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STRATEGIC ANALYSIS OF ORGANISATIONAL DECISION-MAKING AS
THE INTERFACE BETWEEN CORPORATE IDIOSYNCRACIES AND THE
ADOPTION OF TECHNOLOGICAL INNOVATIONS: THE CASE OF
BUSINESS INFORMATION SYSTEMS

(In two volumes)

Vol. II

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RESEARCH METHODOLOGY

0. Introduction

A considerable proportion of the literature previously reviewed suggests that organisational climate is an important characteristic of the company and, as such, influences the company's choices. However, it has been pointed out that the concept of "company's choices" is a metaphor: choices are made by individuals.

Accordingly, the concept of organisational climate proves too crude a variable for tackling individual perceptions and expectations. The organisational climate concept becomes operational only when it is broken into characteristics. Thus, various dimensions have been proposed in the literature to analyse organisational climate and determine how they explain actors' attitudes and behaviour as regards adoption of innovation.

The present research postulates that the organisational actors' rationalities and strategies are elements of the set of corporate idiosyncracies which give rise to the organisation's climate. The expression "are elements of" will be explicited in the light of the empirical findings (see, in particular, the first section of Chapter VIII). The concepts of rationality and strategy have been examined in Chapter V, and tentative definitions were provided in its conclusion. Thus, the core question of this research is:

Determining the extent to which differences in

organisational actors' rationalities and strategies, when applied to a similar innovation problem, can explain the variance in final decisions (adoption, rejection, deferred final decision).

In other words, the conceptualisation of an operational interface between non-strictly techno-economic corporate idiosyncracies (inasmuch as they constitute organisational climate) and technological innovation acceptance is worked out on two dimensions: the actors' strategies and rationalities (which are to be understood in the light of the organisational stakes and zones of uncertainty affecting them).

The intersection of this interface with organisational climate appears through the concept of company's idiosyncratic goals, values, norms, etc. The intersection of the interface with adoption process appears through the concept of choices and decision-making procedures. As a result, the research strategy will have to focus on:

- (i) Characterising the rationalities and strategies of different organisational actors;
- (ii) Explaining how these rationalities and strategies differ;
- (iii) Indicating the influences of these two characteristics when applied to a given context.

These assignments involve three different problems:

- (i) Description of characteristics;
- (ii) Differentiation of properties;
- (iii) Association of attributes.

Clearly, these three questions may not call for the same methodology of research, and each of them is likely to involve different means of collecting and analysing data. Given these

objectives, the present chapter is devoted to providing indications as to adequate means in terms of:

- (i) Research design;
- (ii) Research methods;
- (iii) Data analysis methods.

This chapter addresses the problem of the research methodology to adopt through the research. However, "research methodology", or general system of rules and methods used by the researcher during his investigation, whatsoever it may be of, falls into two sub-sets: (i) the particular strategy (for establishing explanation), or research design; (ii) the tactics (to collect, analyse and interpret data), or research and data analysis methods.

Section 1 deals with the first sub-set, while Sections 2 and 3 concentrate on the second.

SECTION 1 RESEARCH DESIGN

It is generally agreed that research designs will differ depending on the researcher's purpose. In other words, the answer to the question of whether an exploratory, descriptive, or causal research will be conducted, depends on: (i) the problem to solve, and (ii) the way it will be attempted to solve it. More specifically, is it herein intended to:

- (i) Gain familiarity with a phenomenon, by generating new ideas that could be used as hypothetical grounds to conduct further research;
- (ii) Portray accurately the characteristics of a particular phenomenon;
- (iii) Test hypotheses of causal relationships between variables?

The first type of question calls for an exploratory research, the second for a descriptive one, and the third, for a causal research. The adequacy between the research design and the general problem which pervades this research affords more than an academic interest: actually, the whole research validity is at stake. This problem is explicitly stated in the introduction to this chapter. The empirical study of relationships between organisational climate and the acceptance of industrial innovations has already been studied, but the novelty of the present research lies in the conceptualisation of the organisational idiosyncracies as well as in the formalisation of the hypothetical relationship. In this respect, the categories of the research can be now clarified.

1.1. Postulate, Definitions and Hypotheses of the Research

The postulate of the research is not to be proved. However, various streams of the reviewed literature suggest that it has a high degree of likelihood. However, the first section of Chapter VIII will examine the postulate in more detail. Besides, it is worth noticing that no restriction is made about the status of organisational actors. They can be managers, employees, executives, etc. Each organisational actor must be considered in the light of the influence of his decisions, actions and feelings upon the outcome of the decision-making process: adoption of the innovation, rejection or deferred final decision. The postulate is the following:

- P(1) Organisational actors' rationalities and strategies are elements of the set of corporate idiosyncracies giving rise to what can be denoted the organisation's climate.

At this stage, nothing more precise can be stated regarding this

matter. The research hypotheses hinge on a critical appraisal of the classical view of the internal process of decision and adoption within a firm. As section 2.1. of Chapter IV indicates, this process is generally summarised by the following sequence: (i) awareness; (ii) organisational information process (including informal discussions, commissioning of studies, consideration of alternatives); (iii) organisational decision (i.e. adoption, rejection or deferred final decision).

Before introducing the hypotheses, it is worth giving some definitions of the concepts involved in the statements which have not been herein studied as deeply as that of decision. The definitions are suggested by the review of the literature on organisational adoption of innovation:

- (i) "Innovation" refers to the technological system about which an organisational decision must be made: adoption, rejection or deferred final decision.
- (ii) "Organisational information" denotes the state of collective knowledge about an innovation at a particular moment in time. It seems that there are four aspects of information about a technological innovation: technical (the technical point of view is chiefly concerned with the compatibility, versatility, performance, ease of use of the innovation, etc.); financial (the financial viewpoint is mainly concerned with the costs and the investments related to the innovation); commercial (the commercial viewpoint focuses on the potential effects of the innovation on the market share, the customers, the competition, etc.); organisational (the organisational viewpoint focuses on the potential effects of the innovation on the relationships between the organisational actors).
- (iii) "Organisational awareness" refers to the earliest state of information about an innovation. The classical choice of the

term "awareness" could be criticised on the ground that nothing in the concept of "awareness" indicates that such a term should be used only to qualify the beginning of the information process. Awareness of the innovation pervades the whole decision-making process.

- (iv) "Organisational information process" denotes the spread of information, into and within the organisation, about an innovation.

Accordingly, the following hypotheses will have to be tested:

- H(1) "Organisational awareness" is an ambiguous concept.
- H(2) In each organisation, the actors will differ in the relative importance they attach to the four aspects (i.e. financial, technical, commercial, organisational) of information about the innovation.
- H(3) For each given aspect, within the same organisation, the actors will make different assessments.
- H(4) There is an association between the differences that H(2) and H(3) suggest and the actors' strategies and rationalities.
- H(5) There is an association between the features of the organisational information process for evaluating the innovation and the strategies and rationalities of individual actors.
- H(6) The way the actors spread information about the innovation influences the decision-making process.
- H(7) There is an association between the ability of actors to influence the decision-making process and these actors' strategies and rationalities.
- H(8) There is an association between the sequence in which rationalities and strategies become involved in the decision-making process and its outcome (i.e. adoption, rejection or

deferred final decision).

Clearly, these hypotheses are concerned with the aforementioned problems of description and differentiation (of opinions, assessments, rationalities, strategies, features of the decision-making processes, outcomes, etc.) and association (of attributes, outcomes, etc.). The association problem is more or less complex depending on the number and nature of the items to relate. For example, H(8) is more difficult to test than H(4), H(5) and H(7): it involves second-order reasoning. That is, because its items can only be defined in relation to other items, H(8) involves a fourfold association. In other words, to test H(8), one must consider a set of companies, a set of phases constituting the decision-making process, a set of rationalities (if we postulate that there is an isomorphism between rationalities and strategies) and a set of outcomes.

In sum, according to the problem stated above and the resulting hypotheses, it follows that the present research aims at gaining familiarity with a phenomenon from a distinct viewpoint, and generating new ideas which, in turn, could be used as the hypothetical basis for causal investigations. Consequently, the type of research which will be carried out is of the exploratory kind.

1.2. Domain of Validity of the Research

The present research aims at answering questions and testing hypotheses. But what may be the validity of the answers and of the tests?

In 1647, a physics argument (about the vacuum) opposing Pascal to Father Estienne Noel, rector of the College de Clermont in Paris,

gave rise to what is viewed as one of the earliest and clearest statement on scientific method.¹ In his reply to Noel's challenge, Pascal gave the conditions for judging a hypothesis. It was asserted that²

"... a hypothesis could be disproved if one could elicit either a contradiction or a conclusion counter to fact from the affirmation of the hypothesis. However, if all the facts fit the hypothesis or follow from it, this merely shows the hypothesis is probable or possible."

Somewhat more recently, Popper has been the most explicit and systematic in recognising the necessity of basing knowledge on ruling out alternative explanations of phenomena so as to remain with only a conceivable explanation. Actually, Popper's thinking is based on an acceptance of Hume's critique of induction, which denies the possibility of confirmatory knowledge based on generalising from particular observations to general scientific propositions. Therefore, according to Popper, if the data fit the pattern, this supports the theory to the provisional extent that no other known theory can account for the pattern. In this respect, Popper's contention is that such corroborations can never prove the theory to be true, although failures to confirm the prediction can falsify the theory under test. Then, if the predictions are confirmed, the theory remains one of the possible true explanations: failure in prediction drives to logically valid rejection of the theory, while success in prediction induces nothing but logically inconclusive confirmation.

Accordingly, positive tests of the hypotheses will indicate that, so far, and in the limit of the sample, these hypotheses must be regarded as correct statements, until counter evidences, or alternative explanations are found.

Conversely, falsification of the hypotheses will indicate that they were invalid statements, as regards the sample under study.

This leads one to the question of the sample.

1.3. The Sample

The substance of the present research is the analysis of the decisions of adoption of technological innovations. Accordingly, the problem is to select a set of companies ("addressed systems") which have been approached by one or various companies ("addressing systems") proposing a new technology or process ("innovation system"). In order to preserve the consistency of the sample, it is both crucial that the addressed and addressing systems be not too dissimilar and that the corresponding innovation systems belong to the same type of activity. Finally, it is indispensable that the innovation systems which will be considered belong to a domain of activity in which marketing is aimed at playing a significant part.

It seems that the field of information technology, as the domain of the innovation systems, enables these criteria to be satisfied:

- (i) Information technology is a field generating industrial innovations. The opening pages of the next chapter present a preparatory research meant to ensure that industrialists view this field as an innovative one.
- (ii) Information technology is a field enabling one to compare innovations which, though not identical, can be similar. This allows for valid comparisons of the various outcomes of the decision-making processes.
- (iii) Information technology is a field in which industrial marketing aims to play an important part.
- (iv) Information technologies are purchased and marketed by such a variety of companies that it is possible to demarcate similar addressing systems and similar addressed systems for similar innovations.

Accordingly, the innovations involved in the empirical research will have to belong to the domain of information technology. The preparatory research (Chapter VII, 1.2.) explains how the sample of addressed systems was selected (i.e. the companies which are or have recently been faced with a choice about whether to adopt an innovation).

At this stage, it is sufficient to state that the study is limited to recent cases of adoption, rejection or deferred final decision about computer-based information systems (when such systems did not already exist in the companies). The sample consists of:

- (i) Shark Corporation; an industrial company, the innovation under consideration being a decision support system (SP).
- (ii) Piranhas Corporation; a company involved in building and construction, faced with the choice between two information systems for construction management and control (MNL and MCO)
- (iii) Barracuda Corporation; a distribution company, the innovation involved being a computerised stock management system (BGT).

