

Developments in Business Simulation & Experiential Exercises, Volume 11, 1984

LEADERSHIP AND STRATEGIC BEHAVIOR

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ABSTRACT

Considerable research has been directed at clarifying the linkages between leadership styles and strategy formulations. Research has been both cross-sectional and longitudinal with each possessing distinct limitations in either depth or breadth. Further, these studies tend to be predominantly qualitative regarding both people and environment.

Availability of computer speed, memory capacity and advanced programming packages has now made possible an additional, promising approach to the study of strategy leadership linkages.

Toward implementation, a unique set of behavioral, business simulation, statistical analysis and decision support programs have been integrated by computers in a laboratory setting.

This paper reports on the initial and exploratory use of the Strategy Training and Research Center (STARC) to quantitatively examine in detail the dynamic linkages between leadership style and changing strategic choice & The affect of both learning and styles on strategy formulation is evident.

INTRODUCTION

Strategy formulation has been defined as the process by which goals are set and the means to achieve those goals chosen. In another view, strategy may be considered a pattern in a stream of decisions that (1) guides an organization's alignment with its environment and (2) shapes its internal policies (Hambrick, 1983). As research in strategy formulation and implementation has intensified, a number of structural and behavioral factors have been identified as influencing the strategic process.

Strategy has been studied predominantly by cross-sectional, qualitative methods such as field studies and interviews and by longitudinal, quantitative methods as empirical analyses of historical organizational data (Anderson, 1978)(Hambrick, 1983).

This paper presents the results an experiment conducted in the University of Hartford's Strategy Training and Research Center (STARC) with a prime objective to initiating explorations under controlled conditions of the links between the attributes of leadership and the dynamics of strategy formulations (Goldstein, 1978)(House, 1982) (Larson,1974).

STRATEGY CENTER DESCRIPTION

Space does not permit a full description of the data, information and communications facilities of the complete laboratory which has been under development for over 5 years. The main features are as follows:

- Interactive terminals
- Interactive computer forms for input
- Programs for conducting Leadership and Behavioral Measurements
- Flexible business simulation core programs consisting of business firms and industries

- An industry business newspaper, e.i., the Small Street Journal
- Accumulative company and industry databases
- Graphical displays of company comparisons with industry averages
- Terminal and hardprint plots of pertinent industry and company data
- Availability of automatic statistical analyses of pertinent market variables

The subjects of the experiment were 40 practicing managers obtaining their MBAs. The managers were organized into 10 firms participating in a simulated industry, i.e., hand-held calculators. The backgrounds of the managers were: operations, engineering, finance, marketing and international.

Experiment Conditions

The Ohio State Leadership Survey instrument was administered to each firm and its individual members. This Leadership Model consists of 30 questions that establish a score for a dimension called Initiating Structure (henceforth called either Structure or Task) and a score on the dimension of Consideration (Affiliation). These scores have been found to separately measure the predisposition of managers to focus on the task or structure of the situation from the inclination to give priority to the human or behavioral considerations involved in the leadership function. The scores of the members were averaged and used as the scores for each of the firms. Comparison of the individual scores of the ten firms yielded the following classifications:

Group No.	Structure Score	Consideration Score
1	Hi	Avg
2	Hi	Hi
3	Avg	Lo
4	Avg	Hi
5	Lo	Avg
Hi	High	Avg
Average	Lo	Low

While there were two firms in each leadership group based upon the evaluation of their leadership attributes, all firms were free to act according to their own goals and perceptions. The five groups of ten firms participated in a semester long business simulation developing a total of thirteen comprehensive decisions over a simulated three and one-quarter years period.

Exogenous events such as changing wage and salary rates, material prices, interest rates, productivity occurred in each of the periods one through twelve. To achieve goals and protect the value of their assets, each firm had to act and react to these and other potential and real happenings.

Individual firm performances within the industry were measured by a weighted ranking of sales, profits and returns on assets, equity, etc.

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In each simulated period the following data were accumulated in the Center's database:

- the firm's identity
- the firm's decisions
- the environmental events the firm's parameters
- the firm's performance measures
- the industry's averages for parameters and measures

Firms were provided with data regarding their own parameters as well as industry parameters to further facilitate more sophisticated strategy formulation. Two statistical packages were integrated into the Center's software to permit on-line to monitoring of accumulating statistical data: Minitab and SPSS.

