

EFFECTS OF STRATEGIC ORIENTATION AND ENVIRONMENTAL CHANGE ON SENIOR MANAGEMENT REWARD SYSTEMS

NANDINI RAJAGOPALAN and SYDNEY FINKELSTEIN

Graduate School of Business Administration, University of Southern California, Los Angeles, California, U.S.A.

This paper examines the effects of strategic orientation and environmental change on senior management reward systems. We develop a framework that relates differences in strategic orientations and environmental conditions to four factors—availability of multiple options, programability of behavior, cause-effect ambiguity and outcome uncertainty. Hypotheses based on this framework are tested in a sample of 50 electric utility firms across two time periods covering a total of 10 years. Consistent with theory, we find that firms with more discretionary strategic orientations offer greater compensation, more outcome-based compensation plans and greater proportion of outcome-based cash compensation than firms with less discretionary strategic orientations. Similarly, high discretion environmental periods are associated with greater pay, more outcome-based compensation plans and greater proportion of outcome-based cash compensation than low discretion environmental periods.

Research on senior management reward systems has been the subject of considerable work in the strategy area, as a recent survey by Hambrick and Snow (1989) indicates. Several studies have recently examined the relationships among various aspects of executive compensation systems and corporate and business strategy. Napier and Smith (1987) examined the association between diversification and the mix of incentive pay for corporate managers. Balkin and Gomez-Mejia (1987) tested contingency relationships between organizational strategies and compensation systems in high and low-technology firms. In a more recent study, Balkin and Gomez-Mejia (1990) extended this research by exploring 'strategy-compensation' fit on a different sample of manufacturing firms. Galbraith and Merrill (1991) examined how executive compensation affected

business-level strategies in technology-intensive industries.

Although these studies have improved our understanding of how strategy affects compensation, significant questions remain. How do firms with different strategies adjust their compensation systems in response to environmental change? How does the environment affect compensation systems directly? Is there a framework researchers can draw upon to help explain how both strategy and environment affect the amount, type, and mix of senior executive compensation? In this paper, we develop such a model by drawing on arguments from agency theory (Jensen and Meckling, 1976) and managerial discretion (Hambrick and Finkelstein, 1987) to understand the effects of strategic orientation and environmental uncertainty on senior management reward systems. We test this framework by studying the electric utility industry from 1978-87, a period that included federal legislation to deregulate the industry. The shift away from regulation offered firms considerably more opportunities for mana-

Key words: Executive compensation, strategic orientation, environmental change, reward systems

gerial discretion and provided us with an empirical context to simultaneously examine the effects of strategic orientation and environmental change on senior management reward systems.

THEORETICAL DEVELOPMENT

In this paper we develop a model that links strategic orientation and environment to senior management reward systems. Executive compensation systems tend to have both outcome and behavioral components (Eisenhardt, 1989). Firms that rely on behavior-based compensation (typically a salary with no incentive component) tend to operate in relatively simple contexts where appropriate managerial behaviors are generally well-understood. On the other hand, outcome-based compensation systems are designed to reward managers for their performance; hence, outcome-based pay can reduce monitoring costs when appropriate managerial behaviors are difficult to determine (Jensen and Meckling, 1976). However, because outcome-based pay plans are inherently uncertain, they increase managerial risk and tend to be balanced with greater amounts of pay (Eaton and Rosen, 1983). A firm's strategy and its environment create conditions that affect both monitoring costs and managerial risk, which can be reduced by adopting appropriate compensation systems. We have identified four key attributes of strategies and environments that affect monitoring costs and managerial risk. As illustrated in Figure 1, they are the availability of multiple options, programability of behavior, cause effect ambiguity, and outcome uncertainty.

Environments that are complex and dynamic, and strategies that are multi-faceted and proactive, influence the latitude of options top managers have in setting policy (Hambrick and Finkelstein, 1987). Hence, as managerial discre-

tion increases, managers are less constrained in decision-making, and monitoring managerial work is more difficult. Strategies and environments that confer significant discretion to senior executives are also characterized by low programability of managerial behaviors and ambiguity in cause-effect relationships (Snow and Hrebiniak, 1980). It is difficult to specify required behavior in settings that confer significant latitude because of the multiplicity of choices open to managers. In addition, the number of strategic factors (Barnard, 1938) that influence outcomes increases with discretion, muddying the link between behavior and outcome. Finally, there is greater variability and uncertainty associated with outcomes in high-discretion contexts than in low-discretion contexts (Hambrick and Finkelstein, 1987), in part because of the range of options available to managers. These attributes of high-discretion contexts have two implications: high monitoring costs and greater managerial risk. Under these conditions, we would expect outcome-based compensation plans to minimize monitoring costs and large overall pay packages to reduce managerial risk (Walsh and Seward, 1990).

Effects of strategic orientation

This study adopts the Miles and Snow (1978) typology to assess strategic orientation (e.g. Zajac and Shortell, 1989). In the following paragraphs we utilize the framework presented in Figure 1 to hypothesize differences in compensation systems between firms with different strategic orientations.

