

SENIOR MANAGEMENT, THE LOCUS OF DECISION MAKING  
AND THE MANAGEMENT SERVICES DEPARTMENT

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### ABSTRACT

An earlier study (Lucas, 1984), while finding support for the Hickson (1971) framework for organizational power, found that department managers in three major industrial firms rated their information services department as the least critical of five departments, for success in their industry. This study polled 37 plant managers from the same firms. Plant managers, like their department manager counterparts, considered the information services department least critical for success. Centralization of decision making was found to be positively related to information services department power. Finally, implications of the study on distributed versus centralized information processing are discussed.

## INTRODUCTION

In an earlier study, 136 department managers described their perceptions of the power and influence of the information services department (Lucas, 1984). The study applied Hickson framework for organizational power (1971) to the relationship between the information services department and other departments in plants in three multinational firms.

The Hickson framework hypothesizes that there are four conditions which lead to a high level of departmental power in the organization:

1. A department's ability to help the organization cope with uncertainty.
2. The degree of difficulty of substituting for a department's output.
3. High workflow pervasiveness (a high degree of interconnection with other departments) and immediacy (how quickly a disruption affects other departments).
4. The degree to which other departments depend on the output of the department in question.

The information services department is characterized by high coping with uncertainty low substitutability, high pervasiveness and high immediacy of impact. Based on the Hickson framework, one expects information services to exhibit a high level of power in the organization.

The first study led to the somewhat surprising discovery that the information services department was perceived by department managers, as having low power and influence compared to four other departments. As expected, information services demonstrated high coping with uncertainty and high immediacy. Less expected were findings of ease of substitutability, low severity of workflow disruption and few interconnections.

Correlation and regression analysis supported the relationships hypothesized in the Hickson framework. Lucas (1984) suggests that the

unexpected findings may be attributed to a lack of information services department centrality and concealment of the department's power. The organizations in the study were manufacturing firms, and most of the systems were batch processed, "back office" transactions processing applications.

#### THE CURRENT STUDY

The purpose of the study reported here is to determine if senior management of these same plants has a different view than department managers of the contribution of the information services department, and if the structure of decision making in the plant influences ratings of the information services department. The perceptions of the chief executive should help to judge whether or not lack of information services centrality is associated with reduced ratings of this unit's power.

The structure of decision making, whether highly centralized or decentralized, should also provide guidelines for the management of information processing. For a number of years, decentralized management has been recommended to provide local control and response to problems, create a greater sense of autonomy and serve as a training ground for managers.

Distributed or decentralized processing has been recommended for a number of the same reasons as decentralized decision making. Proponents of distribution argue that users will be able to control their own processing, respond to local conditions and will become more knowledgeable about information systems.

The data collected for this study make it possible to correlate the degree of centralized decision making in the firms with management perceptions of the information processing department. Unfortunately there was not enough variance in the type of computing services provided to draw conclusions about centralized, decentralized and distributed processing. However, the style of decision making in the

firms provides evidence which bears on the kind of information processing that users find most attractive.

### Methodology

The sample in this study consists of respondents from 37 plants, each of which is owned by one of three multinational manufacturing firms. Each plant's chief executive completed a questionnaire in an interview setting at the time data were collected from the department managers. While these managers were the most senior managers at the plant, they were not necessarily corporate officers. The plants averaged 647 employees with a range of from 120 to 2100. On the average, 30% of a plant's sales went to the parent company, 25% to consumers, 40% to industry and 5% to government.

### Variables in the Study

Table 1 contains a list of the variables in the study. The questionnaires were analyzed with correlation and factor analysis techniques to develop scales; related items were averaged to form scaled variables. In the previous study, if a plant had more than one department with the same function, or coequal managers led a single department, department manager responses were averaged to yield a composite department manager score for that plant.

<INSERT TABLE 1 HERE>

Table 1 is divided into two parts; the first contains the variables in the study from the plant manager questionnaire. The second part of the table contains the variables from the department manager questionnaire.

For plant managers, the decentralization variable is a scaled

response to a large number of questions adopted from a study by Blau (1974). The items in this scale ask the respondent to indicate the level at which a decision can be made for activities in a number of areas like personnel, production and budgets. A respondent is defined as having the authority to make a decision if he or she can commit the organization to a course of action without prior approval from a higher level manager. The fact that a manager may have to report after having made the decision, does not alter the manager's degree of autonomy. This scale is scored so that a higher numerical value means that decisions are more decentralized, i.e. a manager at a lower level of the organization has the authority to make the decision.