The second section of Chapter VII introduces the case studies in more detail.

SECTION 2 RESEARCH METHOD EVALUATION

The previous section was devoted to discussing the research design that will guide the field work. An exploratory design was selected, as seeming particularly adapted to the problem under consideration.

The present section plays a similar role as regards the methods for collecting data; it is aimed at evaluating options available, justifying choice(s) and anticipating constraints and problems as

well as how these will affect the research outcome. Essentially, research methods are factorable as follows:

- (i) Observation;
- (ii) Analysis of documents;
- (iii) Asking people for information.

Observation Methods- Their main advantage is to enable the researcher to obtain data within the context of the concrete experience of the people who are taking part in the phenomenon under consideration. Generally, this type of study is carried out through participant observations as classically exemplified by Whyte³ and Lupton⁴. A more recent example is that of a research directed by A.M. Bowey at the Pay and Rewards Research Centre, Strathclyde University (Glasgow, 1977-1980). Even studies like those of Dintzberg, usually labelled content studies, involving detailed observation and data collection, owe a lot to participant observation method, in which the researcher is anonymously immersed in the real context of the phenomenon being studied.⁵

But this method suffers from two major drawbacks. First, as Burgoyne and Hodgson pointed out, observation alone gives no insight into the meaning of the observed action.⁶ Second, within the scope of the study of decision processes likely to take months or years, this method supposes a long period of investigation. By definition, at the time of the observation, the decision process outcome is still problematic. This implies that, since the present research aims at relating outcomes to decision-making features, the period of study be, at least, as long as the decision process itself. Such a schedule is not compatible with the current research. However, a first alternative is to concentrate on short decision- processes. But these types of phenomena are very rare in industrial marketing and generally either unpredictable or

unrepresentative. A second alternative is to resort to simulation. The simulation methodology is dealt with in Exhibit 6.A, and the conclusion of the argument is that these techniques impair the main advantage of the observation method, namely the study of behaviours within the context of the concrete (thus, not simulated) work experience. As a result, this method will not be selected.

Analysis of Documents- This type of method refers to paleography and is mainly concerned with collecting and interpreting relevant archives. In the study of organisational decision process, most of these records are companies' published statements, balances, etc., but it is down to the researcher to employ initiative in procuring more confidential data such as reports, meeting minutes, etc. Published data usually provide a basis for time-series analysis and give rise to regression models, the main interest of which lies in helping decision-makers on the basis of predicted values or events.

These models concentrate on econometric variables and are poor indicators of the characteristics and sequences of the decision processes themselves. However, inferences from financial ratios can be made. For example, Nabseth and Ray held that ratios obtained from published balance sheets and income statements could be used as indicators of management attitudes.⁷ This method has already been discussed in Chapter II (conclusion) and it was argued that it results in a static appraisal of the concrete decision-making process. Further, some finance and production figures or ratios may well represent the outcome of the decision-making process. But if this outcome is a kind of "serendipitous" result of the process, invalid conclusions may be drawn on the decision-making process itself.

A more promising attempt is that of studying confidential reports. But this method gives rise to a major risk, which could

be labelled as a "scarcity effect". In fact, the researcher is obliged to rely entirely on the amount of data he has been able to gather. The basic postulate is that the more confidential, the greater the information. This may be true. But the other side of the coin is that the more confidential the data, the more difficult it is to obtain. Suppose there exists, in a given context, three "hush-hush" reports. The three may be contradictory. If they are really confidential, the researcher is unlikely to gain access to all three. Suppose he is crafty enough to manage to get two of them. What about the validity of his assessment? The confidentiality of the two documents will induce the researcher to rely highly on their information, which is potentially contradicted by the third document. In interviews or questionnaires as well, the information provided by one respondent may be contradicted by another respondent, but the researcher is generally able to coordinate this kind of variation.

In conclusion, threats to validity, together with more practical considerations, result in rejection of this method.

Asking People for Information- This method of collecting data is a complex one and gives rise to various techniques. Basically, information can be obtained by means of four types of cooperation between the researcher and the respondent. These four types result from a combination of the following situations:

- (i) Researcher's contribution before respondent's contribution, which may be symbolised by "Rs-Rp";
- (ii) Researcher's contribution after respondent's contribution, which may be symbolised by "Rp-Rs";
- (iii) Researcher's contribution during respondent's contribution, which is symbolised by "Rp+Rs".

"Contribution" refers to the very content of the information being obtained. It embraces (i) the respondent's expressed opinion, (ii) the researcher's questions, (iii) the researcher's interpretation of the information obtained from the respondents. A three-by-four table epitomises this analysis and underlines the differences between the four techniques.

Fig.30- Sequence of research methods

Technique	Sequence		
	Rs - Rp	Rp - Rs	Rp + Rs
Questionnaires	*	*	
Structured Interviews	*	*	*
Non-structured Interviews		*	*
Diary Studies		*	

In questionnaire methods the sequence is as follows: (i) the researcher prepares written questions, (ii) the respondent answers these questions (the researcher may write down the answers, himself, but this is only done for convenience purpose: the answers will not affect the questions being asked), and (iii) the researcher analyses the responses.

In structured interviews there is a cooperation of the two subjects, in real time. There is a possibility of feedback effect. An answer may affect the formulation of the questions being asked by the researcher.

In non-structured interviews the researcher does not provide any a priori contribution to the information process. This does not mean that he achieves a "tabula rasa", since he works on the basis of a framework of hypotheses. But his hypotheses are guidelines rather than limits to the interview process. Sometimes, such limits are necessary, depending on the information the researcher is

looking for.

In diary studies the "respondents" are not asked questions. If they agree, they will write down, on a day to day basis, a report on their work activities and their work-related reflections. Then, without any direct cooperation with the "respondents", the researcher will analyse the information contained in the diaries. The time constraint does not enable, (for reasons similar to those which were addressed as regards observation) such a technique to be used in this study.

It is acknowledged that all these methods may give rise to feedback meetings, once the data have been collected and interpreted. This enables the respondents to give their opinions about the researcher's interpretation of their contribution. However, as this procedure is possible in each case (although it is difficult to handle with large samples) it is not taken into consideration in this comparison.

In conclusion, questionnaire and interview methods are the only options for this research. Which one (or which combination of the two) should this research employ? The answer to this question lies in the nature of the information which is needed.

The research central question is : How do individual strategies and rationalities (as corporate idiosyncracies and components of the organisational climate), affect the decision-making process leading to adopting or rejecting industrial innovation? Industrial innovations are tangible. Adoption or rejection may be deduced from observation. But strategies and rationalities are less manifest. People are behaving and talking, generally without specifying: "Now I am implementing a maximax rationality and my strategy is targeted at highest rewards rather than securing minimum payoffs below which I should not fall."

However, the researcher may gain insights into these strategies

and rationalities, and the way they are likely to be implemented (which refers to behaviour) through the study of attitudes. This is pointed out by two schools examined above.

The Strategic Theory of Organised Action, via its strategic analysis methodology, holds that "one can achieve correct approximations of strategies and rationalities from the attitudes being expressed by each organisational actor."⁸ On the other hand, the phenomenological approach considers that "all meaningful behaviours can be described as 'attitude-taking' acts."⁹

The study of attitudes, its methodology, depends largely upon the definition of the concept. As indicated below, there is no general agreement on what the term refers to.

2.1. The Study of Attitudes as a Heuristic Process

When the term appeared in the rhetoric of the German experimental psychology, in the late XIXth century, attitude was equated to a neuropsychic state preparing and facilitating action. Attitude was thought of as a kind of "adjustment (Einstellung) of mind", an "induced attention" of the individual which should accelerate his response to stimuli. Through various stages, particularly in social psychology, the term has become more and more used to refer to relatively permanent normative orientations of individuals towards certain objects. This conception was epitomised by Secord and Backman when they wrote that attitude is a "component of the personality of the individual,... serving functional or adjustive ends,... a descriptive concept characterising a prevailing mode of thought..."¹⁰ Hence the development of the study of attitudes in consumer marketing, through various and sometimes confusing definitions. It is the purpose of the following lines to clarify each contribution and to select the one which seems the most

relevant to this research purpose.

2.1.1. The Behaviourist Perspective

This approach rests on a theory of instrumental learning process in which attitudes develop and strengthen in relation to sanctions and rewards from the environment.

2.1.2. The Theory of Cognitive Dissonance

This theory, developed by Festinger, has the great merit of linking attitude to overt behaviour.¹¹ Critics often argued that the concept of attitude was useless, because no one could be sure that a person would behave in accordance with his or her verbally expressed attitude. The dissonance theory recognises this shortcoming and helps to remedy it by specifying the conditions under which attitudes and behaviour do correspond. This theory's postulates are the following:

- (i) Consistency of individual attitudes;
- (ii) Accordance between attitudes and behaviour;
- (iii) Consistency of individual actions (behaviour).

This theory's major concepts are those of cognitive elements and dissonance. By "cognitive elements" is meant any knowledge, opinion, or belief about the environment, about oneself or about one's behaviour. "Dissonance" refers to inconsistency between two or more cognitive elements. The theory essentially states that when dissonance is present, in addition to trying to reduce it, the person will actively avoid situations and information which would likely increase the dissonance.

2.1.3. The Theory of Affective - Cognitive Consistency

This theory, initially due to Rosenberg, holds that strong and stable positive affects towards a given object should be associated with beliefs that it leads to the attainment of a number of important values, while strong negative affects should be associated with beliefs that the object tends to block the attainment of important values.¹² Developing a kind of arithmetic of affects, this theory adds that moderate positive or negative affects should be associated with beliefs that relate the attitude object either to less important values or, if important, with less confidence about the relationship between these values and the attitude object.

2.1.4. The Functional Theory of Attitudes

Mainly attributable to Katz and Stotland, this theory holds that the motivational basis for an attitude is the key to understanding change and resistance to change.¹³ In this respect, Katz and Stotland noted that situational factors and the communication directed towards attitude change will have effect depending on the motivational basis of the attitude. In fact, the motivational basis is conceptualised in terms of the function which attitude performs for the person. More specifically, this function is a fourfold one and is factorable as follows:

- (i) Adjustment: attitudes reflect desired or undesired goals and thereby orient behaviour towards the most positive alternatives.
- (ii) Ego-defensive: attitudes can reflect a defence mechanism to avoid recognition of reality which is in opposition to one's self image.
- (iii) Value expressive: attitudes give clarity and expression to

basic orientations.

- (iv) Knowledge: attitudes provide standards for evaluating and understanding one's environment.¹⁴

This theory is to be related to Adorno's psycho-analytical approach which connects attitudes' origin to the individuals' needs, anguishes, inhibitions, motivations and self-defence mechanisms, that is, to the functions which attitudes fulfil in relation to the subjects' experiences and subconscious universe.¹⁵

2.1.5. Comments

Beyond divergent explicative approaches, these theories share common theoretical premises.

- (i) All refer to individual attributes, as opposed to contextual circumstances.
- (ii) They are generally retrospective and base attitudes on individuals' basic social or organisational history. Hence the predictive use of attitudes (since they are considered as relatively stable).

Consequently, attitudes are used in an explicative perspective, and are reduced to an inferred explanation of what must have happened in an individual's "black box" to cause some pattern of observed behaviour.¹⁶

2.1.6. An Alternative Conception of Attitudes

The Strategic Theory of Organised Action does not consider attitudes as expressing a reaction or a kind of "individual synthesis". In contrast, strategic analysis (which is a practical

CHAPTER VI

and research-oriented implementation of this theory) holds the view that attitudes must be related to the orientations the actors have adopted contingently upon their opportunities, projects, forecasted assets, as well as the constraints they have to cope with.¹⁷ Briefly, the proposition of the strategic approach is that the actors' attitudes relate less to the past than to the future as it is foreseen in relation to their prospects and expected assets.