Prospectors

Miles and Snow (1978) define Prospectors as firms that aggressively seek growth opportunities through product and market development and

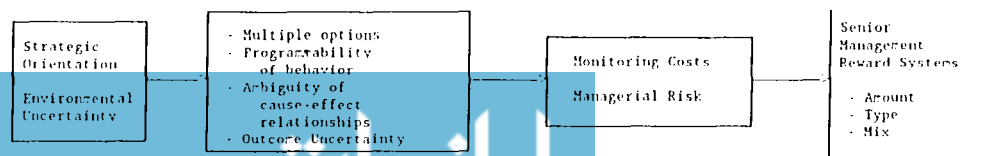


Figure 1. Theoretical framework

innovation. These firms tend to offer top managers considerable discretion, increasing monitoring costs in several ways. For example, aggressive, innovative strategies are not easily programable. In addition, the uncertainty generated by frequent interactions with external actors makes formula approaches to strategy unlikely, clouding the link between behavior and outcome. Prospectors tend not to have a long record of implementing unchanging policy (Miles and Snow, 1978), making it difficult for managers to rely on historical precedents, reinforcing equivocality. Hence, Prospectors are characterized by low behavior programability, multiple options, and ambiguity in cause-effect relationships.

In addition, Prospector strategies are inherently riskier than are other strategies (Miles and Snow, 1978). Hence, compensation plans that reward managers for risk-seeking seem appropriate for these firms. For example, several studies have found that outcome-based incentive plans reduce risk-aversion by top managers (Holmstrom, 1979; Larcker, 1983). As a result, we would expect Prospectors to make greater use of outcome-based compensation plans and tie a greater proportion of managers' pay to performance than firms with less discretionary strategic orientations.

The risk associated with Prospector strategies also increases outcome uncertainty (Hambrick and Snow, 1989). Their dependence on customers and their concern for growth implies a greater concern for managing the environment, increasing uncertainty (Gupta and Govindarajan, 1984). This enhanced risk level reduces the attractiveness of outcome-based pay plans because such reward systems shift the burden of risk to managers, who must bear the associated costs (Eisenhardt, 1989). As a result, the amount of compensation is likely to be higher in order to attract and retain managers.

Defenders

Defenders are firms that adopt, and protect, narrow and stable domains. Just as Prospectors are externally-oriented and innovative, Defenders are internally-oriented and efficient (Miles and Snow, 1978).

Defenders do not operate in as many domains as Prospectors, and their strategies tend to be more narrowly focused on efficiency. Hence, Defender firms tend to exhibit less discretion

than Prospectors. Defenders tend to offer top managers considerable discretion, increasing monitoring costs in several ways. For example, aggressive, innovative strategies are not easily programable. In addition, the uncertainty generated by frequent interactions with external actors makes formula approaches to strategy unlikely, clouding the link between behavior and outcome. Prospectors tend not to have a long record of implementing unchanging policy (Miles and Snow, 1978), making it difficult for managers to rely on historical precedents, reinforcing equivocality. Hence, Prospectors are characterized by low behavior programability, multiple options, and ambiguity in cause-effect relationships.

The role of top management in these firms is to continue with the policies of the past. As such, Defender strategies entail less risk than Prospector strategies (Miles and Snow, 1978). In addition, the degree of outcome uncertainty associated with internal, efficiency-oriented strategies is much less than that associated with more externally-oriented domain expansion strategies (Gupta and Govindarajan, 1984). Hence, we would expect Defenders to utilize outcome-based compensation plans less than Prospectors and, given the lower levels of managerial discretion and risk typical of Defender strategies, to pay less as well.

Analyzers

Analyzers are firms that defend existing product markets through internal, efficiency-oriented strategies while cautiously penetrating new markets through product/market innovation. Hence, Analyzers exhibit characteristics of both Prospectors and Defenders (Miles and Snow, 1978).

Firms following Analyzer strategies tend to have more discretion than Defenders, but less than Prospectors. While their interest in growth expands the range of options that might be considered, their concern with efficiency limits the resources available to pursue such expansion. In a similar vein, managerial behaviors directed toward efficiency are more easily programable than are innovative, growth-oriented behaviors. And cause-effect relationships are clearer when managing for efficiency than for growth. As a result, while monitoring costs can be minimized when decisions are made for efficiency, they are more problematic for decisions on growth.

Finally, the level of risk associated with Analyzer strategies tends to fall between that of Prospectors and Defenders. Analyzers often enter new product-markets after Prospectors and try to control costs in their quest for efficiency.

These dual strategies reduce the likelihood of outright failure, but also create upper limits to success. Hence, Analyzers face only moderate outcome uncertainty. Executive compensation is likely to reflect the Analyzer's equivocal position: the amount of pay and the incidence of outcome-based pay is expected to fall between that of prospectors and Defenders.

Reactors

As opposed to the proactive strategies of prospecting, defending, and analyzing, some firms tend to rely on reaction. These Reactors do not follow a consistent strategy, often because top managers fail to articulate a clear strategic direction (Miles and Snow, 1978).

In the deregulating electric utility industry, some firms may become Reactors because of the dramatic environmental changes that make previous response mechanisms inappropriate. Managers of these firms have the weakest understanding of what it takes to succeed, and their strategies may reflect this. They appear to have little discretion; they neither accept nor create opportunities for action, and they lack the administrative skills needed to implement a proactive and consistent strategy (Miles and Snow, 1978). And senior managers need not be compensated for risk taking, since these firms are not very proactive. As a result, generous rewards are unlikely to be offered, and top managers are unlikely to experiment with new compensation types, preferring guaranteed pay to outcome-based compensation.

These differences in strategic orientations lead to the following hypotheses on the amount, type, and mix of senior management reward systems:

Hypothesis 1a: The amount of compensation for senior managers will be greater in Prospectors than in Defenders, Analyzers or Reactors.

Hypothesis 1b: Outcome-based compensation plans for senior managers will be more common in Prospectors than in Defenders, Analyzers or Reactors.

