit by 30% in the coming period. Thus, they will increase production from 5,000 units to 5,780 $\{(5,000 \times 15.60\%) + 5,000\}$ units to achieve that 30% increase in the profit level. On the other hand, with traditional model it is still calculated as 2.058. In this case, the company will not be able to attain a 30% increase in the level profit by producing 5,728 units as calculated under traditional assumptions, due to changing batch-level and product-level costs. As calculated with the revised model, the company should produce and sell 5,780 units rather than 5,728 units to reach 30% increase in the level of profit. In this case, OLF should be re-calculated and a revised new model and production planning decisions should be reconsidered.

Table 3 makes the comparison between the traditional and the activity-based models in term of the quantities of output that should be manufactured, at different batch and product CDA levels, to achieve 30% increase in the level of profit in the coming period:

Table 3: Calculation of output level required to attain 30% increase in profit with activity-based and traditional models at different product and batch CDA levels

Activity-Based Model			
Operating Leverage Factor*	Number of Batch CDA Level	Number of Product CDA Level	Planned Output Level
1.966	220	80	5,763
2.397	200	140	5,626
2.083	180	110	5,720
2.651	240	150	5,566
2.011	210	90	5,746
1.923	150	120	5,780†
2.058	200	100	5,728
Traditional Model			
Operating Leverage Factor*	Number of Batch CDA Level	Number of Product CDA Level	Planned Output Level
2.058	220	80	5,728
2.058	200	140	5,728
2.058	180	110	5,728
2.058	240	150	5,728
2.058	210	90	5,728
2.058	150	120	5,728
2.058	200	100	5,728
* See Table 2			
† $\{(5,000 \times 15.60^{**}\%) + 5,000\}$			
** $30\% \div 1.923$			

As can be seen from Table 3, output level doesn't change regardless of the number of batch and product CDA levels when calculations are made with traditional model. However; when the activity-based model is used, planned output level changes at

different batch and product CDA levels. That is, as batch or product CDA levels change the production levels required for achieving a 30% increase in profit also change. By considering these differences, managers should take into consideration the expected changes in batch and product CDA levels in calculating OFL which will in turn have significant influence on production planning decisions. Likewise, when managers want to analyze the percentage increase in the profit at alternative production volume levels via OLF, they may be misled if they use a traditional model. As shown previously, OLF was calculated with the traditional model as 2.058 regardless of the numbers of batch and product CDA levels as long as production volume is within the relevant range. Therefore, a one percent change in sales is expected to yield a 2.058 percent change in profit at a specific volume of sales within the relevant range. For example, a 10% increase (from 5000 units to 5500 units) in sales is expected to increase profit by 20.58% (2.058 times the 10 percent sales rise). However; if the same calculations are made with the activity-based model, different results emerge at different batch and product CDA levels. Table 4 presents the differences between traditional and activity-based operating leverage models in calculating expected percentage change in profit at a production level of 5,500 units.

Table 4: Calculation of expected change in profit at a planned output level of 5,500 units with activity-based and traditional models at different product and batch CDA levels

Activity-Based Model				
Operating Leverage Factor*	Number of Batch CDA Level	Number of Product CDA Level	Planned Output Level	Expected Change in Profit (%)
1.966	220	80	5,500	19.66
2.397	200	140	5,500	23.97
2.083	180	110	5,500	20.83†
2.651	240	150	5,500	26.51
2.011	210	90	5,500	20.11
1.923	150	120	5,500	19.23
2.058	200	100	5,500	20.58
Traditional Model				
Operating Leverage Factor*	Number of Batch CDA Level	Number of Product CDA Level	Planned Output Level	Expected Change in Profit (%)
2.058	220	80	5,500	20.58
2.058	200	140	5,500	20.58
2.058	180	110	5,500	20.58
2.058	240	150	5,500	20.58
2.058	210	90	5,500	20.58
2.058	150	120	5,500	20.58
2.058	200	100	5,500	20.58
* See Table 2				
† $10\% \times 2.083$				
†† Planned change in production level				

As can be seen in Table 4, a 10% increase in the production level is expected to produce a 20.58% increase in the profit level regardless of the batch and product CDA levels as long as production volume is within the relevant range. If calculations are made with an activity-based model, on the other hand, a 10% increase in production volume could produce higher or lower increase in profit than 20.58% depending on the number of batch and product CDA levels, which is not taken into consideration by traditional models. Thus, the activity-based operating-leverage model could be a better tool for managers to make more rational and accurate production and profit planning decisions. If, for example, batch and product CDA levels are to be 200 and 140 respectively in the coming period, expected change in profit is calculated as 23.97% by the activity-based model even though it is still calculated as 20.58% with the traditional model. In this case, profit planning decisions will be based on inaccurate calculations.