Attitude is then defined from a prospective viewpoint, and no longer refers to individual "traits" or "personality" as determinants of behaviour; rather, attitude is viewed as indicating a subjective relationship which, given his assets and ability, an individual establishes with his anticipated behaviour and expected payoffs of possible strategies.

This approach, which considers attitudes as strategic orientations, fits reasonably well with the purpose of the present research. Accordingly, strategic analysis appears as a very suitable method for testing the validity of the hypotheses. Exhibit 6.C. describes the main features of strategic analysis in more detail.

The following sub-section is devoted to evaluating questionnaires and interviews (the only possible options) as to their ability to probe individual attitudes as strategic orientations.

2.2. Attitude Evaluation

As has been argued above, the method options for the present research are limited to three possibilities: (i) questionnaires, (ii) interviews, or (iii) a combination of these two methods. In the light of the research objectives (i.e., description, differentiation, and assessment of association), a twofold

reflection is involved in evaluating method options:

- (i) First level, concerned with the relevance of the options' general features.
- (ii) Second level, concerned with the feasibility, constraints, and validity of the analyses the options enable to be carried out.

The first aspect is treated in the following lines, while the second is dealt with in the next section of this chapter.

2.2.1. Relative Relevance of Questionnaire and Interview Techniques

Describing the actors' strategies and rationalities requires information about actors' constraints, degree of freedom and assets in the organisation, and information about the particular way these factors are combined. Resorting to a necessarily contingent approach, the goal will be to discover the characteristics, the nature and the "rules of the game" which structure the actors' inter-relationships and, therefore, structure their strategies. In this respect, the key concepts are: organisational stakes, zones of uncertainty, nature and "rules of the game".

On the other hand, strategies and rationalities will have to be differentiated, since it is aimed at relating them to different decisions. The firms' structural idiosyncracies (organigrams, internal organisation, divisionalisation, regulations, technology, etc.) indicate nothing more than a series of limits circumscribing the participants' strategic fields. This does not provide information about how inner decision processes are affected by rationalities and strategies.

Clearly, interview and questionnaire methods of collecting information are to be evaluated on their amenability to reveal,

among others:

- (i) How the actors perceive and experience their respective situation.
- (ii) How the "objective" constraints are understood by the actors.
- (iii) The nature of the actors' relationships with each other, the importance of these relationships and what they are expected to be.
- (iv) The light in which, as a result, the actors assess their opportunities and how the innovation could affect the latter.

These four points obviously afford considerable interest as far as testing the hypotheses is concerned. In this respect, three remarks may be set forward, which are discussed below.

2.2.1.1. Protocol analysis: The Principle of Harmony

According to Burgoyne and Hodgson, managerial behaviour and action, as a field of research, has been influenced by the main stream of convention about methodology in the social sciences.¹⁸ If Harre and Secord¹⁹ are to be believed, many social sciences have attempted to follow the tradition of logical positivism which derives from the physical sciences the assumption that basic reality consists of absolute stable entities accessible to direct "objective" observations which then provide a "bed-rock of facts or data on which true theories can be cautiously and solidly built."²⁰ Undoubtedly, such a perspective deals harshly with notions of consciousness, experience, human process of interpretation and attaching meaning to events. Such concepts are studied only indirectly and inferentially through their effect on properly observable phenomena (as in Nabseth and Ray's inferences from financial and productivity ratios²¹). Accordingly, an alternative

view has been put forward, the rationale of which rests on the notion of harmony between the phenomenon and its study. In Burgoyne and Hodgson's words, "in order to advance our understanding of human processes, it is necessary to use methods that are in harmony with those processes [i.e., individual experience, consciousness and human interpretation]."²² As an alternative to the search of external objective reality, the method of phenomenological protocol analysis is proposed, as being in harmony with the human processes to be measured.

This method is introduced in more detail in Exhibit 6.A. and, at the present stage, it is sufficient to note that the approach is based on unstructured interviews.

From a phenomenological viewpoint, this analysis aims at detecting, delimiting and describing similarities and differences between the cases of the phenomenon being studied. This is done by careful and repeated exploration for variation in the set of descriptions of experience, generally orally expressed. The basis for analysis lies in the variation within the specific group of cases of the phenomenon. In effect, the final outcome aimed at is a number of categories describing similarities and differences between the cases. It is proposed often, in a more deductionist approach, that transcripts from protocol analysis can be inspected for evidence of specific processes which certain hypotheses would predict to be there. Such an approach has been used to find whether students use certain "rational" decision-making processes in evaluating their own learning.²³ Accordingly, hypotheses about how organisational actors' strategies and rationalities affect the decisions related to innovation adoption could be tested against protocol analysis. In the paper mentioned above (note 18) Burgoyne and Hodgson suggested that protocol analysis and stimulated recall be used in testing a number of theories related to managerial

behaviour and attitudes.

In conclusion, the phenomenological protocol analysis method seems congruent with the present research, since it enables an hypothetico-inductive approach to the phenomenon to be carried out without violating (principle of harmony) the human processes necessarily involved in decision-making. In this respect, it is to be noticed that this method is not compatible with structured interviews.

However, the question of validity (particularly of the external kind) is rarely addressed by protocol analysis defenders. This point is dealt with below.

2.2.1.2. Questionnaire Designs: The Principle of Fusion of A Priori Relevant Probabilities

It is quite possible to assess attitudes by means of relatively simple direct questions like, for example: "Were you against the adoption of word processing in your firm because it would have required your learning a new technique?" It is acknowledged that the formulation is rather naive, but this is not the point. Questions of this type may be highly structured and answerable in yes-no or multiple-choice form; on the other hand they can be open-ended in nature and permit greater flexibility in response. Many researchers feel, however, that the direct question encourages intentional or non-intentional response distortion and turn, instead, to somewhat more disguised procedures.

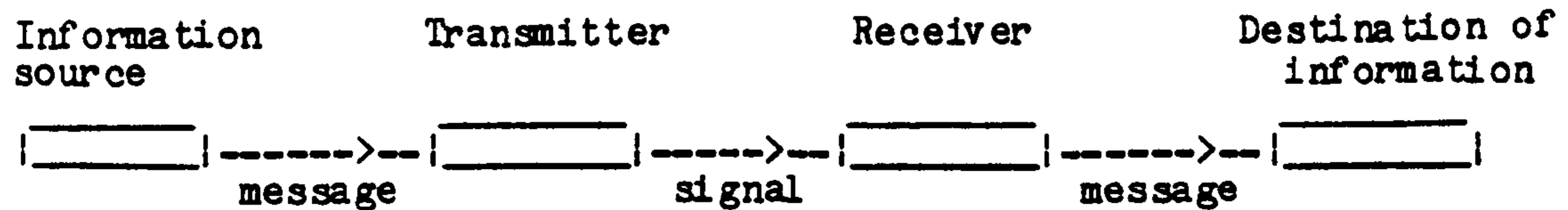
Taking into consideration the conception, generally accepted, of attitudes as complex and multifaceted, researchers make frequent use of scale techniques to assess attitudes. Attitude scales generally consist of a number of attitude statements that ask for agreement or disagreement. Responses are then combined in some manner to

provide more complete indication of feelings. Attitude scales can be constructed in many ways, but the most often resorted to are: (i) equal-appearing interval scales;²⁴ (ii) summated ratings;²⁵ (iii) Semantic-differentials;²⁶ (iv) scalogram analysis;²⁷ (v) Q-sort;²⁸ (vi) Coombs unfolding technique.²⁹ However, and beyond the problems of reliability and validity inherent to scaling, these methods seem to share with classical questionnaires an important shortcoming. This shortcoming is in relation to the scope of the present research and is examined in the sub-section below.

2.2.1.2.1. Questionnaire Designs as Particular Communication Systems

In his Mathematical Theory of Communication, Shannon proposes a schematic diagram of a general communication system.³⁰ Although initially concerned with pure physics, Shannon's theory has been widely resorted to in various fields of human sciences. A reason for this may be that "the mathematical theory [of communication] is exceedingly general in its scope, fundamental in the problem it treats, and of classic simplicity and power in the result it reaches."³¹ Further, according to Weaver, Shannon's general system of communication gives rise to so general a theory that one does not need to say what kinds of messages are being considered - "whether written letters or words, or music notes, or spoken words, or symphonic music, or pictures."³² In other words, "the theory is deep enough so that the relationships it reveals indiscriminately apply to all these and other forms of communication."³³ Accordingly, it is proposed in this research to view questionnaires and their treatment as a particular pattern of Shannon's general system of communication.

Fig.31- Schematic diagram of a general communication system (after Shannon, op.cit., p.34)

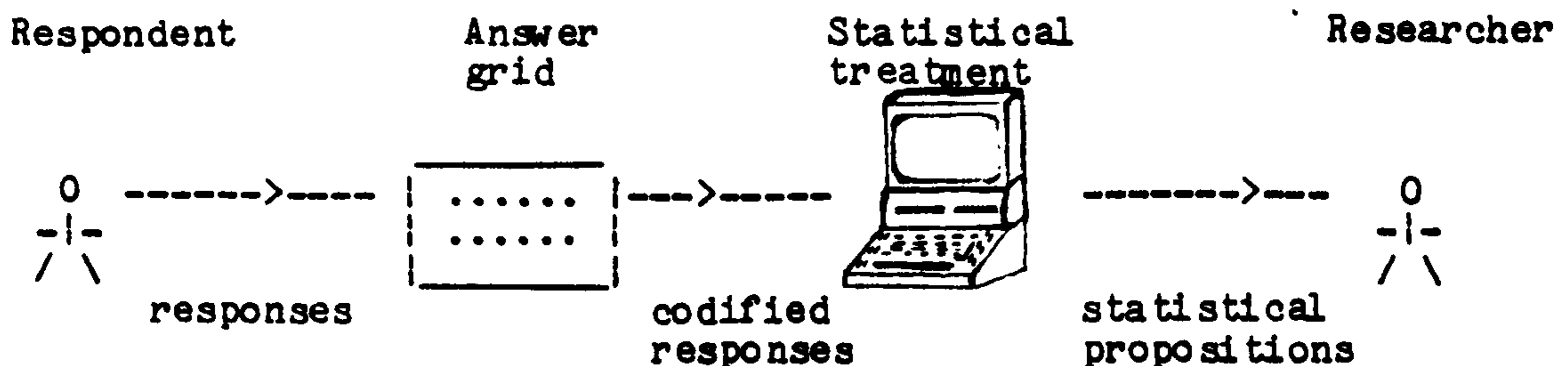


The concepts of this diagram may be explained as follows:

- (i) Information source: it produces a message or sequence of messages to be communicated to the receiving terminal.
- (ii) Transmitter: it operates on the message in some way to produce a signal suitable for transmission over the channel.
- (iii) Channel: it is merely the medium used to transmit the message from the transmitter to the receiver.
- (iv) Receiver: ordinarily, it performs the inverse operation of that done by the transmitter, that is, reconstructing the message from the signal.
- (v) Destination of information: it refers generally to the person or thing for whom the message is intended.

From this general system, the following pattern may be derived:

Fig.32- Schematic diagram of questionnaire designs as particular communication systems



These concepts may be developed as follows:

- (1) Respondent: this information source constitutes potential

messages some of which are particularly relevant to the destination of information. However, the actual messages which are obtained (responses) are only those being asked for by the questions.