Hypothesis 1c: The proportion of outcome-based cash compensation for senior managers will be greater in Prospectors than in Defenders, Analyzers or Reactors.

Hypothesis 2a: The amount of compensation for senior managers will be greater in Analyzers than in Defenders or Reactors.

Hypothesis 2b: Outcome-based compensation plans for senior managers will be more common in Analyzers than in Defenders or Reactors.

Hypothesis 2c: The proportion of outcome-based cash compensation for senior managers will be greater in Analyzers than in Defenders or Reactors.

Hypothesis 3a: The amount of compensation for senior managers will be greater in Defenders than in Reactors.

Hypothesis 3b: Outcome-based compensation plans for senior managers will be more common in Defenders than in Reactors.

Hypothesis 3c: The proportion of outcome-based cash compensation for senior managers will be greater in Defenders than in Reactors.

Effects of environmental change

The population we study is investor-owned electric utilities in the U.S. during 1978–87. This period was marked by significant change, as the Public Utilities Regulatory Policies Act (PURPA) was enacted in 1978, with the Supreme Court upholding its provisions in 1983. This latter date marked a turning point in the industry, since there was active resistance to deregulation before that. These events outline two contrasting time periods: (1) 1978–82, when firms were effectively regulated, in part because managers were reluctant to embrace reforms they were still fighting in court; and (2) 1983–87, when firms were increasingly deregulated, with firms trying to adapt to a rapidly changing environment (Electrical World Conference, 1986).

From 1978 to 1982 adoption of new strategic initiatives was inhibited. Regulatory conditions stabilized the industry, limiting relevant strategic factors and simplifying environmental contingencies. Hence, the relationship between means and ends was not complicated, and managers operated in a regulated industry that buffered firms from major risk. Raviv (1985) has argued that when firms are operating in a relatively stable environ-

ment, the behaviors can often be predetermined and monitored easily, and outcome uncertainty is typically quite low. Hence, we would expect monitoring costs to be relatively low during this time period, with compensation systems more behaviorally-based than outcome-based.

The post-1982 period was significantly different. As environmental uncertainty increased due to deregulation, it became increasingly difficult to specify appropriate behavior or understand cause-effect relationships because deregulation upset established patterns of behavior, enhancing managerial discretion. These changes increase monitoring costs and make outcome-based compensation more desirable (Holmstrom, 1979). In addition, managers are likely to be paid more to compensate for the added outcome uncertainty and risk they face in a deregulating environment.

Hypothesis 4a: The amount of (inflation-adjusted) compensation for senior managers will be greater during the 1983-87 period than during the 1978-82 period.

Hypothesis 4b: Outcome-based compensation plans for senior managers will be more common during the 1983-87 period than during the 1978-82 period.

Hypothesis 4c: The proportion of outcome-based cash compensation for senior managers will be greater during the 1983-87 period than during the 1978-82 period.

METHODS

Sample

The sample for this study was drawn from a population of 175 investor-owned electric utility firms in the U.S. Consistent with previous research using the Miles and Snow (1978) typology (e.g. Snow and Hrebiniak, 1980), the Chief Executive Officer (CEO) was selected as the respondent most knowledgeable about the firm's strategic orientation. Questionnaires mailed to CEOs in each firm, follow-up telephone calls, and a second mailing, yielded 108 responses, for an effective response rate of 62 percent. However, published data were available for only 50 of these firms over the time period of the

study (1978-1987).¹ Nevertheless, the size and composition of this sample are comparable to other samples used in recent studies that have examined investor-owned electric utilities in the U.S. (Russo, 1990).

Eighty-five percent of the respondents were either CEOs or senior VPs responsible for strategic planning, and the remaining 15 percent reported directly to the CEO. Ninety percent had been at their jobs for more than 11 years, suggesting that respondents were quite knowledgeable about the strategic changes taking place during the study period. Nonresponse bias was evaluated by comparing responding firms and nonrespondents along four characteristics for 1987 (investment in electric utility plant, net assets, number of retail customers, and ROE), with no significant differences found ($p < 0.05$ in t -tests).

Measures and data sources

Three sets of measures were developed: (1) perceptual indicators of strategic orientation, (2) objective measures for control variables, and (3) objective measures of compensation.

The study utilized industry-specific, multi-item, 7-point anchored Likert-type scales to operationalize five measures of strategic orientation. Items for these scales were developed through in-depth interviews with senior executives and a review of industry trade journals and company annual reports. These measures were consistent with those adopted in past studies (e.g. Fombrun and Zajac, 1987) and are available from the authors.

To assess the unidimensionality and discriminant validity of the five measures of strategic orientation, principal components analysis with varimax rotation was employed (Dess and Beard, 1984). Ideally, all items should be factor analyzed jointly to assess the number of underlying factors (Kerlinger, 1973). However, given the limited sample size, this would have resulted in a low sample-to-items ratio and hence, unstable factor solutions. Hence, we conducted exploratory analyses of items representing each measure of

¹ These 50 firms were either independent entities or the sole units of holding companies. The statements they filed with the SEC provided the data needed for this study. Names of sample firms are available from the authors.

strategic orientation to check for unidimensionality and of pair-wise combinations of the five measures to assess discriminant validity (Nunnally, 1967). Factors with eigenvalues greater than one were retained, and items that loaded highly on one factor had relatively low loadings on all other factors (using the conventional cutoff of 0.40) (Kim and Mueller, 1978). Cronbach-Alpha for each of the five measures was greater than 0.60, satisfactory for survey-based scales (Nunnally, 1967). A composite measure was obtained for each scale by averaging the individual item raw scores, creating five measures:²