The perception of department characteristics by the plant manager is derived from responses to single items asking about the clarity of job requirements in the department, degree of task difficulty, time to feedback, ability to define own objectives, influence by other departments and importance of the department for the success of the plant.

The level of support variable perceived by the plant manager is a scaled response to a series of questions about the amount of computer support for batch and on-line processing in a number of functional areas of the plant.

The second part of Table 1 contains variables for department managers; most of these variables were included in the earlier study, but some new ones are reported here. Influence is a scaled variable consisting of averages of perceptions of the influence a department has on decisions such as the development of new marketing strategies, pricing, introduction of new products, acquisition of equipment, production planning, and budgeting. Power is an average response to questions on the power each department has from contributing to profits, preventing disruptions, formal position and solving problems.

Coping with uncertainty asks the extent to which a department helps the respondent's department cope with uncertainty by reducing the variability of inputs, providing information on potential

problems, and reducing output variability. Other items under coping are single questions, such as the extent that circumstances do not change in a department and the extent to which the same work is done daily. Workflow refers to how long it would take for a disruption from a department to impact the firm and how severe a disruption would be. Dependence is a perception of the extent to which the department is connected to the respondent's department and the extent to which the respondent's department depends on the one in question.

Involvement is the extent to which the respondent has been involved in new applications and the time spent on design. The respondents also rated the potential of the computer as a managerial decision-making aid. Respondents indicated their personal influence on design and rated their overall satisfaction with information services.

In addition to the department manager variables above from the original study, the research reported here includes the department managers' ratings of the level of batch, on-line and time-sharing support for various functional areas in the firm. Also included is a variable on the perceived value of information processing and a scale measuring the respondent's attitudes toward the information services department staff.

## RESULTS

### Plant Managers

Table 2 contains rankings by plant managers on the characteristics of the environment of the five departments in the study. Senior managers see the information services department as having unclear job requirements and high task difficulty. This department has the longest time to feedback and little opportunity to define its own objectives. It is also seen as the least influenced by other departments.

Similar to the department managers in the earlier study, the highest level executive at the plants sees information services as by far the least important department for the success of the plant.

This finding is highly consistent with the hypothesis that low rankings of power for information services may be result from the department not being perceived in this manufacturing environment as central to the mission of the organization.

<INSERT TABLE 2 HERE>

### Plant Versus Department Managers

To examine the relationship between of the degree of decision-making decentralization and information services department rankings, the responses on plant manager ratings for decentralization of decision making and level of computer support were attached to the responses for each department manager in the plant. Since there was a 1:N relationship between plant managers and their department managers, it was necessary to propogate the plant manager responses for each affiliated department manager. For example, if the plant manager rated decentralization as a 2.5, then that variable on decentralization was propogated with the same value for each department manager who worked in the plant. The same approach was followed for the plant manager's ranking of the level of computer support.

Table 3 presents the results of correlating each of three variables: 1) plant manager ratings of degree of decentralization in decision making 2) department managers ratings of the level of computer support 3) and the plant manager's ranking of level of computer support, with the various variables from the department manager questionnaire on information services department influence, power, variables related to power and variables concerning information processing like involvement.

It should be noted that the mean response for centralization in the sample was .48 with a standard deviation of 1.6 and an n of 110. The scale for centralization ranged from 0 (most centralized) to 3 (least centralized). The results in this section should be interpreted with caution because it appears that the plants and firms



in this study are highly centralized. The data, then, represent rather small deviations in what is basically a centralized environment

The results in the table show that department manager ratings of information services department influence and power are greater in plants with more centralized decision making. Coping with uncertainty is also correlated with centralized decision making, though following the same procedures each day is negatively correlated with decentralization. Centralization is associated with more connections to the information services department, and greater dependence on it.

More centralized decision making is correlated with higher levels of reported involvement in systems by department managers. Decentralized decision making is significantly correlated with a tendency to stay within budgets for information processing. The development of new applications and the value of systems are related more highly under centralized decision making.

Department managers associate high levels of computer support with high information services department power. Plant managers, however, have the opposite association. For this latter group, higher levels of computer support are related to lower information services department power.

For the variables that describe information processing activities, there is substantial agreement between plant managers and department managers with respect to level of computer support. Both groups of managers associated high levels of support with greater involvement in systems activities, their own greater influence on systems, more likelihood of exceeding budget, higher quality of the development and support of applications, and higher value of information processing. Department managers associate high levels of support with greater satisfaction with information processing and more favorable ratings of the information services department staff.