- (ii) Answer grid: the transmitter, consisting of the responses to the questionnaire items. These answers may be either of the yes-no type, or grades (in attitude scaling), etc. The signal consists of codes so that the responses may be immediately fed into the computer (in "sophisticated" procedures).
- (iii) Channel: paper, etc.
- (iv) Statistical treatment: the receiver, constituted of statistical procedures designed to convert the complexity and diversity of the responses into propositions which make sense to the destination of information. These statistical treatments are generally operated by more or less specialised packages. The messages being transmitted to the destination of information generally consist of ratios (chi-square, z, t, F,..), of levels of significance and of confidence intervals: they constitute statistical propositions.
- (v) Researcher: the destination of information, i.e. the individual(s) likely to take decisions or state propositions on the basis of the information being conveyed by the second type of message. Clearly, these decisions or propositions are related to the population out of which the respondent (source of information) is selected. These decisions generally originate with a choice between accepting or rejecting one or various null hypotheses (indifference hypotheses). From this may stem various strategies on the part of the "information-seeker". Each hypothesis was related to the population out of which the set of respondents (sample) was selected, while each strategy deals with what the

researcher's future actions should be, according to the information now available on the respondents.

This Shannonian interpretation of questionnaire designs naturally lends itself to an analysis of the process in terms of information. This aspect is treated in the following lines.

2.2.1.2.2. Questionnaire Designs as Highly Entropic Communication Systems

Whether they consist of mere questions (simple or multiple-choice ones) or ask for degree of agreement on attitude scales, questionnaire techniques are based on a twofold basic principle, decomposable as follows:

- (i) A priori relevance dichotomy: out of all the messages a respondent may express, some are relevant to the destination of information, some are not. So as to avoid irrelevant messages, the relevant ones are defined as to their nature (not as to their content, of course...), and questions likely to give rise to messages of this nature are a priori selected.
- (ii) Fusion of probable relevant messages: out of all the relevant messages a respondent may express, some are viewed as "synonymous". That is, it is assumed that some messages do not add information to others and only differ in their formulation. Each response is supposed to manifest a class of messages equivalent modulo (i.e., according to) the information they contain.

Accordingly, the only responses the researcher is likely to obtain are those for which he has given provision and allowed "room" in his questionnaire. In other words, the responses are unlikely to surprise the "information-seeker". He will only find in the

responses what he was prepared to find. He is more interested in the relationships he may draw between the responses (correlations or associations) than in the responses themselves.

From the foregoing considerations it arises that improbable messages are unlikely to be recorded by questionnaire designs, and that, instead of messages, they record classes of messages with different probabilities and formulations.

However, often, the more improbable the message, the greater the information it contains. This relationship has been worked in economics forecasting by Theil, who defined the information content of a message which states that some event has taken place, as an inverse function of the probability that the event would take place before the message was received.³⁴ On the other hand, borrowed from thermodynamics, the concept of entropy refers to a loss in information. According to Wiener:³⁵

"... the processes which lose information are... closely analogous to the processes which gain entropy. They consist in the fusion of regions of probability which were originally distinct."

Therefore, taking into account the above point that questionnaires rest on the notion of fusion of messages with distinct probabilities of occurrence, it derives that questionnaire designs operate as entropic systems of communication. In other words, their structure entails a loss in information: the respondents' potential messages are fused into responses to a priori designed questions. Further, it can be argued that the process of statistical analysis implies another source of entropy. This point will be addressed below, in a sub-section focusing on statistical methods (which are not only applicable to data collected by questionnaires). On the other hand, it is to be noticed that interviews are entropic communication systems too, be it only for the nature and limitation of language. However, they allow for

much more variety in responses. This is of paramount importance as, in this essentially exploratory research, variety must be preserved by the procedures for collecting data. On the other hand, questionnaires are indisputably relevant to different researches, with distinct purposes and less emphasis on detailed description.

As the process by which information is lost cannot be explained by a simple interpretation of the general laws of information, Exhibit 6.B tackles this issue in more detail.

First Recapitulation

At this stage, three methods may still be chosen: questionnaire designs, unstructured interviews, or a combination of the two. Two reasons have mainly contributed to eliminating other alternatives: (i) time available (observation methods) and (ii) scarcity of relevant archives and threats to validity (analysis of documents methods). The general validity of these methods is not questioned; rather, the point is that they do not seem to suit the purpose of this research.

The main advantage of unstructured interview techniques treated with strategic analysis or phenomenological protocol analysis is that of being in harmony with the human processes that form the core of managerial action. Structured interviews have been rejected because they are bound to undermine this harmony which is a legitimation for resorting to interviews.

The main shortcoming of unstructured interviews is that of problematic generalisability: while questionnaire designs have generated a scientific body of inference laws (sampling theory), nothing similar is available as regards interviews. On the other hand, the major drawback of questionnaire methods (for the present research) is that of limiting the information with which the

respondent could provide the researcher.

These indications can be usefully completed with an evaluation of the analysis which the two options enable to be carried out. This evaluation constitutes the main theme of the following section.

SECTION 3 DATA ANALYSIS METHOD EVALUATION

This section deals with the feasibility, requirements and validity of the data analyses to which questionnaires or interviews give rise. The focus will first be placed on description and differentiation. Then, some procedures to assess association will be examined.

3.1. Description and Differentiation: Analysis of Data Collected by Questionnaire Designs

Among the various questionnaire techniques which were examined (self-completion, open/closed, open-ended questionnaires, or scaling techniques), scaling techniques were found the most relevant approach to attitude evaluation. However, scales do not only aim at evaluating. They are designed to measure, i.e., in Steven's words, "to assign numerals to objects or events according to rules."³⁶ But numerals in themselves are poor indicators: it is only through appropriate operations that they may become useful information. In fact, the analysis of the numerals being assigned to phenomena is done with a view to revealing new information about these phenomena. When the relationship between the phenomenon under consideration and the numbers assigned to them is a direct one, one can, by manipulating the numbers, obtain new information about the phenomenon.

The application of both the principles of induction and

deduction in statistics and physics rests on this property of direct relationship. However, if that direct relationship between numbers and phenomena is altered in some way, the relationship between the numbers will no longer reflect the relationship between the phenomena. Since, in attitude scaling, numbers come from measurements, it is important to know some of the characteristics of measurement scales and the kind of numerical relationships which can be applied to them. This, in turn, determines the kind of statistical methods appropriate to the numerical data, as the following discussion indicates.

3.1.1. Attitude Scales and Related Statistical Techniques

Four types of general scales are commonly distinguished. This distinction operates on a threefold basis:

- (i) According to the type of data being involved;
- (ii) Whether or not reference is made to an origin point (natural or artificial);
- (iii) Whether or not differences between numerals are ordered.

From a combination of these properties four levels of measurement may be distilled. To each of these levels corresponds a type of relation between classes, a number of admissible operations on the numbers, and, as a corollary, a number of appropriate statistics.

- (i) **Nominal Scales-** This type of scale deals with alpha-numeric data. Here, the numerals serve to identify classes of objects. As pointed out by Torgerson, the use of numerals here is unnecessary, and other sets of distinguishable marks would serve as well.³⁷ The only relation involved in these

scales is that of equivalence: nothing can be stated about objects but that they belong to the same class, or do not. The only admissible operations on alpha-numerals are, therefore, frequency counts. The sole non-parametric statistics are relevant to this kind of data, but not all of them. Only contingency coefficient and chi-square are suitable.

- (ii) **Ordinal Scales-** Data are still alpha-numeric but, this time, carat (i.e., smaller or greater than) relations may be held along with equivalence ones for all pairs of class in order to complete rank ordering. Ordinal scales are only amenable to non-parametric statistics, including, this time, Spearman's rho and Kendall's w-coefficient of concordance.
- (iii) **Interval Scales-** In interval scales data are exclusively numeric. In fact, this is a particular case of ordinal scales: an interval scale has the properties of an ordinal scale and in addition has a common and constant unit of measurement and a zero point so that the distances between any two points on the scale are of known size. However, the unit and origin are arbitrary. As a result, carat and equivalence relations are defined, ratios of any intervals are known, and any arithmetic operation may be performed on the differences between scales values (but not on the values themselves). This enable all parametric statistics to be computed, except geometric means and coefficients of variation.
- (iv) **Ratio scales-** These scales deal with numeric data and have the characteristics of interval scales, except that, here, the zero point is a natural origin. As a result, ratio of any two scale values are meaningful, and any arithmetic operation

is admissible on the scale values themselves (as well as on differences between scale values). Clearly, all parametric statistics are appropriate to this type of scale.

The next step is to determine to which class belongs each of the attitude scales that could be of relevance for the present research. This should give rise to an evaluation of these scales in the light of the statistical analyses they permit. The Q-sort and Coombs techniques are excluded from this review for they are more akin to classificatory systems than to techniques of measurement of attitudes.³⁸

3.1.1.1. Thurstone Scales

Also termed method of "equal-appearing intervals", this type of scale attempts to form an interval scale of measurement. Basically, respondents are asked to check those stimuli (propositions, statements) with which they are in agreement. It is assumed that the subject will endorse those opinion statements that most nearly represent his own attitude. In fact, the general idea is that, other things being equal, the probability that a subject will endorse an item (opinion statement) decreases as the distance between his own attitude and that reflected by the items increases. The average (median or mean) of the median values of all the items he endorses is his scale score. As interval scales, Thurstone devices enable several parametric statistics to be computed. The most interesting is the analysis of variance between subjects' attitudes, according to the organisation they belong to. This approach, however, as noticed by Torgerson,³⁹ introduces various problems. First, each of the stimuli is likely to possess some specific variance, which will account for their differences in

popularity (it is difficult to avoid halo effect in questions related to rationality in decision-making). On top of this, it is not always clear that the general notion, that the probability of endorsement of an item depends on the amount of differences between the attitude reflected by the items and that held by the subject, is an appropriate one.

3.1.1.2. Likert Scales

In Likert scaling, the respondent is not asked to decide just whether he agrees with an item, but to choose between several response categories, indicating various strengths of agreement and disagreement. The categories are assigned scores and the respondent's attitude is measured by his total score, which is the sum of the scores of the categories he has endorsed for each of the items. Reflecting these main features, Likert scales are also known as summated rating scales. However, unlike in Thurstone scales, no conclusion may be drawn about the meaning of distances between scale positions. In other words, Likert scales are not interval scales: nothing can be stated about ratio of any two intervals. However, carat relations are admissible. This means that Likert scales are ordinal scales. As a result, only non-parametric statistics may be used for analysis purposes. In this respect, Kendall's coefficient of concordance can be used in order to evaluate the degree of association between attitudes and the organisation the subject belongs to. Conversely, this coefficient can be a good indicator of differentiation.

3.1.1.3. Guttman Scales

Guttman scales are fundamentally different from the methods of

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measurement mentioned above. With Thurstone and Likert techniques a final score of a given magnitude can result from quite different patterns of response, so that it is impossible to tell from the score what the individual answers were. This enhances the relevance of what has been said about the entropic nature of fusion of information: a similar score and, as a result, a same conclusion may stem from opposite individual answers. The beauty of Guttman scalogram is that of limiting this loss in information. A scalogram is a diagram in which the individuals' responses are shown; one can infer from an individual's total score precisely which items he agreed and disagreed with. Theoretically, Guttman scales are ordinal scales. This is due to the fact that the distances between scores are not constant. As a result, the distances between any two scores are not of known size. This implies the use of non-parametric statistics similar to that mentioned for Likert scales. However, the major shortcoming of Guttman scales results from the strict deterministic nature of the underlying model, namely that a person who responds positively (resp. negatively) to one item must respond positively (resp. negatively) to a series of others. Consequently, as mentioned by Moser and Kalton, departures from scale types have to be treated as aberrations or error.⁴⁰ This method, therefore, introduces the kind of violation of rationality described in Chapter III.