Conclusions

Operating leverage factor is used to measure the firm's operating leverage at a particular sales volume. However, the traditional approach that employs only volume-based cost-drivers may fall short in calculating OLF in automated production environments. Therefore, the use of a model which takes multiple cost-drivers into consideration will result in more rational decisions than the traditional model in the automated production environments where non-volume related costs incur. This paper has explained, with a numerical example, how the enhanced activity-based model produces different results from those of a traditional one in the calculation of OLF. Inaccurate calculation of OLF, in turn, results in inaccurate production and profit planning decisions. If the batch-level or product-level activities exist within a production environment, and if the number of batch or product CDA levels in the coming period is to be different from the one of the current period, the traditional and the activity-based models will yield different results in calculating the OLF. Thus if both of the conditions mentioned above are met, use of the activity-based model rather than the traditional one could result in more accurate production and profit planning decisions. If, on the other hand, batch-level and product-level activities do not exist in the production environment, use of the activity-based model does not produce different results from the traditional model. Likewise, even though batch-level or product-level activities exist in the production environment, if the number of product and batch CDA levels in the coming period is the same with those of the current period, again both the traditional and the activity-based model do not produce different results. In that case, fortunately, the traditional operating leverage model does not mislead managers in making decisions.

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Student-Manager Surrogacy in Supply Chain Decision Making

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Numerous business researchers commonly use students as manager surrogates. It is therefore critical for business researchers to understand the viability of this target population for research purposes. In this study, we empirically investigated the student-manager surrogacy in supply chain decision making contexts. From an experimental research, we found that students appeared to have similar decision-making patterns as managers and could be used as surrogates for managers in relational and cooperative supply chain contexts, but not in transactional or competitive supply chain contexts. The methodological implications of the findings for future research are also discussed.

College students have been commonly used as surrogates for managers in business research. Whether college students are reasonable surrogates for managers and business professionals is a question that has evolved into a hotly debated issue (Dobbins, Lane, & Steiner, 1988a, 1988b; Slade & Gordon, 1988). Researchers have empirically investigated this issue in various decision-making contexts such as accounting (Ashton & Kramer, 1980), project investment (Bateman & Zeithaml, 1989a, 1989b; Chang & Ho, 2004), marketing (Corfman & Lehmann, 1994; Roering, Schooler, & Morgan, 1976), lobbying (Potters & van Winden, 2000), production scheduling (Remus, 1986, 1996), ethical dilemmas (Bean & D'Aquila, 2003; Wyld & Jones, 1997) and human resources (Barr & Hitt, 1986). The research findings have been mixed, suggesting that the suitability of using students as surrogates for managers in decision making is context-dependent and contingent on the students'

familiarity with the assigned tasks (Hughes & Gibson, 1991; Gordon, Slade, & Schmitt, 1986). In other words, students can be used as surrogates for managers in some *case-specific circumstances*. This study adds to this line of research by investigating whether business students can be surrogates for managers in the supply chain decision-making context.

Supply chain management (SCM), viewed as a key source of competitive advantage in today's business, has increasingly gained attention from practicing managers, consultants, and business scholars and has developed into an established research arena in the literature (e.g. Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006; Morris & Carter, 2005; Thomas & Griffin, 1996). Several scholars have suggested that SCM research can benefit from longitudinal research design in unveiling causal relationships among various constructs in the supply chain phenomenon (e.g. Carter & Jennings, 2004; Rabinovich, Bailey, & Carter, 2003). However, given the complexity of the supply chain phenomenon, conducting large-scale research based on powerful research techniques such as longitudinal design and research replication becomes quite challenging and often impractical. Although the use of students as experimental subjects has been criticized for its external validity limitation, it has some advantages from practical considerations such as convenient access to data and minimal cost associated with data collection (Cunningham, Anderson, & Murphy, 1974; Gordon et al, 1986). If students are proven to be reasonable surrogates for managers in the supply chain decision-making context, the practical advantages of student samples will make a large-scale longitudinal research design with replications operationally feasible, allowing SCM researchers to leverage the strengths of such research techniques.