1. Market Penetration Strategies (MKT1: 3 items, Cronbach-Alpha = 0.69). Strategies that emphasize cautious penetration and development of existing markets through advertising and promotion, load management and capacity/bulk power sales.
2. Market Innovation Strategies (MKT2: 2 items, Alpha = 0.71). Strategies that seek to develop new markets and segments through aggressive, innovative marketing, such as innovative pricing, time-of-use, and off-peak rates.
3. Technological Innovation Strategies (INN: 3 items, Alpha = 0.74). Strategies that develop new methods of generation and transmission of electricity, such as renewable resource technologies and automated distribution systems.
4. Efficiency-oriented Strategies (EFF: 4 items, Alpha = 0.83). Strategies that seek to improve the efficiency of existing operations through cost-cutting measures and productivity improvements.
5. Domain Expansion Strategies (DOM: 4 items, Alpha = 0.83). Strategies that seek to develop new product markets through mergers and acquisitions, geographical expansion, and diversification.

The second set of measures were objective indicators of control variables. In addition to strategic orientation and environmental period,

² Two different executives responded to the survey in 20 firms. Construct scores were computed separately for the two respondents and compared. Correlations ranged from 0.71 to 0.85 ($p < 0.01$) for the five measures, indicating strong inter-rater reliability.

several other firm-specific and executive-specific factors can explain variations in the amount, mix and type of compensation systems. Past research (O'Reilly, Main, and Crystal, 1988; Finkelstein and Hambrick, 1989) indicates that firm size and profitability are important organizational factors and CEO age, tenure in position, and shareholdings are critical individual factors. Hence, these five factors were chosen as control variables.

Firm size was defined as the natural logarithm of total assets (expressed in 1987 dollars using the GNP Implicit Price Deflator). The logarithmic transformation was used to normalize the measure (Kerlinger, 1973). Firm profitability was defined as return on equity. Age, tenure (number of years in present position) and shareholdings (percentage of outstanding stock held) were obtained for the CEO and used as control variables reflecting individual-specific influences on compensation. Data for these measures were obtained from Moody's Public Utility Manuals, Financial Statistics of Selected Investor-owned Public Utilities, Compustat, and corporate proxy statements.

The third set of measures addressed amount, type and mix of compensation, and were obtained from annual corporate proxy statements.

1. Amount: Four measures were used: CEO cash compensation, CEO salary, CEO annual bonus, and average executive team cash compensation. CEO cash compensation was defined as the sum of annual salary, bonus and fringe benefits (Finkelstein and Hambrick, 1989). The executive team consisted of the officer group (typically vice-presidents and more senior managers) for whom corporate proxies provided compensation data. All four measures were expressed in 1987 dollars using the GNP Implicit Price Deflator.³

³ The definition of cash compensation used in this study excludes stock options and other contingent pay, but is unlikely to result in a serious underestimation of compensation for two reasons. First, as of 1987 only 10 firms had adopted stock option plans and 16 firms had long-term incentive plans, with most of these plans being less than 4 years old. The recency of these phenomena suggest that contingent forms of pay may not play as big a role in this industry as they might in other industries where plans have been in effect longer. Second, in only two of the 10 firms with stock option plans had executives actually exercised stock options during the study period.

2. Type: Four dummy variables for type of outcome-based plan were measured:
 - a. Bonus plan = 1 if an annual bonus plan for executives existed.
 - b. Stock option plan = 1 if a stock option plan for executives existed.
 - c. Long term plan = 1 if a long-term incentive plan for executives existed.
 - d. Total incentive plan = 1 if either a bonus plan or a stock option plan or long-term incentive plan for executives existed.
3. Mix: The proportion of outcome-based cash compensation was measured by dividing CEO bonus by CEO cash compensation (Balkin and Gomez-Mejia, 1987).⁴

Data analysis

Two types of analyses were conducted. First, firms were divided into different clusters based on the five measures of strategic orientation, using a K-means clustering algorithm (Hartigan, 1975) and using the procedure outlined in Mascarenhas (1989). Tukey's tests for multiple comparisons of means were then used to examine pair-wise differences among the clusters along the five variables.

Second, we used repeated measures multivariate analysis of covariance (MANCOVA) to test for differences in amount, type and mix of pay across strategic orientations and across environmental periods. Given the pooled cross-sectional time series nature of the data (50 firms for 10 years each), it was necessary to account for correlated errors across years. The repeated measures design is appropriate in such cases because it controls for individual (within-subject) differences and offers a more powerful test for hypothesized between-subject differences (Bray and Maxwell, 1988). To control for potentially correlated multiple observations on each firm,

⁴ We use the proportion of bonus as our measure of outcome-based pay because: (1) the criteria used by firms in our sample to award bonuses were all based on such outcomes as return on equity and annual sales growth; (2) firms that adopted stock option or long-term incentive plans tended to already have a bonus plan, suggesting that bonuses were in greater use than other plans and that these plans did not take the place of a bonus plan; (3) other forms of outcome-based pay did not constitute a material amount in most firms' pay packages as of 1987.

the firm itself was specified as the within-subject factor. In addition, firm size, firm profitability, CEO age, CEO tenure, and CEO shareholdings were included as covariates. Pair-wise differences in the compensation measures between firms with different strategic orientations and between environmental periods were assessed through Tukey's multiple comparisons of means.