3.1.1.4. Osgood Scales

The rationale of these methods rests on the idea that attitude can be identified with evaluation ("good or bad"; "true or false"; "beautiful or ugly"), and that an attitude scale can therefore be formed from a series of bipolar rating scales measuring the evaluative factor. Reflecting these characteristics, Osgood scales

are referred to in terms of semantic differential techniques. A respondent's total score is the measure of his attitude. Thus, the semantic differential, like a Likert scale, is a summated rating scale; however, while with Likert scaling there is a range of statements but typically only one standard form of response (e.g., strongly agree, agree, etc.), with the semantic differential there is a range of areas of response but only one issue to evaluate. As regards statistics, as ordinal scales, Osgood semantic differentials only admit non-parametric statistics and Kendall's w seems the most relevant one.

3.1.2. Comments

Four types of attitude scaling techniques have been examined. These scales are either of the ordinal or interval type, and it was argued that Kendall's coefficient of concordance (a non-parametric statistic) and the analysis of variance (a method using parametric statistics) were the most relevant techniques of treating the data so collected. These statistics are easily computable on packages such as "Minitab" or "SPSS", available through the EMAS mainframe. In essence, what could be indicated by these statistics is a measure of similarity and, therefore, of differentiation between organisational members as regards their strategies and rationalities. Two remarks may be put forward. First, items to evaluate strategies and rationalities on scales are far from being easy to find if one is to avoid halo effect in responses. Second, the entropic nature of questionnaire designs has been pointed out. If scaling is selected for evaluating strategies and rationalities there will be two important sources of entropy in the total process of interpretation: that inherent in evaluating attitudes, and that inherent in relating differences in attitudes to variance in

outcome.

3.2. Description and Differentiation: Analysis of Data Collected by Interviews

From the outset, it is to be noticed that phenomenological protocol analysis and strategic analysis could have been introduced in this sub-section as well. However, as these methods are intimately linked to unstructured interviews and do not ask for statistical procedures, they have already been mentioned in Section 2. Exhibits 6.A. and 6.C. can be consulted for more complete presentations.

Theoretically, analysis may be either based on common sense or carried out through more or less sophisticated statistical methods. Common sense analysis does not require any particular property of the data to assess them. On the contrary, statistical analysis usually requires rectangular data, particularly when the analysis is carried out on statistical packages. This may limit the applicability of sophisticated techniques to the analysis of data collected by means of unstructured interviews. However, a more basic objection has been raised against mathematical treatment of interviews.

3.2.1. Reconciling Subjective Data and Statistical Treatment

Defenders of unstructured interviews do not agree on the validity of statistical analyses of subjective data. For instance, the phenomenological perspective usually criticises the statistical process of interpretation of expressions of views, beliefs, preferences, assumed to be of relevance by the researcher. This process is criticised on the ground that it involves severe constraints in order to give rise to so-called objective data. In fact, this piece of criticism is similar to that addressed to

questionnaires. In Burgoyne and Hodgson's words:⁴¹

"... converting base subjective data into supposedly golden objective data is conducted behind a smoke-screen of test mystique and statistical manipulation."

According to some organisational phenomenologists, the basic assumption of this process is that "if such subjective data can be forced, by the conditions of its generation and the suppression of the variety in it by statistical technique, to display some of the properties associated with supposedly objective physical resources... then it is objective data."⁴² The notion of loss in variety has been previously addressed, but another point remains to be made.

It is illusory to believe that the entire richness and variety of the respondent's information will be preserved throughout the whole process of interpretation by the researcher, even by means of a phenomenological interpretation. This issue is similar to that of things as opposed to concepts (universals). There will always be more information in a day's work in the workshop than in the word "assembly line". There is more information in the Gioconda's smile than in the concept of beauty. But not everybody knows Vinci's paintings. Similarly, the researcher's contribution to knowledge cannot be a pure collection of individual cases; these cases must make sense. Somehow or other, the necessary process of interpretation reduces variety. When interpretation involves a great numerical diversity of cases, statistical methods may be indicated. Further, it is important to notice that it is not more "artificial" to apply statistical techniques to unstructured interviews than to questionnaires. On no grounds could questionnaire responses be held as more objective (or less subjective) than opinions expressed in interviews. Questionnaires are more easy to manipulate, but convenience must not be mistaken

for validity.

Along with strategic analysis and phenomenological protocol analysis, an other method of treating data collected by means of interviews seems of relevance to the present research: content analysis. This method is introduced in this data analysis section because it is less "organisational theory-oriented" than the two former perspectives. In other words, strategic and phenomenological approaches were introduced before because they are more than data analysis methods: they make some basic assumptions about organisational processes. Content analysis is based on statistics and is examined in the following lines.

3.2.2. Content Analysis of Interviews

Basically, content analysis is a technique for analysing written material and, more specifically, published data.⁴³ However, this technique may as well apply to broadcast data⁴⁴ or verbal data⁴⁵. Content analysis has also found an application in diary study and unstructured interview interpretation, as instanced by the research carried out by Professor Bowey and her team on incentive scheme effectiveness at the Strathclyde University Pay and Reward Research Centre (1977-80).

Content analysis is a quantitative method and is based on the frequency theory. Its main feature can be summarily described as a method of inferences on the basis of semantic recurrences. The first step of the method consists, not surprisingly, in reading the document. Then, the prevailing perspectives (theories) to which the document may be related must be identified. Similarly, the themes which the content could shed light on are to be defined. In the following step, the researcher has to determine what, in the content to be analysed, will be regarded as evidences and counter

evidences for each theory or the theory. If the researcher is looking for recurrences of themes (e.g., power, rewards, risks, etc.), he must decide on the unit for counting. This may be words, group of words, sentences, paragraphs, the interviews themselves, etc. On this basis, frequencies may be calculated, and give rise to propositions such as: the words "innovation and risk" are coupled in x% of the sentences, etc. These frequencies imply more or less support for each of the prevailing theories. The next, and necessary, phase is to compare these frequencies to frequencies obtained from different interviews. On the basis of this comparison, each interviewee may be described and associated with others, or with the organisation he belongs to. This may enable the description and differentiation of organisational actors, which are two of the three methodological objectives of this chapter.

The third objective refers to association and involves relating various features of the decision-making processes. The following discussion focuses on this issue.

3.3. Assessment of Association: a Log.-Linear Model of Interpretation

The problem of association is raised by the test of H(4), H(5), H(6) to some extent, H(7) and H(8). This type of test can only take place once protocol analysis, strategic analysis, content analysis (if interviews are used) or scaling methodologies (if questionnaires are used) have successfully described and differentiated the actors' assessments, rationalities, strategies, the features of the decision-making processes, the outcomes, etc.

As mentioned above, H(8) involves a higher level of analysis than that required for testing the other hypotheses. As far as H(4), H(5), H(6) and H(7) are concerned, content, strategic or

phenomenological protocol analyses are well able to detect possible associations. Similarly, if questionnaires are used, classical non-parametric statistics of the type reviewed below could enable these hypotheses to be tested.

Accordingly, since $H(8)$ involves more complex problems, attention should be focused on how to test this hypothesis. What is true for the test of $H(8)$ is a fortiori true for the test of less complex hypotheses (if these hypotheses are based on the same logical structure).

The point at issue is therefore: How is it possible to assess a hypothetical association between the descriptions and differentiations previously examined and the outcomes of the decision-making processes? This question, in fact, can be exposed as follows:

- (i) Given a set of companies which were, or are still, faced with the problem of whether to adopt a new information technology;
- (ii) Given various phases in the decision-making process (e.g. awareness, search for information, study of alternatives, selection of alternatives, internal or external negotiations, decision);
- (iii) Given various rationalities and strategies (each rationality and strategy relating to an organisational actor) which intervened in the above sequence;
- (iv) If we suppose that to each rationality corresponds one and only one strategy;
- (v) Given three possible outcomes: adoption, rejection or deferred final decision:

Is there any association between the pattern of involvement of the rationalities in the decision-making processes and these processes' outcomes? If so, what is the

nature of this association ? (A possible answer to the latter question could be, for example: when the adoption process is initiated by a Savagian rationality (see Exhibit 5.A.), the outcome is likely to be rejection).

From the outset, two remarks must be put forward. First, at this stage, no specification a priori is made as to the nature and number of phases in the process. Obviously, the literature provides some guidelines, but the data must prevail in the characterisation of the sequences. Second, the last example refers to a criterion borrowed from operational research. The operational research theory's criteria may provide clues to characterising the actors' rationalities but, here too, no specification is made a priori as to the nature of the rationalities. The foregoing points clearly indicate that four sets are to be distinguished in the analysis:

- (i) Set of the companies being investigated. If m companies are investigated, this set is equal to: $\{C_1, C_2, \dots, C_m\}$.
- (ii) Set of the phases in the decision process. If n phases are distinguished, this set is equal to: $\{P_1, P_2, \dots, P_n\}$. Here, a considerable constraint arises. Whatever the model to analyse and interpret the data, this type of analysis requires that the number of phases be the same in all the companies. This is unlikely to happen. However, if a pattern seems to prevail (say, if in 70% of the companies the same number of phases is observed), inexistent phases can be replaced by a dummy zero value in the matrices related to the small number of "a-typical" companies. If no prevailing pattern is observable, this type of analysis will have to be rejected and the interpretation of association made by means of alternatives methods. If, for some reason, such a

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quantitative formalised method must still be used, the various phases will have to be reduced to a broad common pattern (similarly to the arithmetic common denominator reduction procedure), but this would be done at the expense of accurate information.

- (iii) Set of the rationalities that took part in the process. If q rationalities are distinguished, this set is equal to: $\{R_1, R_2, \dots, R_q\}$. Here too, the method requires that the number of rationalities and their nature be the same in all the investigated companies. The same remarks as in (ii) apply.
- (iv) Set of the possible outcomes. This set is equal to: $\{O_1, O_2, O_3\}$, in which O_1 refers to adoption, O_2 refers to rejection, and O_3 refers to deferred final decision.

Consequently, four different variables are to be taken into consideration by the model. The measure of association of four variables may be easily determined by means of correlation procedures (multiple or non-linear). But these techniques require that the data meet with four conditions:

- (i) Generation of the data by independent sampling;
- (ii) Normal distribution of the populations;
- (iii) Homoscedasticity of the populations;
- (iv) Interval scaling of measurement.

Obviously, excepting the first condition, these requirements will not be fulfilled by the data likely to be collected. The third and fourth conditions are the most likely to be infringed (see what has already been said as regards attitude measurement). Accordingly, only non-parametric statistics could be used, which eliminates the use of correlation coefficient in the measurement of association. Non-parametric statistics make no assumption for the four conditions, except independence of sampling. Various non-

parametric statistics may be used in the measure of association: the chi-square test and the coefficients related to contingency table analysis. In the context of contingency tables, a measure of association means the extent to which the categories of variables are associated. On the other hand, with correlation procedures, a measure of association means a single coefficient or number which measures the extent to which variables vary together.⁴⁶ The analysis of contingency tables is usually carried out by the determination of statistics such as:

- (i) Spearman's coefficient of rank correlation (measures the association between two sets of observations which are expressed in an ordinal rather than an interval scale of measurement).
- (ii) Kendall's coefficient of concordance (adjusted Spearman's coefficient when more than two sets of ranks are involved).
- (iii) Phi coefficient (adjusted chi-square, applies only to two-by-two tables);
- (iv) Cramer's v (phi corrected for table size, may be used for tables of any size);
- (v) Contingency coefficient (corrects the chi-square statistics for sample size)
- (vi) Lambda coefficient (based on the idea of association as prediction);
- (vii) Gamma coefficient (measures the association between ordinal variables);
- (viii) Tau b (based on concordance and discordance between pairs and is appropriate for symmetrical tables);
- (ix) Tau c (an approximation of gamma which adjusts for the size of the tables and the number of ties when the table is not symmetrical);

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- (x) Somers's D (similar to gamma, but involves adding the mean number of column and row ties to the denominator of the formula for gamma).

