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THE IMPACT OF HIERARCHICAL AND EGALITARIAN ORGANIZATION STRUCTURE ON GROUP DECISION MAKING AND ATTITUDES

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ABSTRACT

This article reports a simulation experiment which compared the decisions made by hierarchically organized groups with decisions made by egalitarian groups. The criterion for evaluating decision quality was return on investment. Overall the return on investment for hierarchically organized groups was significantly less than that of egalitarian groups. However, when sacrifices by individual group members gave a competitive advantage, hierarchically organized groups had a significantly higher return than egalitarian groups. The experiment also found that the hierarchically organized groups spent more time and effort making decisions but enjoyed the task less. The experiment used 64 groups of senior level business students that were organized into 11 computing industries.

INTRODUCTION

The productivity and performance of groups has been a major concern in the organizational behavior literature. A key issue in many of these studies is how to best organize groups. A major dichotomy for this choice is whether to use an egalitarian or hierarchical organizational structure. This study examines the latter question in some detail. Collins and Raven (1969), Glisson and Martin (1980), Steiner (1972), and Vroom (1969) provide reviews of related issues.

The superiority of groups over individuals in certain kinds of decision-making situations has been attributed to a) the shifting of suggestions in social interaction which serves as an error-correcting mechanism, b) the social support furnished in interaction which facilitates thinking, and c) the competition among members for respect which mobilizes their energies for contributing to the task (Blau and Scott, 1963, pp. 121-124). These benefits of the group over the individual may, however, be limited to egalitarian groups since the presence of status differences in hierarchically organized groups may have a debilitating effect on the decision processes. First, status differences may distort the error-correcting mechanisms such as that suggested by Restle and Davis, 1962) since subordinates are less likely to criticize or find fault with the opinion of persons with superior status. Second, the formal status differences may affect the social interaction since lower-status members may egalitarian groups will make equally profitable business decisions.

not receive the social support needed to facilitate their thinking. Presumably egalitarian group members have equal input and equal say (Borsig and Frey, 1979). Third, formal status differences hinder the competition for respect since an individual's status is not a function of the respect of others but is prescribed by the formal structure (Blau and Scott, 1963; Bridges, Doyle, and Mahan, 1968).

The empirical research generally supports the prior contentions. Bridges, Doyle, and Mahan (1968) found the productivity and satisfaction of egalitarian groups in analyzing the "doodlebug problem" (Rokeach, 1969, pp. 171-181) was higher than that of the hierarchically organized groups. The improved productivity was also noted by Harshberger (1971). The increased satisfaction of egalitarian groups is widely (White and Lippett, 1960; Kahn and Katz, 1960; Harshberger, 1971) but not universally (Borsig and Frey, 1979) noted. In the Bridges, Doyle, and Mahan study (1968), the egalitarian groups also required significantly less time to perform the analysis. Levine (1973) found the equality of power distribution in the egalitarian groups was a crucial key to the improved problem solving performance noted by Bridges, Doyle and Mahan. Also Doyle (1971) confirmed the role of status differences in hierarchical organized groups in reducing group performance.

Hierarchical structures do, however, provide improved coordination (Katz and Kahn, 1960). As noted by Smith (1970), the improved coordination leads to improved performance on measures which are enhanced by coordination. Although coordination is clearly improved by hierarchical structure, self coordination can yield similar results in egalitarian groups (Morse and Reimer, 1956). It is important to also note that personality and organizational structure can interact to predict satisfaction (Tannenbaum and Allport, 1956; Wilson, Arnoff and Messe, 1975) and productivity (Wilson, Arnoff, and Messe, 1975). That is, when personality and structure are compatible, higher productivity and satisfaction result.

The purpose of this experiment is to compare the performance of hierarchical and egalitarian groups in a business setting. The null hypothesis was:

Both hierarchically organized and

The literature would suggest that the hypothesis would be rejected and the egalitarian groups would make more profitable decisions. As was suggested by the methodology

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used by Borsig and Frey (1979), the hypothesis was tested using a simulated business setting.

THE EXPERIMENTAL DESIGN

To test the hypothesis 64 groups were formed with subjects drawn from 11 senior level classes (sections) of Business Policy taught at the College of Business Administration, University of Hawaii. Each class was organized into groups of 3 or 4 subjects to serve as a top management team in The Multinational Management Game (Edge, Keys and Remus, 1980). The subjects were allowed to select their own team members with the provision that each group would have at least one accounting or finance major.

Each group represented a multinational corporation with divisions in three countries (Japan, the United States, and West Germany). In the groups with 3 subjects, each subject served as a director of one division. The directors consulted with each other to the degree they felt necessary but there were no formal status differences between the directors. These groups were termed egalitarian. In the groups with 4 subjects, a Chief Executive Officer (CEO) was appointed to supervise the three division directors. These were termed hierarchical groups. Some industries contained only 3-person or 4-person teams; these we termed homogeneous industries. Some contained both 3 and 4 person teams; these we termed heterogeneous industries. As discussed later, all the preceding variables were statistically controlled to avoid confounding.