RESULTS

Characteristics of strategic orientations

Table 1 describes the characteristics of the three types of strategic orientations identified through the K-means clustering algorithm. Overall *F*-values for each of the five cluster-defining variables and Tukey's tests for intercluster differences are also provided in this table. All five *F*-values were significant ($p < 0.05$), indicating that each of the five measures was a significant determinant of strategic orientation. The three strategic types were labeled Prospectors, Defenders, and Reactors,⁵ as follows:

Type 1 firms scored the highest among all three clusters on market innovation (MKT2), technological innovation (INN) and domain expansion (DOM). Hence, the 14 firms in this cluster were labeled Prospectors.⁶

Type 2 firms concentrated on market penetration (MKT1) and efficiency-oriented (EFF) strategies and scored the highest among all three clusters on these two measures. The 19 firms in this cluster were labeled Defenders.

⁵ Surprisingly, we found no Analyzers in the sample of 50 firms. The three clusters identified were fairly tight-knit, indicating that no outliers existed. There are two likely reasons for the absence of Analyzers. First, the industry is still not completely deregulated, with limits on allowable rates of return and pricing. Firms continued to face a constrained resource environment, and may have been unable to deploy resources for both internal efficiency and aggressive innovation, the hallmarks of an Analyzer strategy. In fact, there appears to be a trade-off between efficiency and expansion in the firms in our sample: the correlation between operating efficiency and diversification was -0.38 ($p < 0.001$). And second, since the onset of deregulation is rather recent, firms may still be in the process of developing capabilities to manage in the changed environment. Analyzer strategies, which call for the most comprehensive mix of capabilities, may still be evolving.

⁶ Strategic orientations were measured in relative terms. Hence, firms were classified as Prospectors in the regulated electric utility industry because they were more innovative than other firms in the sample, even though they may appear less proactive than some firms in unregulated industries.

Table 1. Characteristics of strategic orientations^a

Orientation-defining ^b variables	Type 1 prospectors (N = 14)	Type 2 defenders (N = 19)	Type 3 reactors (N = 17)	F-value	Tukey ^c test
MKT 1	4.30 (0.61)	5.87 (0.52)	4.59 (0.75)	30.21***	2 > 1; 2 > 3
MKT 2	6.21 (0.66)	5.84 (0.76)	5.36 (0.78)	4.65**	1 > 2; 1 > 3; 2 > 3
INN	4.96 (0.75)	4.90 (0.64)	4.41 (0.53)	3.27 [†]	1 > 3; 2 > 3
EFF	5.56 (0.70)	6.33 (0.58)	5.39 (0.74)	10.51***	2 > 1; 2 > 3
DOM	6.17 (0.61)	4.89 (0.82)	4.45 (0.57)	22.24***	1 > 2; 1 > 3

^aMeans are shown with standard deviations in parentheses

^bOrientation-defining variables were measured on a 7-point scale where 1 represented 'significant decrease in emphasis', 4 represented 'no change' and 7 represented 'significant increase in emphasis'.

^cClusters are significantly different at $p < 0.05$. Significance levels: [†] $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Type 3 firms displayed no consistent pattern in strategic orientation. In fact, Type 3 firms scored lowest on four of five measures (MKT2, INN, EFF, DOM), indicating that they were not even as efficiency-oriented as Prospectors or as innovative as Defenders. This lack of focus appears to be in line with Miles and Snow's (1978) discussion of Reactors as those firms that do not have clear competencies or consistent strategies. Accordingly, the 17 firms in this cluster were labeled reactors.⁷

Given that there were no Analyzers identified in this sample, Hypotheses 2a, 2b and 2c were

dropped from analysis. Reported results are limited to differences in reward systems among Prospectors, Defenders, and Reactors.

Descriptive statistics

Table 2 reports the means, standard deviations and correlations of all variables used in the MANCOVA. It is important to note that, given the pooled nature of the data, significance levels of the reported correlations tend to be somewhat overstated. Since age and tenure were found to be highly correlated, only age is used as a control variable in subsequent analysis (however, identical results emerge from the inclusion of tenure instead of age). The high correlations between the different measures of amount, mix and type of reward systems indicate the appropriateness of using MANCOVA.

Multivariate results

Multivariate analysis using Wilks's Lambda (λ) indicated that each of the seven independent variables had significant effects on the nine dependent variables. The hypothesis of no overall effect was rejected for strategic orientation ($\lambda = 0.77$, $F = 9.37$, $p < 0.001$) and environmental period ($\lambda = 0.82$, $F = 14.83$, $p < 0.001$). In addition, firm size, firm profitability, CEO age,

⁷To assess both the stability and convergent validity of the clusters derived from executives' self-reported measures of strategic orientation, objective measures of strategy were used to create alternative clusters of strategic types for both the 1978-82 and 1983-87 time periods. Using the same procedure described above, and using objective measures of operating efficiency, capital intensity, plant and equipment newness, and extent of diversification, three distinct strategic types corresponding to Prospectors, Defenders, and Reactors were identified for each time period. For 46 of 50 firms, cluster membership did not change across the two time periods, indicating that strategic orientations were stable over time for firms in this sample (All tests to be reported below were also conducted after dropping these four firms. Results did not change). In addition, the objectively-determined clusters for 1983-87 were identical to those derived from perceptual data for 47 of 50 firms, indicating strong convergent validity. However, because data limitations precluded obtaining objective counterparts for the 20 questionnaire measures, the perceptually-derived strategic types were used in subsequent tests of hypotheses.