However, all those statistics refer only to a bivariate analysis of contingency tables. The only way to obtain a measure of association between four variables which do not fulfil all the parametric conditions is to resort to a log.-linear model. Log.-linear models cell frequencies using the multinomial response model and produce maximum likelihood estimates of parameters by means of the Newton-Raphson algorithm. Output includes observed and expected cell frequencies and percentages; residuals, standardised residuals, and adjusted residuals; and the Pearson and likelihood-ratio chi-square statistics. The first steps of the application of a log.-linear model are introduced below.

For each company C_i , such matrix can be displayed:

		Phases				
		1	...	k	...	n
1 ... j ... q Rationality		c_{i11}		c_{i1k}		c_{i1n}
		c_{ij1}		c_{ijk}		c_{ijn}
		c_{iq1}		c_{iqk}		c_{iqn}

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Then, each company may be represented by a vector of the type $C_i = (c_{ijk})$ in which (c_{ijk}) is a matrix like above. Further, it can be proposed that:

- (i) $c_{ijk} = 1$ if, in company C_i , rationality R_j was involved in phase P_k ;
- (ii) $c_{ijk} = 0$ if, in company C_i , rationality R_j was not involved in phase P_k ;
- (iii) Consequently: $C_i = (c_{i11}, c_{i21}, \dots, c_{iq1}, c_{i12}, c_{i22}, \dots, c_{iq2}, \dots, c_{i1n}, \dots, c_{iqn})$.

Accordingly, the pattern of involvement of various rationalities in the decision-making process for a given firm C_i can be viewed as a $(q \times n)$ -dimensional vector C_i containing only 0's and 1's.

From the foregoing considerations it follows that the point at issue is, now, to determine the extent to which there exists an association between $\{C_i\}_{i \in [1, m]}$ and $\{O_j\}_{j \in [1, 3]}$, that is, between the firms, as characterised by a sequence of involvement of rationalities in the decision process, and the outcomes.

The symbol "e" means "is element of", or "belongs to". The expression " $i \in [u, v]$ " means: "for any integer i belonging to the interval $[u, v]$ ", or, "when i takes successively the values $u, u+1, u+2, \dots, v-1, v$." To the effect that $\{C_i\}_{i \in [1, m]}$ is equal to the set $\{C_1, C_2, \dots, C_{m-1}, C_m\}$.

The order of the elements between " $\{$ " and " $\}$ " does not matter, while the order of the terms between " $($ " and " $)$ " does matter.

At this stage, the basic procedure consists in distinguishing between the patterns of involvement attached to each outcome, by means of three matrices of the following type.

Outcome O_1

		Phase				
		1	...	k	...	n
Rationality	1	x_{111}				
	...					
	j			x_{1jk}		
	...					
	q					x_{1qn}

In this matrix, x_{1jk} is the number of companies with outcome O_1 and rationality R_j intervening in phase P_k . A similar matrix will be drawn in relation with outcome O_2 , and x_{2jk} will be the number of companies with outcome O_2 and rationality R_j intervening in phase P_k of the decision process. The third matrix, obviously, will refer to outcome P_3 , and x_{3jk} will be the number of companies with outcome O_3 and rationality R_j intervening in phase P_k of the decision process.

If this model is applicable (see the constraints), it should give rise to one of the two following propositions:

- (i) Indifference: under the conditions of this research, there is no association between the nature and the sequence in which rationalities intervene in the decision process and its outcome.
- (ii) Association: under the condition of this research, the null hypothesis (indifference) is to be rejected. To a particular level of confidence (to be specified), there is, in the sample, an association between the nature and the sequence in

which rationalities intervene in the decision process and its outcome.

Clearly, this model is both applicable to data collected by means of questionnaires and to categories suggested by strategic, phenomenological or content analyses. This model is not available on SPSS or MINITAB, but is available on SPSSX by means of the LOGLINEAR procedure. The LOGLINEAR procedure is a general procedure which does model fitting, hypothesis testing, and parameter estimation for any model that has categorical variables as its major components. As such, the LOGLINEAR procedure subsumes a variety of related techniques, including general models of multiway contingency tables, logit models, logistic regression on category variables, quasi-independence models and so on. The LOGLINEAR procedure is interesting for this research because its only required specification is the set of variables used in the models.

Finally, one may raise the question of whether it is consistent to use such a statistical model to analyse data recorded, or information structured, by means of phenomenological protocol analysis or strategic analysis. In this respect, it must be noted that the association this model could reveal should be compared to that suggested by the subjects themselves, in the course of protocol recording. The interest of this model is that of enabling inter-firm comparisons to be made. The subjects can well assess if there is an association between the rationalities and strategies (they can use other words) that have intervened in the decision-making process and its outcome, but they cannot be helpful in terms of inter-firm comparison: it belongs to the researcher to determine if a pattern may be distinguished in his sample. In this respect, the log-linear model may prove useful.

Second Recapitulation

As seen in Section 2, owing to the constraints of time and the threats to validity inherent in observation and analysis of document methods, the alternative option of "asking for information" was selected. This method refers either to questionnaire designs or to interviews. Questionnaire designs and their scaling variety enable robust conclusions in terms of external and internal validity to be drawn. But this is done at the expense of detailed information. This is a major shortcoming since the present research is focused on decision-making processes, the study of which requires accurate understanding of the organisational game. Accordingly, in the light of 3.1.2. and of the conclusion to the research methods evaluation, questionnaire designs and their scaling variety must be rejected.

Structured interviews cannot be selected, as they impair the major advantage of verbal records (assignment of limitations) while they do not achieve the kind of robustness of questionnaire designs.

Accordingly, information will be collected by means of unstructured interviews. The problems of differentiation and description involved by the test of the hypotheses can be handled in the framework of phenomenological protocol analysis, content analysis or/and strategic analysis. As far as the test of association is concerned, a distinction must be made. Since (i) questionnaires will not be used and since (ii) protocol, content or/and strategic analyses are well able to detect relatively simple associations, any of these methods can be used to test H(4), H(5), to some extent H(6), and H(7). As far as the more complex association between the pattern of involvement of rationalities (as they attach to strategies) in the adoption process sequences and the outcome is concerned (see Hypothesis 8), a log.-linear model could be used. It has been shown that this is the only possible

statistical procedure to estimate an association between four variables which do not fulfil all the criteria attached to parametric statistics. However, the applicability of this model depends upon various properties of the data. If the form of the data is not appropriate, or if rendering it appropriate entails too substantial distortions of their meaning, another method will have to be used. Such alternative method could be based on common sense bolstered by strategic, content or phenomenological protocol analyses. If the log.-linear model can be applied, the theory provides confidence intervals. Alternatively, common sense or the corresponding theories are well able to set limit to the validity (internal or external) of content, strategic and phenomenological protocol analyses.

4. Conclusion of the Fifth Chapter

This chapter was devoted to identify a research design, research methods and data analysis procedures suitable to the resolution of the problem which is at the centre of the thesis. These points were successively addressed in Section 1, Section 2 and Section 3.

In recapitulation: information will be collected by means of unstructured interviews; in order to examine the validity of the hypotheses, the following techniques could be employed:

- (i) Phenomenological protocol analysis (see Exhibit 6.A.);
- (ii) Content analysis (see 3.2.2.);
- (iii) Strategic analysis, which denotes the practical and research-

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oriented implementation of the Strategic Theory of Organised Action (see Exhibit 6.C.);

- (iv) A combination of (i), (ii), and (iii) with the possible support of a log.-linear model (see 3.3.).

The choice between these techniques will be dictated by empirical circumstances. Such circumstances will only be experienced in the process of the field work, "on the ground".

This leads one to the data themselves, which constitute the core of the following chapter.

PROTOCOL ANALYSIS

There is no agreement on what "protocol analysis" exactly refers to. Two major streams may, however, be distinguished.

First, the concept may refer to a method which involves instructing subjects to verbalise their thoughts while they are in the process of making a decision or solving a problem. Owing to the time constraint previously addressed, these studies often resort to simulations. Such methods have been applied to develop descriptive models of decision-making processes in a variety of marketing contexts, including buying behaviour, by Alexis et al,⁴⁷ Bettman,⁴⁸ Clarkson,⁴⁹ Payne,⁵⁰ and Wind,⁵¹ for example. However, Wind commented on the ability of protocol analysis to provide valuable insights into the industrial buyer's purchase decision and noted the "surprising" lack of studies applying this approach in organisational buying behaviour.⁵² More recently, protocol analysis was used to develop situation models of the decision processes industrial buyers use in requesting quotations and selecting a final supplier.⁵³ According to these researchers, the major advantage of protocol analysis is that it allows the researcher to obtain more complete data on the details of the subject's decision-making process than can be obtained by any other method. It is argued that, to a significant degree, Newell and Simon's information processing theory provides a conceptual basis for the application of protocol analysis.⁵⁴ According to this theory, complex cognitive behaviour is compounded out of a sequence

of elementary information processes: under these conditions, one might reasonably expect individuals to be able to articulate their decision processes. Further, it is argued that the flow charting and computerisation of these processes become possible.

The second stream is more philosophically oriented and does not specify that the subjects be in the course of the action when they articulate their thoughts. In other words, protocol analysis may be applied to memories and, in this sense, refers to "way of knowing" and study the process by means of which "ideas may show themselves in the consciousness of the individual as subjective realities". The following lines draw heavily on Huczinski and Mmobuosi.⁵⁵

It is to be recalled that the main ideas of phenomenology is that phenomena are not just "out there" (positivism), but are in the "in-here" of consciousness. Phenomenological seeing is not merely perceiving, but includes the totality of experiencing. The research problem is how can one establish contact with something as intangible as consciousness or the stream of experience. It is argued by phenomenologists that the main problem is to get at how things appear in the consciousness of the individual or persons concerned, given that consciousness is abstract. The key to the phenomenological seeing of reality is through the two concepts of:

- (i) Noema : the "what" of experience; what is experienced; the object of experience; and,
- (ii) Noesis: the "how" of experienced; experiencing.

Although noesis and noema are inseparable because one cannot have an object of experience without the process of its being experienced, for practical research purposes, phenomenologists will separate them.

Practically, phenomenological protocol analysis consists in analysing a record (unstructured interview, for example) into noema

and noesis. This enables the researcher to go into the study of reality through the subject's consciousness without asking himself which variables he is going to correlate with which others. On the contrary, questionnaire items would come from the researcher's own knowledge rather than from the subject's. For example, if causal relationships appear in the analysis, it is only when and because such relationships are established by the subject and not by the researcher imposing or pre-supposing correlations.

Consequently, words themselves are to afford a great interest for the researcher. Words are viewed by the phenomenologists as symbols which represent the world as it is experienced by the subject. This is why it is usually referred to as the process of eidetic reduction, which aims at tracing the phenomena back to how they show themselves in the consciousness of the subject, by looking for cues in the spoken and recorded language. Alongside with eidetic reduction, protocol analysis involves the notion of epoche. Epoche refers to a suspension of judgment. This does not mean that the researcher has no hypotheses, but only that he suspends them when he is proceeding to a phenomenological study of the phenomena under consideration. Once the data are collected, they are considered in the light of the hypotheses.

The problem of validity in positivist social sciences has its phenomenological equivalent in whether the interpretation is congruent with that of the subject. The problem is solved by phenomenologists by displaying the subject's account of the phenomena being studied side by side with their interpretation. This allows the subject, or any other interested party, to inspect and controvert them.