As this study focuses on the student-manager surrogacy in the supply chain decision-making context, the levels of analysis in this study involve students and purchasing/supply chain managers. In addressing the validity of such surrogacy, this study examines the similarity of the decision-making pattern of students and that of the managers. Supporting results of this study would suggest that research findings based on student subjects can be reasonably generalized to practicing manager subjects in the supply chain decision-making context. It is worth-noting that the purpose of this study is not to provide empirical support for the use of student subjects for convenience sake alone; we are still in support of using practicing managers as subjects whenever possible. Our intent in this study is to examine the viability of trading the relevancy gained from using manager subjects for the operational feasibility of more rigorous research methods gained from using student subjects.

This paper is organized into four sections. First, we review the literature and propose our hypotheses. Next, our research methodology is explained in the second section. In the third section, our data analysis and results of the study are described. In the final section, the findings, contributions, practical implications, and limitations of this study, as well as avenues of future research are discussed.

Literature Review

Whether college students can be used as surrogates for managers in the decision-

making process has provoked debate among scholars (Dobbins et al, 1988a, 1988b; Slade & Gordon, 1988) and led to empirical investigations on this issue in various contexts. A number of studies provide evidence to support the suitability of using students as surrogates for practicing managers. For example, in marketing contexts, Roering and colleagues (1976) found that the evaluations of marketing practices performed by business students and business professionals yielded congruent results, leading to the suggestion that business students could be used as reasonably accurate surrogates for business professionals. Corfman and Lehmann (1994) also found no significant difference between business students and marketing managers in their study of the Prisoner's Dilemma in advertising budgeting decisions. Similarly, Bateman and Zeithaml (1989a) conducted repeated studies on R&D investment decision using undergraduate business students (in their first study) and practicing managers (in their second study) as experimental subjects and found that both studies yielded consistent results. They also surveyed executives and MBA students and asked them to predict the results of the experiment. The survey results showed that the predictions of both the executives and MBA students were consistent although inaccurate (Bateman & Zeithaml, 1989b). Wyld and Jones (1997) also found there to be no significant difference between non-managerial students and those with managerial roles in organizations in their ethical decision making. In addition, from a lobbying experiment, Potters and van Winden (2000) found that the behavioral differences between undergraduate student subjects and professional subjects were generally small, and that eighty percent of professional subjects showed no behavioral difference from student subjects.

Remus (1986, 1996) also found that graduate business students and line managers attained approximately the same cost efficiency when solving production scheduling problems whereas undergraduate business students made less effective decisions and resulted in significantly high overall costs. Ashton and Kramer (1980) approached this line of research in accounting contexts and found that in evaluating thirty two hypothetical payroll internal control cases, undergraduate auditing students and professional auditors showed no significant difference in their decision making in approximately two-thirds of the cases. They also observed that auditing students and professional auditors displayed similar patterns of cue utilizations although the professional auditor group had slightly greater judgment consensus than the auditing student group. Lastly, Ford and Hegarty (1984), when studying the use of students in managerial decision making, discovered strong agreement between the cognitive maps of a group of MBAs and a group of full-time practicing managers concerning the overall causality of context, structure, and performance variables in a study of decision maker beliefs concerning the causes and effects of structure. They conclude that training and education play a major role in developing students into better surrogates for managers in the decision process.

Nevertheless, several research studies have resulted in evidence that does not support the appropriateness of using student subjects in place of business professionals. Bean and D'Aquila (2003) found that undergraduate accounting students responded to accounting ethical dilemmas, embedded in six financial reporting cases, in different manners from accounting professionals (CPAs). Similarly,

Hughes and Gibson (1991) revealed that even after going through a training program, graduate students still scored significantly differently on several variables from professional decision makers in the use of a decision support system generator. Barr and Hitt (1986) found that in human resources contexts, the decision process of students and that of managers were quite different. Specifically, students and managers used different criteria in making decisions pertaining to job applicant selection and compensation, and students tended to rate job applicants more highly and offered much higher starting salaries than managers. Frederickson (1985) also found that MBA students and executives had different process of making the same strategic decisions while Staw and Ross (1980) found that administrators' investment decisions were influenced by the norm for consistency to a greater degree than those of students. More recently, Chang and Ho's (2004) research findings indicated that students and managers were quite different in their decision process. From their investment decision experiment, they found that managers were more sensitive to contextual information (i.e., degree of project completion, favorable vs. unfavorable information) than students when making project investment decisions, while students exhibited inconsistencies between their resource allocation decisions and the project continuation decisions.