Zero-order correlations

Variables	N	Mean	Standard deviation	TCC	SAL	BON	AVGTCC	BONDUM	OPTPLAN	LTPLAN	TOTPLAN	BONPER	LNASSETS	ROSE	AGE	TENPOS	SHSEX	TYPE	PERIOD
1. CEO cash compensation (TCC)	500	307.89	120.75	1.00	0.89***	0.61***	0.68***	0.49***	0.09*	0.37***	0.41***	0.54***	0.68***	0.18***	0.13***	0.15***	-0.22***	-0.29***	0.37***
2. CEO salary (SAL)	406	278.15	92.33	1.00	0.33***	0.72***	0.31***	0.13**	0.17***	0.27***	0.17***	0.25***	0.79***	0.13***	0.08	0.16**	-0.32***	-0.23***	0.28***
3. CEO bonus (BON)	406	11.44	40.51	1.00	0.25***	1.00	0.49***	0.15**	0.27***	0.55***	0.94***	0.12**	0.14**	0.08	-0.01	0.01	0.01	-0.22***	0.30***
4. Average team cash compensation (AVGTCC)	461	136.81	50.91	1.00	0.29***	0.04	0.29***	1.00	0.32***	0.30***	0.21***	0.56***	0.15***	-0.02	0.07	-0.16***	-0.25***	-0.25***	0.23***
5. Bonus plan (BONDUM)	500	0.28	0.45	1.00	0.40***	0.49***	1.00	0.40***	0.88***	0.76***	0.09	0.28***	0.01	-0.09	0.10*	-0.33***	-0.33***	0.39***	0.39***
6. Option plan (OPTPLAN)	500	0.08	0.27	1.00	0.03	0.42***	1.00	0.03	0.63	0.20***	-0.01	0.07	0.05	-0.10*	0.26***	-0.28***	-0.28***	0.11*	0.11*
7. Long-term plan (LTPLAN)	500	0.10	0.30	1.00	0.47***	0.12***	1.00	0.47***	0.12***	0.30***	0.12***	0.19***	-0.06	0.07	0.11*	-0.11*	-0.11*	-0.04	0.29***
8. Total incentive plan (TOTPLAN)	500	0.34	0.47	1.00	0.72***	0.06	0.72***	1.00	0.72***	0.06	0.25***	-0.01	-0.10*	0.07	0.11*	-0.32***	-0.32***	0.33***	0.33***
9. Proportion outcome based cash compensation (BONPER)	406	0.02	0.07	1.00	0.18***	0.07	0.18***	1.00	0.18***	0.07	0.18***	0.10*	0.00	0.04	0.04	-0.17***	-0.17***	0.31***	0.31***
10. Firm size (LNASSETS)	500	8.37	0.80	1.00	0.02	1.00	0.02	1.00	0.02	-0.00	0.02	-0.29***	-0.29***	-0.29***	-0.29***	-0.29***	-0.29***	0.12***	0.12***
11. Firm profitability (ROSE)	500	0.11	0.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12. Age (AGE)	500	57.57	5.23	1.00	0.07	1.00	0.07	1.00	0.07	1.00	0.07	1.00	0.07	1.00	0.07	1.00	0.07	1.00	0.07
13. Tenure in position (TENPOS)	437	4.49	3.40	1.00	0.08	1.00	0.08	1.00	0.08	1.00	0.08	1.00	0.08	1.00	0.08	1.00	0.08	1.00	0.08
14. Executive shareholdings (SHSEX)	461	0.001	0.001	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01
15. Strategic orientation (TYPE)	500	2.04	0.78	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01
16. Environmental period (PERIOD)	500	0.50	0.50	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01	1.00	0.01

*Less than 500 for some variables due to missing data. The maximum sample size of 500 represents 50 firms over a 10-year period. Significance levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

CEO share-holdings, and the within-subject factor also had significant $p < 0.05$) effects.

Differences in senior management reward systems

To assess the specific effects of each independent variable on each compensation measure, univariate analyses were conducted, as reported in Table 3. As is evident from this table, both strategic orientation and environmental period were significant sources of variation in the amount, type, and mix of senior management compensation in eight of nine cases. Only long-term plans (for strategy) and stock option plans (for environment) were not significant.

To examine pair-wise differences between strategic orientations and environmental periods, Tukey's test for mean comparisons was used. Table 4 provides the means for each of the nine dependent measures for the three strategic orientations and the two environmental periods. The results of the Tukey tests are provided in the last column and are used to assess differences

in the main effects of strategic orientation and environmental period.

As Table 4 indicates, Prospectors paid significantly more than Defenders or Reactors (for all four measures of amount of compensation), and Defenders paid more than Reactors (in three of four cases). Average compensation for all four measures during the 1983-87 period were significantly greater than that in the 1978-82 period, supporting Hypotheses 1a, 3a, and 4a.

Similar results were found for three of four measures of outcome-based compensation plans. More Prospectors used bonus plans, stock option plans, and at least one of three incentive plans than did Defenders and Reactors.⁸ Also, more Defenders tended to have bonus plans than reactors. Average utilization of these incentive mechanisms was greater in 1983-87 than in

⁸ When we examined the cumulative proportion of firms that adopted these compensation plans over the 1978-87 time period, we found that differences in the rate of adoption of outcome-based plans across strategic orientations remained relatively constant, suggesting that industry trends did not account for these results.