The question, therefore, is to assess the extent to which protocol analysis allows generalisation (external validation). It is generally held that the only generalisation feasible in the

phenomenological view of reality is described as problematic generalisation, rather than universal generalisation. This means that in a world considered as of changing meanings and unique individualised definitions of reality, any generalisation must necessarily be cautious and qualified with conditions. According to these researchers, generalisation has, therefore, to be restricted to the subjects in the situation and not universalised outside them. As a summary, one design of protocol analysis may be provided:

(i) Collection of the protocols- During the face-to-face interview, various concepts are addressed by the researcher, such as: new product, adoption, etc. The respondent is asked to "think aloud" when he analyses these concepts. His words are recorded and then transcribed. The researcher then goes on to code these protocols. The meanings which have been attached by the interpreting researcher are indexed alongside the protocol in the right-hand column of a table. The researcher has to select questions to help him look for noematic and noetic elements in the protocols. These questions may be:

(a) Noema: what factors does a subject experience as characteristic of the innovation under consideration?

(b) Noesis: how does he experience these factors and relate them to his expected rewards of the "organisational game"? The logic of this relation constitutes the subject's rationality. The articulation of his expected rewards constitutes his strategy.

(ii) Then, letters a and b will be attached to the interpretation to represent noema and noesis respectively.

- (iii) The interpretation of noema and noesis constitutes this step of the analysis.
- (iv) Finally, the interpretation must be discussed in the light of the literature and current theories.

ENTROPIC INTERPRETATION OF QUESTIONNAIRE DESIGNS

B.1. Neglecting Probabilities

In the interpretation of questionnaire design as a particular communication system, only one source of entropy has been considered. That inherent in the process by which the respondent's potential messages are transformed into answers to questions. In other words, other sources of entropy likely to emerge from statistical treatments, for example, will not be examined here, as they entail considerations beyond the writer's capacities.

The source of entropy under consideration can be symbolised and made easier to understand in an example.

Suppose a researcher is interested in obtaining a particular type of information from respondents. A question with three different responses is designed. Respondents must "tick as appropriate". Suppose each respondent may express nine messages in relation with the researcher's interest.

Let M be the set of the nine possible messages: $M = \{m_1, m_2, \dots, m_9\}$, in which m_i is a potential message.

Let R be the set of the three possible answers: $R = \{r_1, r_2, r_3\}$, in which r_i is a potential response.

If Weaver is to be believed, the amount of information is defined, in the simplest cases, to be measured by the logarithm of the number of available choices.⁵⁶ As a result, if I_M is the quantity of information available from M , and I_R , that from R , it

follows that: $I_M = \log 9$, and $I_R = \log 3$.

Henceforth, Boltzman's k is neglected, as well as the unity and the fact that these logarithms are to be expressed in base two if the unity is bit. These simplifications do not impair the reasoning which is only interested in the relationship between the two quantities of information.

Here, obviously, the relation is that: $I_M = 2I_R$, in other words, half the information has been lost in the questionnaire process. It is acknowledged that, on the other hand, the questionnaire provides a type of structuration of the answer. The problem is to express structuration and categorisation in terms of supplementary information. However, this interpretation is somehow over-simple, because it does not take into consideration the probabilities of occurrence of the messages and responses. These probabilities, and their fusion, have previously been analysed as the justification for questionnaire design. The next sub-section focuses on how probabilities are integrated into the model.

B.2. Introducing Probabilities

Consider the same example as above. The nine possible messages boil down to three different responses to a same question. The respondent must choose between r_1 , r_2 , and r_3 . To each message or answer corresponds a probability of occurrence. The fact of selecting r_1 as a response is considered as equivalent to the fact of expressing either m_1 , m_2 , or m_3 (other combination are possible, but this one is more simple). The fact of responding r_2 is considered as equivalent to the fact of expressing either m_4 , m_5 , or m_6 . Similarly for r_3 and m_7 , m_8 , or m_9 . The following diagram explains the situation:

M		R	
Potential messages	Probability of occurrences	Possible responses	Probability of choice
m_1	p_1	r_1	$p_1 + p_2 + p_3$
m_2	p_2		
m_3	p_3	r_2	$p_4 + p_5 + p_6$
m_4	p_4		
m_5	p_5	r_3	$p_7 + p_8 + p_9$
m_6	p_6		
m_7	p_7		
m_8	p_8		
m_9	p_9		

The measure of the information contained in the message ensemble as a whole is:

$$I_1 = - \sum_{i=1}^{i=9} p_i \log p_i \quad (\text{See Singh}).^{57}$$

Then it is substituted for the original ensemble $M = \{m_i\}_{i \in [1,9]}$ with its probability pattern $\{p_i\}_{i \in [1,9]}$ an other ensemble, that of the three related responses: $R = \{r_i\}_{i \in [1,3]}$ with the following probability pattern:

$$\left\{ \sum_{i=1}^{i=3} p_i, \sum_{i=4}^{i=6} p_i, \sum_{i=7}^{i=9} p_i \right\}.$$

Then, it is considered that: $r_1 = \{m_i\}_{i \in [1,3]}$, $r_2 = \{m_i\}_{i \in [4,6]}$ and $r_3 = \{m_i\}_{i \in [6,9]}$.

If we do so, the subsystems r_1 , r_2 , and r_3 will have their probability patterns altered from $\{p_i\}_{i \in [1,3]}$, $\{p_i\}_{i \in [4,6]}$ and $\{p_i\}_{i \in [7,9]}$ in their original set to, respectively:

$$\left\{ p_j / \sum_{i=1}^{i=3} p_i \right\}_{j \in [1,3]}, \left\{ p_j / \sum_{i=4}^{i=6} p_i \right\}_{j \in [4,6]}, \text{ and } \left\{ p_j / \sum_{i=7}^{i=9} p_i \right\}_{j \in [7,9]}$$

in the subsets to make the subsums equal to 1. Indeed, one can

easily verify that:

$$(p_j / \sum_{i=1}^{i=3} p_i) = 1, \quad (p_j / \sum_{i=4}^{i=6} p_i) = 1, \quad \text{and} \quad (p_j / \sum_{i=7}^{i=9} p_i) = 1.$$

The procedure consists now of two steps. First, when one deals with the original set or ensemble as made up of r_1 , r_2 , and r_3 , one treats those three subsets as if they were constituents of the original set M . In the second step, one treats each of those subsets as a set in its "own right" with its own subconstituents.⁵⁸

$$r_1 = \{m_i\}_{i \in [1,3]}, \quad r_2 = \{m_i\}_{i \in [4,6]}, \quad \text{and} \quad r_3 = \{m_i\}_{i \in [7,9]}.$$

First Step

The probability pattern of the ensemble $R = \{r_1, r_2, r_3\}$ is:

$$\left(\sum_{i=1}^{i=3} p_i, \sum_{i=4}^{i=6} p_i, \sum_{i=7}^{i=9} p_i \right)$$

so that its information content I_2 is:

$$-\left\{ \left[\left(\sum_{i=1}^{i=3} p_i \right) \log \sum_{i=1}^{i=3} p_i \right] + \left[\left(\sum_{i=4}^{i=6} p_i \right) \log \sum_{i=4}^{i=6} p_i \right] + \left[\left(\sum_{i=7}^{i=9} p_i \right) \log \sum_{i=7}^{i=9} p_i \right] \right\}.$$

As the logarithm function is increasing, and negative when the arguments are smaller than 1, it is easy to show that I_2 is smaller than I_1 . This is consistent with the results obtained in section B.1.

Second Step

Let I_3 be the information content of r_1 , with its probability

pattern:

$$\left\{ p_j / \sum_{i=1}^{i=3} p_i \right\}_{j \in [1,3]}$$

Thus, according to the general equation of information:

$$I_3 = - \sum_{j=1}^{j=3} \left(p_j / \sum_{i=1}^{i=3} p_i \right) \log \left(p_j / \sum_{i=1}^{i=3} p_i \right).$$

Likewise, let I_4 be the information content of r_2 , with its probability pattern:

$$\left\{ p_j / \sum_{i=4}^{i=6} p_i \right\}_{j \in [4,6]}. \quad \text{It follows that:}$$

$$I_4 = - \sum_{j=4}^{j=6} \left(p_j / \sum_{i=4}^{i=6} p_i \right) \log \left(p_j / \sum_{i=4}^{i=6} p_i \right).$$

Now, let I_5 be the information content of r_3 , with its probability pattern:

$$\left\{ p_j / \sum_{i=7}^{i=9} p_i \right\}_{j \in [7,9]}. \quad \text{It follows that:}$$

$$I_5 = - \sum_{j=7}^{j=9} \left(p_j / \sum_{i=7}^{i=9} p_i \right) \log \left(p_j / \sum_{i=7}^{i=9} p_i \right).$$

Then, if one computes the weighted following sum:

$$I_2 + \left(\sum_{i=1}^{i=3} p_i \right) I_3 + \left(\sum_{i=4}^{i=6} p_i \right) I_4 + \left(\sum_{i=7}^{i=9} p_i \right) I_5,$$

it is obtained, by developing and using the functional property that $\log(1/x)$ is equal to $-\log(x)$,

$$\begin{aligned}
& - \left\{ \left[\sum_{j=1}^{j=3} (p_{j-} - p_j) \log \sum_{i=1}^{i=3} p_i \right] + \left[\sum_{j=4}^{j=6} (p_j - p_j) \log \sum_{i=4}^{i=6} p_i \right] + \right. \\
& \left. \left[\sum_{j=7}^{j=9} (p_j - p_j) \log \sum_{i=7}^{i=9} p_i \right] + \left[\sum_{i=1}^{i=9} p_i \log p_i \right] \right\}
\end{aligned}$$

which is equal to:

$$\begin{aligned}
& = - \left(0 + \sum_{i=1}^{i=9} p_i \log p_i \right) \\
& = - \sum_{i=1}^{i=9} p_i \log p_i \\
& = I_1.
\end{aligned}$$

This result is consistent with the assumption that we could compute the information content of each individual message in the ensemble and then compute the weighted sum $[I_1]$ or alternatively divide it into subsets of messages and compute the information content of each subset before deriving the weighted sum:⁵⁹

$$[I_2 + \sum_{i=1}^{i=3} p_i I_3 + \sum_{i=4}^{i=6} p_i I_4 + \sum_{i=7}^{i=9} p_i I_5].$$

In conclusion, by weighting adequately each response, it is arguable that there is no loss in information when the messages are grouped. But this supposes that the probabilities of occurrence of each message are known. This is unrealistic, and, further, if these probabilities were really known by the researcher, his survey would be somewhat pointless. Nevertheless, it must be stressed that questionnaires generally counterbalance the loss of information by structuration. In various researches this is highly advantageous.

This tentative evaluation is aimed at underscoring the risk inherent in using unsuitable techniques for collecting information. When detailed information is preferred to (a priori) structured information, questionnaire designs appear to be unsuitable. In this respect, it is worth noting that an interesting approach to the evaluation of information has been recently developed by Cecez-Kecmanovic.⁶⁰ This researcher has designed descriptive models of decision-making with various types of uncertainties. However, the purpose of these models goes beyond that of the present exhibit.

**THE PRACTICAL USE OF THE STRATEGIC THEORY OF ORGANISED ACTION:
STRATEGIC ANALYSIS**

This exhibit provides a summary of the research methodology recommended by the Strategic Theory of Organised Action. Strategic analysis of organisations and systems may be used to "understand", describe and comment on a situation.

C.1. Description

- (i) The researcher must describe the judgments, feelings and actions of the actors being directly involved in the situation under under consideration.
- (ii) The researcher must identify the actors involved in the situation, and examine their "problems", roles, and objectives.
- (iii) The researcher must identify the type of relationships which the actors establish between themselves.
- (iv) The researcher must identify the conflicts and coalitions that can exist within the system.