In sum, the empirical research examining the student-manager surrogacy collectively has produced mixed findings, leading some scholars to suggest a contingency approach – whether students can be surrogates for practicing managers is context-specific and depends on students' knowledge and familiarity with assigned managerial tasks (Hughes & Gibson, 1991; Gordon et al, 1986). To our knowledge, the subject surrogacy research has not been done in supply chain decision-making contexts. Given the growing research interest in SCM coupled with the need for more rigorous SCM research techniques such as large-scale longitudinal research designs, which can be made more operationally feasible with student samples, this study contributes to the dual fields of subject surrogacy in business research and SCM in general by investigating the suitability of students as surrogates for managers in supply chain decision-making contexts.

Hypotheses and Research Methods

Hypothesis

Current literature suggests that whether students can be surrogates for managers is context-specific, and that student-manager surrogacy is more accurate particularly when students have knowledge about the assigned managerial tasks and/or are familiar with the tasks (Hughes & Gibson, 1991; Gordon et al, 1986). This is based on the logic that in the context in which students share similar skill sets, experiences, and knowledge as professional managers, both groups can exhibit similar decision making patterns. Some ways to increase the knowledge and skills needed for students to become familiar with managerial tasks could include education, training, and repetitive exposure to different kinds of managerial activities (Ford & Hegarty, 1984; DeNisi & Dworkin, 1981). Training and education can play a major role in developing students into more reasonable surrogates for professional managers in the decision

process, as students acquire requisite knowledge, become familiar with tasks in the decision process, and then use the acquired knowledge in a similar manner to their professional counterparts (Ford & Hegarty, 1984; DeNisi & Dworkin, 1981).

Guided by the above arguments, we can expect that in an experimental setting, students who are exposed to supply chain management concepts in the business classroom may exhibit the behavior of practicing managers on various managerial tasks in supply chain decision-making contexts. Therefore, we hypothesize that students exposed to SCM concepts in Operations Management courses can be reasonable surrogates for managers in supply chain decision-making contexts. Our hypothesis is summarized as follows:

Hypothesis 1: Students in Operations Management classes have the same patterns of decision making in supply chain contexts as practicing managers.

Previous Study

Joshi and Arnold (1998) conducted a study in which industrial purchasing professionals were subjects of a scenario-based experiment investigating how a buyer's dependence on a supplier and relational norms in the buyer-supplier relationship could influence the buyer's compliance decisions (see Appendix A for the scenarios used in their experiment). They found (1) that at a high degree of relational norms, the buyer's dependence on a supplier was positively related to the buyer's compliance decisions, and (2) that at a low degree of relational norms, the buyers' dependence on a supplier was not related to the buyers' compliance decisions. This study is a replication of Joshi and Arnold's study, using students in Operations Management courses as experimental subjects. The comparison between the findings of this study and those of Joshi and Arnold's will unveil whether students and purchasing managers have similar decision-making patterns in buyer-supplier relationships and supply chain contexts. Using two key findings of Joshi and Arnold as the points of comparison, we divide Hypothesis One into two specific hypotheses as follows:

Hypothesis 1a: In the high relational norms scenario, the dependence on the supplier of students as purchasing managers is positively related to their compliance decisions (similar to the managers' decision-making pattern in Joshi and Arnold's study).

Hypothesis 1b: In the low relational norms scenario, the dependence on the supplier of students as purchasing managers is not related to their compliance decisions (similar to the managers' decision-making pattern in Joshi and Arnold's study).

Sample and Experimental Design

Subjects in this study were 300 undergraduate students enrolled in senior-level Operations Management courses, 187 and 113 of which were from an urban Master's-level university in the Midwest region and a rural Master's-level University in the Mid-Atlantic region, respectively. SCM concepts were integrated into Operations

Management courses at both universities. At the time of the data collection, students had already been exposed to some of the relevant issues in supply chain management such as outsourcing, make vs. buy, and purchasing. The subject pool characteristics included (a) 55.37% men and 44.63% women; (b) 21.55% minority and international students, and 79.45% white students; and (c) 40.77% had at least one year of managerial experience.