<INSERT TABLE 3 HERE>

## CONCLUSIONS

The results for plant managers are remarkably consistent with the picture that emerged in the earlier study of department managers (Lucas, 1984). Like their department manager counterparts, senior executives at the plant perceive information services at their plants as not being critical to the success of their business.

The sample in both studies was drawn from highly centralized plants. The majority of the applications processed transactions, and most operated in a batch processing mode. This type of application is generally not in the forefront of business decision making. Consequently, these systems may easily be perceived as secondary to the main mission of the firm. The findings of this study lend support to the notion of centrality as important in considering power (Lucas 1984). The relatively low state of technology in the sample probably contributed to plant manager perceptions of low systems criticality. A repetition of the study in an environment with more central applications for the mission of the organization (e.g. on-line systems, DBMS applications and DSS) might uncover different perceptions. It is interesting to note, however, that this study did find a relationship between level of support and the perceived value of information systems.

Other explanations for perceptions of low information systems criticality are possible. Perhaps information services departments do not "market" their services as well as other departments. Applications backlogs, constant crises, lack of resources, et al may preclude the information services departemnt from advertising the availability and the importance of their services. Perceptions are more quickly and more strongly molded by systems failures, downtime and inability to meet deadlines, than they are with the less visible and less tangible success of an application.

There are at least two possible explanations for the suggestion that plant managers as well as department managers do not find

information processing central to the mission of their organizations. The first is that information services is perceived as "back office" support. Firms do not consider themselves successful due to the strength of back office support. The second explanation is that though information services are in reality crucial, various factors conceal their criticality from both department and plant managers.

#### Centralization and Systems

Centralization, as reported by plant managers, is related to more user involvement in systems development, less likelihood of exceeding budgets, and higher ratings of new applications and their value. Perhaps in a centralized decision making environment, managers have greater needs for specific information applications themselves. As a result, they participate more in systems development. Their increased participation would be related to higher ratings of satisfaction with these applications and more favorable perceptions of their value. In a less centralized environment, the top manager may depend more on subordinates to provide information and therefore take less notice of information systems.

#### Future Research

These findings led to speculation on the power and influence of information processing in a distributed environment. Moving responsibility for processing to user department managers is consistent with a more decentralized decision making style. Therefore, one expects that a firm that encourages decentralized decision making along with distributed processing should see less power attributed to the information services department(s). The popular notion that distributed processing delegates power to users may turn out to be the case.

The findings of the study with respect to the level of computer support also have implications for management. High levels of computer support are positively related to power and to variables that are considered antecedents of power. High support is also associated

with more favorable ratings of information processing activities.

This study found that in a heavily batch, transactions processing environment, perceptions of information systems power and influence are low. This finding may be explained by lack of systems centrality or by poor marketing of the information services area to users, a contributing factor to the concealment of the importance of information processing. Decentralized environments, including those with distributed processing, are likely to exhibit perceptions of low information systems power and influence. However, when managers are involved in applications development, they should develop more favorable perceptions of applications success and value. These latter evaluations are important and should be encouraged. If distributed processing turns out to be associated with lower ratings of information services power, but encourages users to become more involved in systems activities, distributed processing will have helped solve at least one troublesome set of problems in many organizations.

For most firms, information systems activities are crucial, whether back office support or in highly visible, strategic applications. Management's failure to recognize the importance of information processing can result in significant problems. Information processing is too important to be left to computer professionals alone, managers at all levels must help control the systems effort.

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Table 1. Variables in the Study

Plant Manager

DEC	Decentralization of decision making
CLAR	Clarity of department's job requirements
DIFF	Degree of difficulty of department's tasks
FEED	Time until department receives feedback
OBJ	Department's ability to define its own objectives
INF	Department's influence by other departments
IMPON	Department's relative importance
LEV1	Level of computer support

Department Manager

Dependent Variables:

INF	Influence of accounting, engineering, marketing, production and information services department
POWER	Power of accounting, engineering, marketing, production and information services department

Independent Variables:

COPE	Coping with uncertainty in general
ENV	Coping with environmental uncertainty
OPER	Coping with uncertainty from operations
CHG	Lack of changing circumstances
PROC	Following set procedures
SAME	Does not do the same work each day
REP	Substitutability, difficult to replace

Pervasiveness and immediacy of workflow measured by:

TIME	Time of halted output to impact firm
LEN	Length of disruption
SEV	Severity of disruption
CONN	Dependence: few connections to this department
DEP	Depend on this department

Information Services:

INV	Involvement of users
POT	Managerial decision making potential of computers
OWN	Personal influence on new systems
SAT	Satisfaction with information systems
BUD	Department activities stay within budget
NEWAPP	Rating of development/operation of applications
VALUE	Value of information systems
ISDSTAFF	Rating of information services staff
LEV2	Level of computer support

Table 2. Plant Manager Ranking<sup>b,c</sup>

	Acctg	Engin	ISD	Mktg	Prod	Numeric Rank ISD	Implication	n sig <sup>a</sup>
Clarity of job Reqs.	2.6	3.0	3.5	3.7	2.5	4	unclear job reqs.	(8)
Degree of Difficulty	3.3	4.6	4.3	3.9	4.1	4	high difficulty	(5)
Time to Feedback	2.4	3.1	2.6	2.9	1.6	5	slowest time to feedback	(6)
Ability to Define Own Objectives	4.5	3.5	4.4	3.9	4.1	4	little ability to define own objectives	(3)
Deg. Infl. by other Departments	3.4	3.5	3.6	2.6	2.6	5	least influenced by other departments	(6)
Rel. Import. in Industry	2.8	1.8	3.1	1.6	1.6	5	least important for success	(7)

<sup>a</sup>Number of pairwise t-tests out of 10 significant at 0.10 or better

<sup>b</sup>Sample size ranges from 18 to 35

<sup>c</sup>All responses range from 1 to 7 except feedback (1 to 6)

Table 3. Variable Correlations With  
Plant Manager and Department Manager  
Ratings of Level of Computer Support  
and with Degree of Centralization

<u>Var.</u>	<u>Description</u>	<u>Centralization</u>	<u>Level Support (Dept. Mgrs)</u>	<u>Level Support (Plant Mgr.)</u>
INF	Influence	-.13 <sup>a</sup> (108) <sup>1</sup>	NS	-.44 <sup>c</sup> (61)
POWER	Power	-.25 <sup>c</sup> (109)	.26 <sup>c</sup> (100)	-.18 <sup>a</sup> (61)
COPE	Coping with Uncertainty	-.23 <sup>b</sup> (90)	.18 <sup>b</sup> (85)	NS
ENV	Coping with Env. Uncert.	NS	NS	NS
OPER	Coping w. Operat. Uncert.	NS	NS	NS
CHG	Lack of Changing Circumstances	NS	NS	NS
PROC	Following Set Procedures	.16 <sup>b</sup> (106)	-.21 <sup>b</sup> (97)	NS
SAME	Does not do Same Work Every Day	NS	NS	NS
REP	Substitutability	NS	.19 <sup>b</sup> (97)	NS
TIME	Time for stoppage to hurt firm	NS	-.27 <sup>c</sup> (99)	NS
LEN	Length of Disruption	NS	NS	NS
SEV	Severity of Disruption	NS	.21 <sup>b</sup> (96)	NS
CONN	Few connections to department	-.22 <sup>b</sup> (96)	-.34 <sup>c</sup> (91)	NS
DEP	Depend on Department	-.22 <sup>b</sup> (94)	.28 <sup>c</sup> (89)	-.22 <sup>a</sup> (51)

(continued)



(Table 3 - continued)

<u>Var.</u>	<u>Description</u>	<u>Centralization</u>	<u>Level Support (Dept. Mgrs)</u>	<u>Level Support (Plant Mgr.)</u>
INV	Involvement of Users	-.25 <sup>c</sup> (104)	.18 <sup>b</sup> (97)	.28 <sup>b</sup> (59)
POT	Managerial Potent. of Computers	NS	NS	NS
OWN	Personal influence on systems	NS	.26 <sup>c</sup> (96)	.19 <sup>a</sup> (58)
SAT	Satisfaction with ISD	NS	.33 <sup>c</sup> (96)	NS
BUD	Stays within Budget	.84 <sup>c</sup> (70)	-.16 <sup>a</sup> (68)	-.50 <sup>c</sup> (35)
NEWAPP	Dev./Oper. of New Applications	-.18 <sup>a</sup> (102)	.36 <sup>c</sup> (97)	.20 <sup>a</sup> (59)
VALUE	Value of Systems	-.15 <sup>a</sup> (104)	.34 <sup>c</sup> (98)	.29 <sup>b</sup> (60)
ISDSTAFF	Rating ISD Staff	NS	.36 <sup>c</sup> (95)	NS

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<sup>†</sup>correlation, n

<sup>a</sup> $\alpha < .1$ 
<sup>b</sup> $\alpha < .05$ 
<sup>c</sup> $\alpha < .01$