All groups played eight simulated quarters from initially equal starting points. The subjects were required to develop business strategy and tactics in order to successfully compete in an international setting. This required a series of complex decisions in marketing, production, and finance at the division level and interdivisional transfers of cash and/or products. In addition, decisions about dividends and the issuance or recall of stock occurred at the corporate level. Steps taken to standardize procedures within the 11 class sections included:

- 1) All classes received the same introduction to the game by the same game administrator using a standardized format.
- 2) All decisions were made over the same time period with each group making one decision per week for eight consecutive weeks.
- 3) All economic variables were identical for all groups.
- 4) All measures of performance and grading weights were held constant.

- 5) All subjects input their own decisions via computer terminals and received printed output directly from the game administrators.

The subjects were told that grading of performance in the game would be based predominately on Return-On-Investment (ROI). ROI was also used as the dependent variable for our analyses. Division managers were evaluated on the basis of their divisional ROI. For example, division managers in Japan competed with all other Japanese divisions for market share, and their performance was measured against all other Japanese divisions in that section. The primary objective of the division managers was to obtain the highest possible ROI in their division. The CEO's performance was measured by the overall corporate ROI. It is important to note that corporate performance could be enhanced by the transfer of goods between the divisions. This transfer, however, could adversely affect the performance of the sending (Japanese) division because the transfer cost was set at the unit production cost of the sending division.

Each class section functioned as a separate industry so competition was only with the other groups within that section. The subjects' performance in the simulation was given a weight of 15% of their final course grade. Additionally, each subject completed the post simulation attitude questionnaire (Remus, 1977, pp. 489-490) during the final week of class.

RESULTS

RETURN ON INVESTMENT

The central hypothesis was tested using analysis of variance. The independent variables were egalitarian vs. hierarchical firm organization, country in which the division was located, and whether the industry was homogeneous or heterogeneous. Also the interaction terms were tested.

As shown in Table 1 there were significant differences between egalitarian and hierarchical organizations ($p=.076$), significant differences among the three countries in which the divisions were located ($p=.028$), and a significant interaction between organization structure and industry structure ($p=.003$). As shown

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in Table 2, the egalitarian groups earned a significantly better ROI than the hierarchical groups. This variable, however, interacted with industry structure ($p=.003$); egalitarian groups performed better in homogeneous industries and hierarchical groups performed better in heterogeneous industries. Also due to the nature of the transfer pricing mechanism, the returns were less in Japan than elsewhere. Table 3 reveals that particularly in hierarchical groups the Japanese ROI was reduced.

To further explain the differences, the Questionnaire responses of the two groups were compared using the t-test; the questions and results obtained in post testing are presented in Table 4 and summarized below.

ENJOYMENT OF THE TASK

The subjects in the egalitarian groups enjoyed the task more than the subjects in the hierarchical groups ($p.07$). This finding is consistent with Remus (1977) and Remus and Jenner (1981) who found a significant correlation between the subjects' enjoyment of the task and the group rank. That is, the egalitarian groups would be predicted to enjoy the task more than the hierarchical groups since the former had a better return on investment than the latter.

GOALS

Locke (1968) suggested that high goals lead to high performance. In this study group goals were not significantly correlated with performance. There were no significant differences between the hierarchical and egalitarian groups' self-reported goals. Thus differences in goals cannot be used to explain the difference in performance of the groups.

DECISION-MAKING STRATEGIES

The subjects did not differ significantly in their self-reported decision-making strategies as measured by questions 4 to 7. The hierarchical groups did, however, make more decisions involving international transactions (transfer of product and cash between divisions) than the egalitarian groups.

TIME AND EFFORT

The subjects' responses to question 8 reveal a significant difference in the time and effort required. Apparently, the hierarchical groups required more time and effort to reach their decisions. The latter is consistent with the findings of Bridges, Doyle and Mahan (1968). The amount of time and effort expended was not correlated with

rank for hierarchical groups but was correlated for egalitarian groups ($r=.1717$, $p=.053$).

DISCUSSION AND CONCLUSION

Although the finding that hierarchical groups were less effective than egalitarian groups was expected, the magnitude of the difference was unexpected. It is surprising that the addition of a supervisor to a team should adversely effect the decision-making to the degree that the data seems to indicate. This is especially true if one questions whether there really is any status difference between the appointed CEO and the division managers in a business simulation. The two factors that may have influenced the results of this study, the structure of the industries and the dynamics of the three divisions, were controlled statistically when reaching the latter conclusion.