As in Joshi and Arnold's (1998) study, we randomly assigned subjects into four groups based on a two-by-two experimental design of low vs. high relational norms and low vs. high dependence, illustrated in Figure 1. Subjects were asked to read a short business case, verbatim from the validated business scenario used in Joshi and Arnold's study, in which they assume the role of a purchasing manager at a midsize electronic equipment manufacturer and are responsible for the purchase of microchips – an important component of the company's product. Therefore, they need to purchase the microchips on a regular basis. At the end of the case, subjects were provided with information indicating that the microchip supplier was involved in a labor dispute and temporarily unable to guarantee on-time delivery, which potentially caused their company problems in meeting delivery to customers. Subjects were then asked to rate the nature of their reaction to the supplier's call for their regular supply order and request for patience. It is noted that all subjects were provided with the same materials for the introduction and the conclusion of the case scenario. However, they received different manipulation materials pertaining to relational norms and dependence in the supplier relationship, based on which group they were assigned to. (See Figure 1 for the experimental design and manipulations and Appendix A for the full description of the case).

Figure 1: *Experimental Design*

		Manipulation 1: Relational Norms	
		Low	High
Manipulation 2: Dependence	Low	Group 1	Group 2
	High	Group 3	Group 4

Variables, Data Coding and Statistical Model

Subjects' Compliance Decision was the dependent variable in this study. Compliance was also measured by Joshi and Arnold's validated 6-item instrument (see Appendix B). Factor analysis was performed to summarize most of the total variance into the minimum number of principal components (Hair, Anderson, Tatham & Black, 1995), and our analysis indicated that all six items were highly correlated and loaded onto a single component with a Cronbach's Alpha of 0.76. Therefore, we used the Principal Component Analysis (PCA) score as a single composite measure of

Compliance Decision. Relational Norm's manipulation (coded as 1 and 0 for high and low degrees) was the moderating variable whereas the Dependence manipulation (coded as 1 and 0 for high and low degrees) was the independent variable in this study. In addition, control variables included the university location (i.e., urban vs. rural campus), and subjects' gender, ethnicity and years of managerial experience. The urban and rural campuses were coded as 1 and 0, respectively. Similarly, male was coded as 1, and female was coded as 0. Ethnicity, simply categorized into white and minority/international, was coded as 1 and 0, respectively, whereas years of managerial experience were kept as continuous variables.

In testing our proposed hypotheses, we divided our sample into two sub-samples based on the low and high degrees of relational norms. We then used two separate regression analyses to examine the relationship between Dependence and Compliance Decision under the different conditions of low and high Relational Norms. The regression models are as follows.

Model 1 for the high Relational Norms sub-sample: $Compliance = constant + b_1Dependence + b_2Campus + b_3Managerial\ Experience + b_4Gender + b_5Ethnicity + errors$

Model 2 for the low Relational Norms sub-sample: $Compliance = constant + b_1Dependence + b_2Campus + b_3Managerial\ Experience + b_4Gender + b_5Ethnicity + errors$

Data Analysis and Results

Correlations summarized in Table 1 indicated that both Relational Norms and Dependence manipulations had significant positive associations with subjects' Compliance Decision ($p < 0.01$). Campus also had a significant negative association with subjects' Ethnicity ($p < 0.01$), which underlines the fact that the student body of the urban campus was more diverse and had a significantly greater proportion of minority/international students than that of the rural campus. However, the Variance Inflation Factor did not indicate multi-collinearity between them, thus not violating the assumption underlying multiple regression analysis.

Table 1: Correlation Matrix

Variable	1	2	3	4	5	6	7
1. Compliance	1.00						
2. Relational Norms	0.41**	1.00					
3. Dependence	0.27**	-0.01	1.00				
4. Campus	-0.04	0.00	-0.03	1.00			
5. Managerial Experience	0.11	0.03	0.05	0.01	1.00		
6. Gender	0.06	0.01	-0.08	-0.05	0.10	1.00	
7. Ethnicity	0.04	-0.02	-0.05	-0.19**	0.01	0.07	1.00