RESULTS

The primary objective of this experiment was to conduct initial explorations of the dynamic links between leadership attributes and strategy formulation and its reformulation under changing conditions. Certain previous, limited and static studies have shown the importance of an improved understanding of underlying managerial styles to the field of strategy formulation. (Carlyn, 1977) DeWaele, 1978) (Henderson, 1980)

T-Tests

Hypothesis I: Groups with different leadership attributes will emphasize different decision variables.

The variables examined included Selling Effort, Research, Market Research, Unit Manufacturing Costs, Plant Capacity, Inventory Levels, Sales Staff, Production Levels, Price, Sales and Profit. T-tests were used to establish the decision variables on which each group's usage differed ($p < .20$) with respect to the remaining firms as a group across the entire experiment (Decisions 1 thru 13).

As this experiment is considered to be exploratory, a $p < .2$ was employed so as to retain most all variables of possible interest. Due to the large number T-tests involved across the enumerated periods and space imitations, detail parameter of the tests have been omitted for brevity.

T-tests Across Ali Periods

Profile Significantly Different Strategic

SC	Variables Used ($p < .20$)
1	Hi Avg Market Research, Inventory Levels
2	Hi Hi Research, Market Research, Plant Capacity
3	Avg Lo Price, Production level, Market Research, Unit Costs, Capacity
4	Avg Hi Market Research, Research, Inventory Levels, Capacity

5 Lo Avg Market Research, Inventory Levels S Structure or Task C Consideration

The foregoing tabulation does not indicate whether a particular usage was above or below the industry mean.

The two groups with Average Consideration employed only the forces of market research and low inventory levels - a conservative position. Both groups having High Consideration stressed research, market research and capacity-long term planning considerations. The AvgS/LoC Group generally adopted the shorter term view - price, production, unit costs and market research - bottom line determinants. The T-Tests suggest here that Consideration may have greater influence on strategy formulation than Structure (Task).

T-tests Across 3 Intervals of Decisions

Hypothesis II: If a group perceives change in its goals or environment, the group will adapt or change its strategy accordingly. The strategy process is dynamic and it is necessary to study its transient states. To accomplish this examination, Group 2 (HiS/HiC) theoretically possessing the ideal leadership attributes was compared by T-tests with the balance of the industry over the annualized decision periods of 1-4,5-8,9-12 to identify adaptations in strategy content under the changing conditions of the experiment.

In the initial period, Group 2 was managed below other groups in its marketing and research efforts. In mid-phase, Group 2 pursued uniqueness of low inventories and small sales staff. In the last phase, this group advanced its marketing effort and capacity while controlling for lower prices and unit costs - a 'market share' approach.

From the data, Group 2 effected an adaptation over time from a conservative, low risk and cost strategy to a stronger marketing and controlled volume/cost strategy with attention on cost controls.

T-tests Hi/Structure vs. Low/Structure Groups

Hypothesis III: HiS groups will formulate different strategies from Lo/S Groups. To examine this hypothesis, Groups 1 and 2 were considered to be the HiS Set and Groups 3,4 and 5 were classified as the LoS set.

In the initial phase, the HiS set maintained significantly lower marketing effort, research, inventory and prices than the Lo/S set. HiS concentrated upon capacity, production levels and units sold. The group can be linked to a conservative, low cost and price, safe strategy relative to the LoS set of groups or firms. By the final phase of the experiment, the HiS set had reconfigured the significant dimensions of its comparative strategy to a stronger sales staff and extension of its low unit manufacturing costs. It

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appears that initial strategies of groups possessing extremes of Structure can differ sharply, but learning and experience tend to moderate the differences.

T-Tests Hi/Consideration Group vs Lo/Consideration Group

Hypothesis IV: HiC groups will formulate strategies different than LoC Groups.

The influence of social forces on strategy formulation is been of major interest to the researcher of strategy formulation. To extend this line of investigation, two sets of groups were segregated - Groups 2 and 4 representing the Hi/Consideration set; Groups 1,3 and 5, the Lo/Consideration set. The relative strategic behavior of the two Consideration sets was as follows:

Phases Hi/Consideration vs Lo/Consideration Sets

Studied Strategic Variable Differences

1 - 4 Marketing Effort(b), Research(b),

Capacity(b), Inventory(b), Sales(b)

Production(b), Price(a), Unit Costs(a)

Sales Staff(b)

9 - 12 Inventory Levels(b)

During the first phase, the HiC set pursued an extremely conservative strategy with unit costs substantially out of control. By the final phase, the strategy of the HiC grouping had become indistinguishable from the broad, average behavior of the industry. Most traces of uniqueness of strategy had disappeared. This data would suggest that HiC does shape, initial strategy formulation relative to LoC groups or firms. Here, also, learning and experience tend to moderate the differences, but not eliminate them.