The overall results confirm the Bridges, Doyle, and Mahan (1968); Doyle (1971); Harshberger (1971); Katz and Kahn (1969); and White and Lippett (1969) studies in a business setting. But it is interesting to note that egalitarian teams do not always perform better than hierarchical firms. The interaction, reported in Table 2, shows hierarchical teams to have higher ROI in heterogeneous industries and egalitarian teams to have higher ROI in homogeneous industries.

In heterogeneous industries, the hierarchical firms gained an advantage by getting their Japanese division to transfer goods at attractive prices. As noted earlier, more transfers were made by hierarchical groups. In homogeneous industries, these transfers gave no competitive advantage but instead fueled competition and thereby reduced everyone's ROI. On the other hand, the egalitarian teams did well when competing with similar firms; then oligopolistic tendencies emerged and the ROI's were higher.

The latter findings suggest that egalitarian groups do not always perform better than hierarchical groups. The hierarchical leadership can force organizational sacrifice which egalitarian groups cannot force. This sacrifice can, as was shown in this study, lead to better return on investment than can be achieved by egalitarian groups provided the sacrifice gives a competitive advantage. This finding and interpretation is consistent with Smith (1970) and Borsig and Frey (1979).

The subjects' attitudes toward the tasks were consistent with their performance. The successful egalitarian groups enjoyed the task more than the less successful hierarchical groups. The former found the task a more valuable experience; the latter

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attributed the lack of success to luck. Those groups that had to interact with the CEOs reported they expended more time and effort than the groups where interaction requirements were less. Interestingly, there were no differences in self-reported decision-making strategies although groups having CEOs adopted more international strategies. The addition of a CEO had the effect of making the group more multinational in scope.

As with earlier studies, rank as measured by ROI had an effect on attitudes. In the Remus and Jenner (1979) study, it was noted that the correlation between rank and enjoyment was larger for individuals not on a team than for individuals on a team. In this study, the correlation was larger for egalitarian than for hierarchical groups. Apparently the increasing levels of social interaction weakened the relationship between performance (rank) and satisfaction. This finding explains why Doyle (1971); Bridges, Doyle, and Mahan (1968); Harshberger (1971); Katz and Kahn (1969); and White and Lippett (1969) observed that egalitarian groups enjoyed the task more. The egalitarian groups performed better and, therefore, were more satisfied.

FOOTNOTE

This instrument was used in the Remus (1977) and Remus and Jenner (1979, 1981) studies. The questionnaire can be found in the appendix of Remus (1977). Its relationship to the literature and similar instruments is reported in Remus and Jenner (1981). Technical details such as its reliability of .79 are also reported in Remus and Jenner (1981).

REFERENCES

1. Blau, P.M., and R. Scott. San Francisco, California: Chandler Publishing Company, 1963.
2. Borsig, C.A.H. and D. Frey. Satisfaction with Group Processes and Group Decision as a Function of Group Structure. Psychological Reports, 1979, 44: 699-705.
3. Bridges, E., W. Doyle, and D. Mahan. Effects of Hierarchical Differentiation on Group Productivity, Efficiency and Risk Taking. Administrative Science Quarterly, 1968, 13: 305-319.
4. Collins, B.E. and B.H. Raven. Group Structure: Attraction, Coalitions, Communication, and Power. In G. Lindzey and E. Aronson (Eds.). The Handbook of Social Psychology (2nd Edition) (Volume 4) Reading, Mass.: Addison-Wesley, 1969.
5. Doyle, W. Effects of Achieved Status of Leader on Productivity of Groups. Administrative Science Quarterly 1971, 16: 40-52.
6. Edge, A., B. Keys, and W. Remus. The Multinational Management Game: Students Manual Plano, Texas: Business Publications, 1980.
7. Glisson, C.A. and P.Y. Martin. Productivity and Efficiency in Human Service Organizations as Related to Structure, Size, and Age. Academy of Management Journal 1980, 23, 21-37.
8. Harshberger, D. An Investigation of a Structural Model of a Small Group Problem Solving. Human Relations, 1971, 24: 43-63.
9. Levine, E. Microcosm: Group Performance and Group Members Satisfaction As a Function of Differences in Control Structure. Journal of Applied Psychology, 1973, 58: 186-196.
10. Locke, E. Toward a Theory of Task Motivation and Incentives. Organizational Behavior and Human Performance, 1968, 3: 157-189.
11. Kahn, R.L. and D. Katz. Leadership Practices in Relation to Productivity and Morale. In D. Cartwright and A. Zander (Eds.), Group Dynamics: Research and Theory, (2nd Edition). New York: Harper and Row, 1960.
12. Morse, N.C. and E. Reimer. The Experimental Change of a Major Organizational Variable. Journal of Abnormal and Social Psychology, 1956, 32, 120-129.
13. Porter, L.W. and E.E. Lawler. Managerial Attitudes and Performance. Homewood, Illinois: Irwin-Dorsey, 1968.
14. Remus, W. Who Likes Business Games? Simulation and Games, 1977, 8: 64-6 8.
15. Remus, W. and S. Jenner. Playing Business Games: Attitudinal Differences Between Students Playing Singly and in Teams. Simulation and Games, 1979, 10: 75-86.
16. Remus, W. and S. Jenner. The Expectations and Realities of Business Games. Simulation and Games, 1981, 12: 480-488.
17. Restle, F. and J.H. Davis. Success and Speed of Problem Solving by Individuals and Groups. Psychological Review, 1962, 69, 520-536.
18. Rokeach, M. The Open and Crossed Mind. New York: Basic Books, 1960.