** $p < 0.01$

Table 2 will reveal the multiple regression results with Compliance Decision as the dependent variable. Model 1 was to test Hypothesis 1a – the positive effect of Dependence on Compliance Decision under the high Relational Norms condition. After controlling for Campus, Managerial Experience, Gender and Ethnicity, Dependence was positively associated with Compliance Decision ($p < 0.01$), yielding a strong support for Hypothesis 1a. Two control variables including Managerial Experience and Gender were also found to be positively related to Compliance Decision at $p < 0.1$ and $p < 0.05$, respectively, indicating that under the high Relational Norms condition, subjects with more managerial experience and male subjects were more likely to comply with the supplier request than their counterparts who possessed less managerial experience and were female. Model 2 was to test Hypothesis 1b - the null effect of Dependence on Compliance Decision under the low Relational Norms condition. After controlling for the above control variables, Dependence was still positively related to Compliance Decision ($p < 0.001$), and none of the control variables had any significant effects on Compliance Decision under the low Relational Norms condition. This result disconfirms Hypothesis 1b.

Table 2: Results of Regression Analyses

Dependent Variable: Compliance Decision	Model 1: High Relational Norms	Model 2: Low Relational Norms
	Beta ^a	Beta ^a
Control Variables:		
Campus	0.04	-0.10
Managerial Experience	0.14†	-0.01
Gender	0.17*	0.00
Ethnicity	0.06	0.04
Independent Variable:		
Dependence	0.24**	0.40***
R Square	0.12	0.18
Adjusted R Square	0.08	0.15
F Value	3.52**	6.01***

a Standardized regression coefficients

† $p < 0.10$

* $p < 0.05$

* $p < 0.01$

*** $p < 0.001$

We also performed an analysis of variance (ANOVA), using Compliance Decision as the dependent variable and Dependence as the independent variable under both low and high Relational Norms conditions. The results are shown in Table 3, indicating that the means of the low and high Dependence groups are significantly different under both low and high Relational Norms conditions with $p < 0.001$ and $p < 0.01$, respectively. In addition, we graphically summarize the findings of this study in

comparison with those of Joshi and Arnold's (1998) in Figure 2, suggesting that (1) when the supplier relationship is characterized by a high degree of Relational Norms, student subjects appear to have a similar pattern of decision making as manager subjects, and (2) when the supplier relationship is characterized by a low degree of Relational Norms, student subjects seem to have a vastly different pattern of decision making from manager subjects.

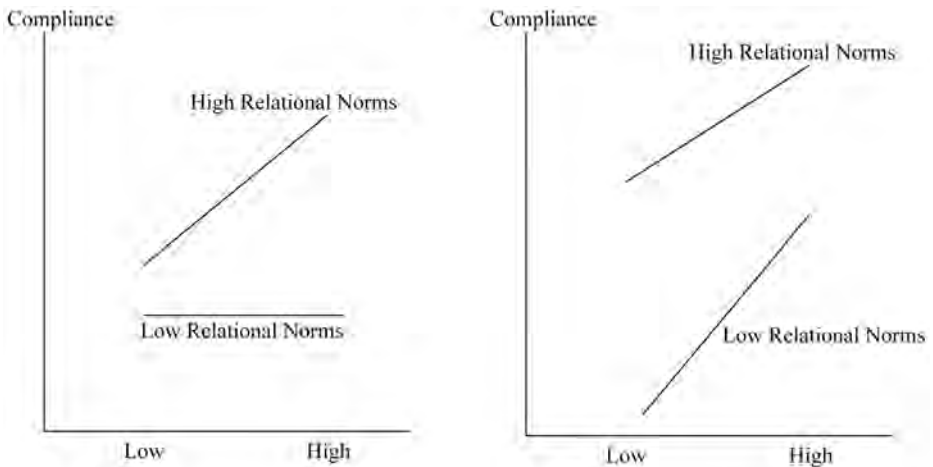
Table 3: Results of ANOVA

Dependent Variable: Compliance Decision	Group Mean	
	High Relational Norms Sub-sample	Low Relational Norms Sub-sample
Low Dependence Group	0.19	-0.76
High Dependence Group	0.63	-0.08
F Value	8.18**	25.90***

** p<0.01

*** p<0.001

Figure 2: Results of this study in comparison with those of Joshi and Arnold's (1998)