Factor Analyses

T-tests provided considerable insight to the significant behavior patterns of the leadership groups. To further explore and enhance the links between the leadership attributes of the groups and the related strategy formulations, Factor Analysis was applied to the accumulated database to distinguish the major Factors employed by the industry to achieve their corporate goals.

The extracted Factors were then used in Discriminant Analyses to isolate the strategies used by each leadership group. Factor

Analysis using Varimax rotation identified the following variables as explaining more than 90% of the variance in the strategy database:

Group, Marketing Effort, Profit, Research, Unit Costs, Price, Capacity, Sales Staff and Inventory Levels. The analyses also showed significant factor loadings on the following variables by phase as follows:

Space does not permit display of the factor loading of each phase or the specific constructions of the associated discriminant functions. Nor does space

permit examination of the changes that occurred in Factor Loadings by groups and across periods.

Discriminant Analyses

The significant forces or variables that were shaping the outcomes of the experiment were inputted in a Discriminant Analysis of the experiment's accumulated database.

Behavior of the leadership groups was found to have changed during the course of the experiment. These responses to changes in the total environment are broadly interpreted as evidence of learning and subsequent alignment to the environmental changes and the changing levels of uncertainty.

The discriminating functions identified over the three phases studied were: Application of these discriminating functions to the five leadership groups yielded the following strategy formulation 'traces' across the three phases studied:

DISCUSSION AND CONCLUSIONS

The goal of this experiment was to further the examination of the links between the attributes of leadership and strategy formulation. However, as this experiment is:

the first substantial test using the University of Hartford Strategy Training and Research Center

(STARC)

a first, experimental design for the studying of leadership/strategy formulation and reformulation performed under laboratory conditions and control

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limited in the longitudinal extent of its database using a basic, unelaborated instrument to establish leadership attributes

The reader is cautioned that conclusions developed data must be considered tentative.

The T-tests confirmed that groups with differing leadership attribute profiles do select significantly different variables in their strategy formulations. The range of strategic behavior appears much greater in the initial phases of managing a changing situation and decreases with learning, skill acquisition and experience.

The leadership groups were found to modify both the variables and magnitudes used in the strategy formulation process in accordance with their perceptions of the changing environment.

Hi/Structure set initially utilized conservative strategies relative to LoStructure set. The HiS set appeared to need fuller knowledge of the environment prior to risk-taking. Significant strategic differences continued to exist between these sets at the end of the experiment.

Initially, the HiConsideration set displayed even wider variation in strategic behavior relative to its LoC set. The HiC set opted for an extremely conservative strategy when compared to the LoC set. HiC appears to restrict initial risk-taking to the lowest common denominator. By the final phase, significant differences between sets had disappeared.

This T-test study of leadership linkages faintly suggests that over time, Structure (Task) tends to progressively shape strategy at the expense of Consideration. Factor Analysis established that different sets of strategic forces were driving and shaping the industry during the phases studied. Industry perceptions and responses were clearly linked, but differed significantly in the three phases studied.

Study of the resulting strategy 'traces' provided by the Discriminant Analysis suggests that each leadership group utilized a unique, although interrelated, set of strategies during the course of the experiment. These unique strategy sets may be described as follows:

1	Description of Strategy Set Used
	Increasing aggressiveness (Prospector)
2	Expansion followed by consolidation (Analyzer)
3	Increasing control and reduction of costs (Defender)
4	Improving contribution margin (Prospector)
5	Incrementing (Defender)

Inserted in parentheses are the strategy types as suggested by the Miles and Snow's strategy typology (Miles & Snow, 1978).

To this point, information about the performance of the leadership groups has been deliberately withheld in order to focus upon the central leadership/strategy linkages. However, to illuminate these linkages from another perspective, it is helpful, in passing, to

connect leadership groups, strategies and general simulation performance.

Using a weighted formula to establish group simulation effectiveness, ranked performance data implies, as a minimum, that leadership groups which scored High on Structure or Consideration or both significantly outperformed those groups that did not.

In summary, on the basis of these empirical analyses, it is concluded that the design and establishment of the Strategy Training and Research Center operationalizes, in addition to field and historical data studies, a third-major method for performing valid, dynamic strategy research, development and training the conduct of this experiment, at least, opens the door to strategy experimentation of intermediate complexity and duration the analyses reported can be used as a beginning point for incisive experimental designs of improved validity.

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