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19. Smith, C. Consultation and Decision Processes in a Research and Development Laboratory. Administrative Science Quarterly 1970, 15, 203-215.
20. Steiner, J.D. Group Processes and Productivity. New York: Academic Press, 1972.
21. Tannenbaum, A.S. and F.H. Allport. Personality Structure and Group Structure: An Interpretative Study of Their Relationship Through an Event-Structure Hypothesis. Journal of Abnormal and Social Psychology. 1956, 53, 272-280.
22. Vroom, V.H. Industrial Social Psychology. In G. Lindzey and E. Aronson (Eds.) The Handbook of Social Psychology. (2nd Edition) (Volume 5). Reading, Mass.: Addison-Wesley, 1969.
23. White, R. and R. Lippett. Leader Behavior and Member Reaction in Three "Social Climates." In D. Cartwright and A. Zander (Eds), Group Dynamics Research and Theory. (2nd Edition). New York: Harper and Row, 1960.
24. Wilson, J.P., J. Aronoff, and L.A. Messe. Social Structure, Member Motivation, and Group Productivity. Journal of Personality and Social Psychology, 1975, 52: 1094-1098.

Table 2
AVERAGE RETURN ON INVESTMENT (ROI)
FOR THE SIGNIFICANT
INDEPENDENT VARIABLES

<u>FIRM'S ORGANIZATION</u>	ROI
EGALITARIAN	14.46
HIERARCHICAL	8.74
<u>COUNTRY</u>	
W. GERMANY	13.78
JAPAN	5.29
USA	15.44
<u>INDUSTRY VS. FIRM'S ORGANIZATION</u>	
	INDUSTRY
FIRM	HOMOGENEOUS HETEROGENEOUS
EGALITARIAN	18.48 9.36
HIERARCHICAL	1.50 12.49

TABLE 3
RETURN ON INVESTMENT (ROI) BY FIRMS
ORGANIZATION AND COUNTRY
ROI

<u>EGALITARIAN</u>	ROI
W. GERMANY	15.97
JAPAN	12.41
USA	15.14
<u>HIERARCHICAL</u>	
W. GERMANY	11.76
JAPAN	-.87
USA	15.68

TABLE 1
ANALYSIS OF VARIANCE FOR
RETURN ON INVESTMENT (ROI)

MAIN EFFECTS	SUM SQUARES	DEGREE OF FREEDOM	F	SIG
INDUSTRY STRUCTURE	112	1	.247	.620
FIRM'S ORGANIZATION	1449	1	3.188	.076
COUNTRY	3342	2	3.677	.028
2-WAY INTERACTIONS				
INDUSTRY * FIRM.	4206	1	9.257	.003
INDUSTRY * COUNTRY	61	2	.067	.936
FIRM * COUNTRY	1454	2	1.600	.205
3 WAY INTERACTION	233	2	.257	.774
RESIDUAL	68159	150		

TABLE 4
RESPONSES TO QUESTIONNAIRE AFTERPLAYING THE
MULTINATIONAL MANAGEMENT GAME
(SCALE: 1-STRONGLY DISAGREE,
3=NEUTRAL,5=STRONGLY AGREE)

QUESTION	EGALITARIAN (N=81)		HIERARCHICAL (N=113)		T	PROB. (192 D.F.)
	MEAN	STD. DEV	MEAN	STD. DEV		
1. ENJOYMENT	4.30	.83	4.07	.98	.82	.070
2. SET GOAL TO WIN	4.11	1.08	4.33	.95	-1.47	.82
3. WANTED TO RANK FIRST	4.28	.94	4.30	.97	-.12	.903
4. SYSTEMATIC DECISION MAKING	3.52	1.05	3.41	1.02	.74	.460
5. CONSERVATIVE DECISION MAKING	3.42	1.09	3.41	1.30	.02	.982
6. GAMBLES	3.43	1.23	3.34	1.20	.47	.636
7. CONSISTENT STRATEGY	3.22	1.16	2.99	1.11	1.40	.163
8. SPENT A LOT OF TIME	3.51	1.10	3.90	.87	-2.64	.009