Discussion and Conclusions

The results provide mixed support for our main hypothesis; that is, business students in Operations Management classes have similar decision-making patterns as practicing managers in supply chain contexts. Specifically, our study suggests that students appear to have similar decision-making patterns as practicing managers and may be used as reasonable surrogates for managers *only* in relational and cooperative

supply chain contexts, *not* in transactional and competitive supply chain contexts. These findings lend further support to the well-established argument in the subject surrogacy literature that whether students can be used as surrogates for practicing managers is context-specific (Hughes & Gibson, 1991). This contingent applicability resembles some previous research findings while contrasting with others. For example, Hughes and Gibson (1991) discovered that students who received training in decision support systems still achieved scores in the use of a decision support system generator significantly different from those attained by professional decision makers, leading to the conclusion that whether students can be surrogates for managers in the decision process may be dependent upon specific decision situations. This study in part supports Hughes and Gibson's view, as our findings suggested that students who were exposed to SCM concepts had a similar decision making pattern to that of practicing managers only in the cooperative supply chain context, not in the competitive one.

In addition, our research findings, to some degree, contradict those of Ford and Hegarty (1984) in their study on the use of students in managerial decision making. They found that students with training and education could develop their decision-making pattern resembling that of practicing managers. However, our findings are consistent with theirs only in the cooperative supply chain context, not in the competitive one. Such contrasting findings could be explained by the fact that SCM concepts embedded in undergraduate Operations Management classes may prescribe the cooperative aspect of supplier relationships as the way to leverage suppliers' capabilities to create firms' sustainable competitive advantage. This also reflects Cox, Lonsdale, Sanderson and Watson's (2004) remark that the literature in SCM, buyer and supplier relationships and competitive advantage has put a great emphasis on long-term, cooperative buyer-supplier relationships to the extent that power structure in the relationships is de-emphasized. As students exposed to SCM concepts with the emphasis on cooperative supplier relationships, they are more familiar with issues in the cooperative nature of supplier relationships and are more likely to make similar decisions to practicing managers in such context. On the other hand, students may not be sufficiently exposed to the power-struggle and opportunistic side of supplier relationships, which is also the reality in today's business. Thus, they are not equipped to deal with various issues in the competitive supplier relationships as practicing managers are.

Another possible explanation could be that students in general have less mental strengths or less managerial insights than practicing managers in dealing with supplier opportunism in the supplier relationships. As Joshi and Arnold (1998) explained, managers in the high dependence on the supplier and low relational norms situation are not likely to comply with the supplier's request because of their realization that compliance may invite more opportunistic behaviors from the supplier. Conversely, students who assume the role of purchasing manager are under the pressure of their dependence on the supplier and do not have strong relational norms as an alternative governance. Therefore, as their dependence on the supplier increases, they may become short-sighted and submissive to the supplier and are more likely to comply with the supplier's request.

This study makes two contributions to the literature. First, it provides an empirical support to the contingency perspective of student-manager surrogacy as well as empirically investigating the appropriateness of using students as surrogates for managers in supply chain decision-making contexts, which has not been done before in the subject surrogacy literature. Second, this study makes a methodological contribution to the SCM literature by unveiling that students can be used as reasonable surrogates for practicing managers in relational and cooperative supply chain contexts. This may open avenues for more rigorous research methods such as large-scale longitudinal research with replications. Longitudinal research in SCM tends to be confined to small-sample studies such as case study and field research. Large-scale longitudinal research with or without replications is operationally difficult for various reasons including (a) time constraints of managers to participate in any study for a long period of time, (b) issues of management turnover or attrition in various industries, and (c) the amount of time and cost needed for longitudinal research efforts. Using students as surrogates for managers could be a happy-medium solution if SCM researchers are to make large-scale longitudinal studies operationally feasible.

The findings of this study also provide two practical implications. First, while researchers may prefer manager subjects to student subjects, researchers can still use students to pretest the research instrument in their cooperative supply chain research endeavors with a reasonable degree of validity. In addition, from the pedagogical standpoint, management educators can use students in place of practicing managers in the process of developing cooperative SCM techniques and training programs.

This study still has some limitations, which may provide directions for future research. First, this study used business students who have been exposed to SCM concepts in Operations Management classes as experimental subjects. Therefore, the generalization of the findings is confined to business students *with* some SCM knowledge rather than business students in general. Future research may replicate this study, using business student subjects who have not been exposed to SCM concepts to see whether the findings of this study can still hold. In addition, this study only compared the patterns of students' and managers' *compliance* decisions in supply chain contexts. Whether the findings of this study remain robust in various decision situations in supply chain contexts is subject to future empirical investigations.