Table 3. Results of repeated measures analysis of covariance

Dependent variables	Source of Variance— <i>F</i> -Values						
	Between-subject factors		Within-subject	Control Factors (covariates)			
	Strategic orientation	Environmental period		Firm size	Firm profitability	Age	CEO share-holdings
I. Amount							
1. CEO cash compensation	11.49***	62.13***	8.22***	19.75***	2.51	35.98***	0.18
2. CEO salary	3.61*	29.57***	10.43***	38.74***	0.09	31.24***	5.27**
3. CEO bonus	16.88***	23.42***	8.82***	1.68	5.68*	2.57	10.25***
4. Average team cash compensation	6.36**	27.98***	11.47***	2.57	0.72	6.12**	2.92
II. Type							
1. Bonus plan	22.77***	55.79***	7.80***	1.84	11.53***	2.45	6.64**
2. Long-term incentive plan	0.94	17.74***	5.10**	1.96	5.16*	5.69*	0.04
3. Stock option plan	13.31***	1.10	14.19***	7.47**	0.25	0.91	1.47
4. Total incentive plan	11.31***	41.38***	7.51***	2.94	9.57**	2.31	0.92
III. Mix							
1. Proportion outcome-based cash compensation	10.31***	27.87***	6.89***	1.83	3.92*	3.61	18.95***

Significance Levels: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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Table 4. Mean differences across strategic orientations and environmental periods

Dependent variable ^a	Environmental period	Strategic orientation			Overall mean	Tukey test ^b
		Prospectors (1)	Defenders (2)	Reactors (3)		
I. Amount						
1. CEO cash compensation	1978-82 (A)	303.79	268.47	245.98	270.70	1 > 2 > 3 B > A
	1983-87 (B)	431.03	345.48	298.09	355.07	
	Overall ^c	370.82	306.98	272.38	-	
2. CEO salary	1978-82 (A)	299.35	262.64	241.18	262.84	1 > 2 > 3 B > A
	1983-87 (B)	351.42	317.79	274.56	307.97	
	Overall	323.53	287.03	257.41	-	
3. CEO bonus	1978-82 (A)	0.00	0.00	1.40	0.51	1 > 2 1 > 3 B > A
	1983-87 (B)	68.40	17.54	8.17	24.91	
	Overall	31.76	7.76	4.70	-	
4. Average team cash compensation	1978-82 (A)	138.85	121.94	117.29	125.03	1 > 2 > 3 B > A
	1983-87 (B)	168.58	152.29	125.01	148.14	
	Overall	154.51	137.11	121.20	-	
II. Type						
1. Bonus plan	1978-82 (A)	0.31	0.02	0.05	0.11	1 > 2 > 3 B > A
	1983-87 (B)	0.75	0.45	0.21	0.46	
	Overall	0.54	0.24	0.13	-	
2. Long-term incentive plan	1978-82 (A)	0.02	0.00	0.02	0.01	B > A
	1983-87 (B)	0.19	0.25	0.12	0.19	
	Overall	0.11	0.12	0.07	-	
3. Stock option plan	1978-82 (A)	0.19	0.00	0.00	0.05	1 > 2 1 > 3 B > A
	1983-87 (B)	0.25	0.08	0.02	0.11	
	Overall	0.22	0.04	0.01	-	
4. Total incentive plan	1978-82 (A)	0.40	0.08	0.11	0.18	1 > 2 1 > 3 B > A
	1983-87 (B)	0.77	0.49	0.27	0.50	
	Overall	0.58	0.29	0.19	-	
III. Mix						
1. Proportion outcome-based cash compensation	1978-82 (A)	0.00	0.00	0.006	0.002	1 > 2 1 > 3 B > A
	1983-87 (B)	0.11	0.04	0.024	0.049	
	Overall	0.05	0.02	0.015	-	

^aCEO cash compensation, salary, bonus and average team compensation are measured in thousands of dollars.

^bSignificant differences at $p < 0.05$.

^cSample sizes vary between 130 and 175 across the three strategic orientations.

1978-82. Only results for long-term plans were inconsistent with hypotheses on strategic orientation. Although not statistically significant, Defenders had a greater proportion of long-term plans than Prospectors. These results provide support for Hypotheses 1b and 4b.

Finally, Prospectors used a significantly greater proportion of outcome-based pay than other firms, and the average proportion of outcome-based pay during 1983-87 was significantly greater than that in 1978-82, supporting Hypotheses 1c and 4c. Although Defenders did use a larger

proportion of outcome-based pay than did Reactors, the difference was not significant. Hence, Hypotheses 3c was not supported.

DISCUSSION

Research findings and implications

This paper studied the effects of strategic orientation and environmental change on senior management reward systems. We presented a model that employed arguments from agency theory and managerial discretion to develop a more complete explanation for executive compensation systems. The model argues that multiple options, cause-effect ambiguity, behavior nonprogramability, and outcome uncertainty, increase monitoring costs and managerial risk. Under these conditions, the type and mix of pay tend to be significantly outcome-based (to reduce monitoring costs), and the amount of pay tends to be large (to reduce managerial risk).

These ideas were tested in a sample of 50 electric utility firms over 10 years. Senior management reward systems were examined across Miles and Snow's (1978) strategic types and across two-environmental time periods representing different levels of managerial discretion. Three major findings emerge. First, both strategic orientation and environmental period have significant main effects on the amount, type, and mix of senior management reward systems. Second, firms with more discretionary strategic orientations (Prospectors as opposed to Defenders or Reactors, and Defenders as opposed to Reactors) make greater use of outcome-based reward mechanisms (such as incentive and option plans), tie a greater proportion of pay to performance, and offer higher overall compensation levels. Third, irrespective of strategic orientation, as environmental uncertainty increases, more firms tend to adopt outcome-based compensation plans, pay a greater proportion of outcome-based cash compensation, and pay managers more.