Appendix A: Scenario and Experimentl Manipulations

Introduction

You are a purchasing manager responsible for the purchase of microchips for a midsize electronic equipment manufacturer. Microchips are an important component for the equipment that you manufacture; therefore they need to be purchased on a regular basis. You have one existing supplier for this component.

Low Dependence

As purchasing manager responsible for microchips, you find yourself in a situation wherein it is not difficult for you to find a suitable replacement for the existing

supplier. If you decide to stop purchasing from this supplier, you could easily replace their volume with purchases from alternative suppliers. There are many competitive suppliers for microchips and you can switch to them without incurring any search costs. Switching suppliers is not going to have any negative effects on the quality or design of the equipment that you manufacture. Your production system can easily be adapted to use components from a new supplier. The procedures and routines that you have developed are standard and they are equally applicable to any supplier of this component. The skills that your people have acquired in the process of working with the supplier can easily be changed to fit another supplier's situation. You can therefore terminate your relationship with your present supplier without incurring any costs.

High Dependence

As purchasing manager responsible for microchips, you find yourself in a situation wherein it is difficult for you to find a suitable replacement for the existing supplier. If you decide to stop purchasing from this supplier, you could not easily replace their volume with purchases from alternative suppliers. There are very few, if any, competitive suppliers for microchips and you cannot switch to them without incurring significant search and verification costs. Switching suppliers is also going to have negative effects on the quality or design of the equipment that you manufacture. Your production system cannot be easily adapted to use components from a new supplier. The procedures and routines that you have developed are unique and hence they are not applicable with any other supplier of this component. The skills that your people have acquired in the process of working with the supplier cannot easily be changed to fit another supplier's situation. You cannot therefore terminate your relationship with your present supplier without incurring significant costs.

Low Relational Norms

Both you and your supplier bring a formal and contract governed orientation to this relationship. Exchange of information in this relationship takes place infrequently, formally, and in accordance to the terms of a pre-specified agreement. Even if you do know of an event or change that might affect the other party, you do not divulge this information to them. Strict adherence to the terms of the original agreement characterizes your relationship with this supplier. Even in the face of unexpected situations, rather than modifying the contract, you adhere to the original terms. You have an "arm's length" relationship with your supplier. You do not think that the supplier is committed to your organization—in fact; you think that if you did not carefully monitor this supplier's performance, they would slack off from the original terms. Above all, you see your supplier as an external economic agent with whom you have to bargain in order to get the best deal for yourself.

High Relational Norms

Both you and your supplier bring an open and frank orientation to the relationship. Exchange of information in this relationship takes place frequently, informally, and not only according to a pre-specified agreement. You keep each other informed of any event or change that might affect the other party. Flexibility is a key characteristic of this

relationship. Both sides make ongoing adjustments to cope with the changing circumstances. When some unexpected situation arises, the parties would rather work out a new deal than hold each other responsible to the original terms. You tend to help each other out in case of unexpected crises. If your supplier is unable to fulfill an order, they recommend an alternative source of supply for the same. Above all, you have a sense that your supplier is committed to your organization and that they work with you keeping your best interests in mind. You see each other as partners, not rivals.

Conclusion

Recently, the supplier informed you that they are involved in a labor dispute. Consequently, they are temporarily unable to guarantee on-schedule delivery. This creates some uncertainty for your organization. Delayed delivery of microchips, may, for example, cause problems for your organization in meeting delivery schedules to customers. The supplier has called to get your regular order. Drawing from experience, how would you be most likely to react in this situation? Please rate each of these statements to the extent that they match with your expectation of your reaction.

Appendix B: Compliance Scale Items

Scale: 1-7 (1 = strongly disagree, 7 = strongly agree)

1. I would hang in there and wait for the labor dispute to be resolved.
2. I would be continually looking out for another supplier to replace the existing supplier (reverse coded).
3. I would patiently wait for the supplier's performance to return to its original level.
4. I would accept the terms and conditions of an alternative supplier (reverse coded).
5. In my negotiations with this supplier, I would imply that they were in danger of losing our business (reverse coded).
6. I would terminate our relationship with this supplier (reverse coded).

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