One unexpected finding concerns the greater proportion of Defenders than Prospectors (or Reactors) that adopted long-term incentive plans. Consistent with our model, we had expected long-term plans to be most prevalent among Prospectors. However, when we investigated the criteria Defenders and Prospectors used for

making awards under these plans, differences consistent with our earlier profiles of these strategic orientations were apparent. Defenders tied long-term incentives to operating efficiency criteria that were consistent with their focus, such as operating costs per kilowatt hour and fuel costs per kilowatt hour. In contrast, Prospectors emphasized overall rates of return, such as return on capital base and return on equity. Hence, while Defenders were more likely to have long-term plans than Prospectors, they used criteria that were more controllable, and less subject to environmental variation, reducing the risk associated with such plans.

This study makes several theoretical contributions to the growing body of work relating senior management reward systems to firm strategy. First, it offers a theoretical framework that may be useful in understanding compensation systems in different contexts. For example, Balkin and Gomez-Mejia (1987) found that high-technology firms typically use incentive pay plans more than other firms do. Because these firms operate in rapidly changing environments (Eisenhardt and Bourgeois, 1988), characterized by low behavior programability, cause-effect ambiguity, and the availability of multiple options, we would expect outcome-based compensation to be more attractive. In a similar vein, Napier and Smith's (1987) finding that the proportion of corporate managers' incentive pay was significantly greater in more diversified firms may be due to the enhanced discretion of these firms (Hambrick and Finkelstein, 1987).

More broadly, this study contributes to the growing body of research on administrative systems, which examines relationships among strategy, structure, and planning and control systems (e.g., Govindarajan and Fisher, 1990). Compensation systems are a critical part of a firm's administrative system because they serve to either motivate or impede managerial actions, with important consequences for both firm strategy and performance.

Implications for practitioners

This study has several implications for practitioners. First, a firm's strategy affects board monitoring costs and the inherent risks top managers face. Boards need to recognize these costs and risks, and ensure that firm compensation

systems are consistent with their strategies. In particular, firms following Prospector strategies need to monitor top managers closely because of the enhanced discretion such a strategy confers. Compensation plans in such firms should be outcome-based because of this broad degree of discretion. In addition, to ensure that high quality top managers are retained, the board should compensate executives for the added risk the Prospector strategy involves. In a similar vein, firms following Defender strategies should ensure that any outcome-based plan they adopt is consistent with the efficiency goals pursued by such firms. Our findings indicate that while both Prospectors and Defenders use outcome-based compensation, there are differences in the criteria these firms use to make awards. The outcomes Prospectors emphasize tend to be more subject to environmental influences than those chosen by Defenders. However, Prospectors balance the increased risk managers face by paying them more. Tying pay to performance in uncertain environments without increasing absolute compensation may very well have disincentive effects.

Second, the need to balance managerial accountability on the one hand with managerial risk bearing on the other is likely to increase compensation costs to firms. And, once a firm puts such compensation mechanisms in place, managers may very well oppose subsequent attempts to change the compensation system. Finally, managers with abilities and risk preferences consistent for a given strategy and compensation package may be out of place under other conditions. Any decision to change a strategy or compensation system needs to take such factors into account as well.

Limitations and directions for future research

There are several limitations and directions for future research that should be noted. Surprisingly, we did not find any Analyzers in our sample. Although there appear to be several industry-specific reasons for this, their omission in the study meant that some hypotheses could not be fully tested. However, we would expect Analyzers to exist in many other industries, offering other investigators an opportunity to extend the analysis reported here.

Another potential limitation concerns the use of self-reported measures of strategy. Although

perceptual data have been used to assess strategy quite often (e.g. Fombrun and Zajac, 1987), we attempted to reduce potential bias by collecting objective data to validate perceptual scores and by obtaining multiple responses for a subset of the sample. In addition, the survey was tailored to a specific industry, making questions more meaningful to respondents (Koberg, 1987).

Third, although studying a single industry enables a richer examination of environmental context, external validity is limited. The electric utility industry is still subject to more regulation than most other industries, limiting generalizability. Subsequent work could extend and refine our theoretical framework in different industries.

Fourth, we did not control for changes in tax law over the time period of the study, suggesting that changes in compensation that we attributed to changes in environmental uncertainty may also partly be due to changes in tax policy.

Fifth, we excluded stock options and long-term incentive payments, both in our valuation of total cash compensation and in our definition of the proportion of outcome-based pay. As discussed earlier, the recency of these plan introductions and the small number of firms that had made payments under these plans as of 1987 suggest that this assumption does not result in a significant underestimation of compensation in our sample. In addition, it also suggests that our reliance on bonus does not seriously understate the proportion of outcome-based pay. However, this situation is somewhat unique to the industry and may not be true in other industries where contingent forms of pay could constitute a more material part of the compensation package.

Finally, the performance implications of behavior-based vs. outcome-based senior management reward systems and how these effects vary across different strategic orientations and environmental contexts need to be examined. An implicit assumption in much of the compensation literature is that a tight linkage between pay and performance has positive performance effects (Kerr and Bettis, 1987). This study suggests that a firm's strategic orientation and environmental context may be critical contingencies in the pay-performance relationship because it may not always be possible or even desirable to utilize compensation plans strictly contingent on performance. Future research also needs to explore the conditions under which 'misfits' between

strategy and compensation are likely to arise, since such misfits could have significant implications for performance.

It is evident that there are many unanswered research questions to investigate in this area. We believe that senior management reward systems are only partly understood. This study described one approach that might help improve our understanding of compensation systems by positing a central role for both strategy and environment. We hope other researchers will help extend and refine this approach.

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