C.2. Amazement

At this stage, the researcher must experience "amazement", surprise, astonishment. By relating these descriptions to his experience and expectations and to the prescriptions of the formal structure (e.g. organisational chart flow, actors' brief, task definitions, etc.),

the researcher must try to identify "distortions", i.e. what is unexpected, baffling, surprising, inconsistent or "ununderstandable". Strategic analysis is all the more enriching as the researcher is "amazed", astonished, by the discrepancy between what he was expecting and what he, in fact, observes.

C.3. Resolution

In order to understand and explain these "distortions" and discrepancies, the actors' opinions, feelings and actions are to be thought of within an organisational and systemic context. In other words, the researcher must raise the following questions:

- (i) What uncertainties affect the actors?
- (ii) What interdependencies exist between the actors, i.e. which actor controls which zone of uncertainty (inasmuch as this uncertainty affects other actors)?
- (iii) What are the main problems to which the actors are confronted?

C.4. Conclusion

Once the foregoing questions are answered by the researcher, resorting to hypothetico-inductive reasoning, he must then proceed to determining:

- (i) The strategies the actors are implementing, and their rationalities;
- (ii) The organisational stakes over which these strategies crystallise;
- (iii) The structures of power and dependency which underline these strategies and rationalities.⁶¹

CHAPTER VI

NOTES AND REFERENCES

- 1- See: Edwards, P. (Editor in chief) The encyclopedia of philosophy. New York, the Macmillan Company and the Free Press, 1967, vol.6, p.51.
- 2- Ibid.
- 3- Whyte, W.F. Street corner society. Chicago, University of Chicago Press, 1941.
- 4- Lupton, T. On the top floor. London, Pergamon, 1963.
- 5- Mintzberg, H. The nature of managerial work. Englewood Cliffs, N.J., Prentice-Hall, Inc., 1973.
- 6- Burgoyne, J.G., & V.E. Hodgson. An experiential approach to understanding managerial approach. Paper presented at the Seventh Biennial Conference on Leadership and Managerial Behaviour, Oxford, May 1982, p.7.
- 7- Nabseth, L., & G.F. Ray. Op.cit., pp.166 et sq.
- 8- Crozier, M., & E. Friedberg. Op.cit., p.198.
- 9- Huczinski, A., & I.B. Mmobuosi. Op.cit., p.20.
- 10- Secord, P.F., & C.W. Backman. Theories of attitude organisation. In Concepts and controversy in organisational behaviour, edited by W.R. Nord. Pacific Pallissades, Cal., Goodyear Publishing Company, Inc., 1972, pp.398-342. See p.398.
- 11- Festinger, L. A theory of cognitive dissonance. New York, Harper, 1957.
- 12- See:
 - Rosenberg, M.J. A structured theory of attitude dynamics. Public Opinion Quarterly, vol.24, 1960, pp.319-340.
 - Rosenberg, M.J. An analysis of affective cognitive consistency. In Attitude organisation and change, edited by C.I. Hovland & M.J. Rosenberg. New Haven, Conn., Yale University Press, 1960, pp.15-64.
- 13- Katz, D., & E. Stotland. A preliminary statment of a theory of attitude structure and change. In Psychology: a study of science, edited by S. Koch (vol.3) New York, McGraw-Hill, 1959.
- 14- Katz, D. The functional approach to the study of attitudes. Public Opinion Quarterly, vol.24, 1960, pp.163-264.
- 15- Adorno, T.W., et al. The authoritarian personality. New York, Harper, 1950.
- 16- See: Engel, J.F., D.T. Kollat, & R.D. Blackwell. Consumer behaviour. New York, Holt, Rinehart & Winston, Inc., 1968, p.165.

CHAPTER VI

- 17- Crozier, M., & E. Friedberg. Op.cit., p.406.
- 18- Burgoyne, J.G., & V.E. Hodgson. Op.cit., p.5.
- 19- Harre, R., & P.F. Secord. The explanation of social behaviour. Oxford, Blackwell, 1972.
- 20- Burgoyne, J.G., & V.E Hodgson. Op.cit., p.5.
- 21- Nabseth, L., & G.F. Ray. Op.cit., p. 166.
- 22- Burgoyne, J.G., & V.E. Hodgson. Op.cit., p. 6.
- 23- Burgoyne, J.G. The judgement process in management students' evaluation of their learning experiences. Human Relations, vol.28, 1975, pp.543-569.
- 24- See: Thurstone, L.L.(Editor). The measurement of social attitudes. Chicago, Chicago University Press, 1929, pp.129-134.
- 25- See: Likert, R.A. A technique for the measurement of attitudes. Archives of Psychology, No.140, 1932, pp.1-55.
- 26- See: Osgood, C.E., et al. The measurement of meaning. Urbana, Ill., University of Urbana Press, 1957.
- 27- See: Guttman, L. The basis for scalogram analysis. In Measurement and prediction, edited by S.A. Stouffer. Princeton, N.J., Princeton University Press, 1950.
- 28- See: Stephenson, W. The study of behaviour: Q-technique and its methodology. Chicago, University of Chicago Press, 1953.
- 29- Coombs, C.H. Psychological scaling without a unit of measurement. Psychological Review, vol.57. 1950, pp.145-158.
- 30- Shannon, C.E. The mathematical theory of communication (fifth edition, first published 1949). Urbana, Ill., University of Illinois Press, 1972, pp.33 and 34.
- 31- Weaver, W. Recent contribution to the mathematical theory of communication. In The mathematical theory of communication, by C.E. Shannon & W. Weaver (fifth edition, first published 1949). Urbana, Ill., University of Illinois Press, 1972, pp.1-28.
- 32- Ibid., p.25.
- 33- Ibid.
- 34- Theil, H. Applied economic forecasting. Amsterdam, North Holland Publishing Company, 1966, p.257.
- 35- Wiener, N. Cybernetics - Control and communication in the animal and the machine (third edition). New York, Wiley, 1949, p.79.
- 36- Stevens, S.S. Mathematics, measurement, and psychophysics. In Handbook of experimental psychology, edited by S.S. Stevens. New York, Wiley, 1951, p.22.
- 37- Torgerson, W.S. Theory and methods of scaling (sixth edition). New York, Wiley, 1965, p.17.

CHAPTER VI

- 38- Ibid., p.18.
- 39- Ibid., pp.89-91.
- 40- Moser, C.A., & G. Kalton. Survey methods in social investigation (second edition). London, Heinemann Educational Books, 1981, p.372.
- 41- Burgoyne, J.G., & V.E. Hoagson. Op.cit., p.6.
- 42- Ibid.
- 43- Bierhoffalfermann, D., et al. Sex-typical behaviour in fairy tales - A content analysis. Psychologie in Erziehung und Unterricht, vol.29, 1982, pp.129-139.
- 44- Fitzpatrick, M.A. Book review of: Life on television: content-analysis of United States T.V. drama. (a book by B.S. Greenberg). Quarterly Journal of Speech, vol.68, 1982, pp.341 and 342.
- 45- Shrink, J.L., E.D. Poole, & R.M. Regoli. Sexual myths and ridicule - A content analysis of rape jokes. Psychology, vol.19, 1982, pp.1-6.
- 46- Whiteley, P. The analysis of contingency tables. In Data analysis and the social sciences, edited by D. McKay, N. Schofield, & P. Whiteley. London, Frances Pinter, 1983, pp.72-120.
- 47- Alexis H.M., G. Haines, & L. Simon. Consumer information processing: the case of woman's clothing. In Marketing and the new science of planning, edited by R. King. Chicago, A.M.A., 1968, pp.197-205.
- 48- Bettman, J.R. Information processing models of consumer behaviour. Journal of Marketing Research, vol.7, 1970, pp.370-376.
- 49- Clarkson, G.P.E. A model of trust investment behaviour. In Computer and thoughts, edited by E. Feigenbaum & J. Feldman. New York, McGraw-Hill Book Company, 1963, pp.347-371.
- 50- Payne, J.W. Task complexity and contingent processing in decision-making: an information search and protocol analysis. Organisational Behaviour and Human Performance, vol.16, 1976, pp.366-387.
- 51- Wind, Y. Applying the behavioural theory of the firm to industrial buying decisions. The Economic and Business Bulletin, vol.10, 1968, pp.22-28.
- 52- Wind, Y. Organisational buying behaviour. In Review of marketing, edited by G. Zaltman & T. Bonoma. Chicago, A.M.A., 1978, pp.160-193.
- 53- Crow, L.W., R.W. Olshavski, & J.O. Summers. Industrial buyers' choice strategies: a protocol analysis. Journal of Marketing Research, vol.17, 1980, pp.34-44.
- 54- Newell, A., & H.A. Simon. Human problem solving. Englewood Cliffs, N.J., Prentice-Hall, Inc., 1972.

CHAPTER VI

- 55- Huczinski, A. & I.B. Mmobuosi. Op.cit.
- 56- Weaver, W. Op.cit., p.9.
- 57- See: Singh, J. Information theory, language and cybernetics. London, Constable & Co., Ltd., 1966, p.16.
- 58- Ibid., p.17.
- 59- Ibid., p.18.
- 60- Cecez-Kecmanovic, D. The value of information in decision-making. In Processes and tools for decision support, edited by H.G. Sol. Amsterdam, North-Holland Publishing Company, 1983, pp.7-23.
- 61- Exhibit 6.C. is a summary of:
- Cycle Superieur de Sociologie de l' Institut d'Etudes Politiques de Paris. Exercice d'analyse d'une situation vecue. March 1985. (With permission).

THE EMPIRICAL FINDINGS

0. Introduction

The preceding chapter was devoted to presenting various alternative research methodologies allowing for the collection and analysis of the information relevant to testing the hypotheses. Accordingly, the present chapter is aimed at presenting this information and discussing the hypotheses in the light of the empirical findings.

The first section presents a brief overview of the relationship between innovation and information technology, before introducing an important opportunity which was offered to penetrate the domain of information technology, and concludes by characterising the preparatory research which derived from this opportunity.

The second section introduces the case studies of three French firms which were faced with the problem of adopting or rejecting technological innovations. Four computer-based information systems are involved in this analysis.

Finally, the third section examines the hypotheses in the light of the case studies, and concludes as to their validity.

SECTION 1 INFORMATION TECHNOLOGY AND INNOVATION

As previously stated in Chapter VI (1.3) the field of business information systems is chosen as the domain to which the innovations to study must belong. Information technology has long been

considered as a highly innovative field. Since the first computer sold by a commercial firm was installed at the United States Census Bureau in 1951, information technology has known at least three generations, and numerous others seem in sight. However, at this stage of the research, two points must be made.

First, the concept of information technology is a very broad one, and nothing rigorous can be achieved if no other characterisation is brought to the domain of study. However, at this introductory stage, no accurate definition will be given, and it will be used equally to refer to data processing, computer sciences, information technology, etc. It is only at the case study level that precise definitions of the systems under review will be proposed.

Second, one may wonder whether information technology is still an innovative field. Is any information system an innovation per se? The following lines purport to answer this question.

Today, very few companies do not possess their own computer, and it seems that very few managers are not already convinced of the advantages of computerised data processing. In order to assess the degree to which organisational actors associate information technology with innovation, two solutions may be employed.

The first solution is to look into the recent literature. But this may generate only partial indications, since most of the related studies avoid the question of novelty, and concentrate on the criteria according to which information technologies are perceived.¹

The second alternative solution, which, of course, may be used together with the first one, consists in collecting information from the elements belonging to the segment under study. These elements are, in fact, the organisational actors who have dealt or are still dealing with information technology in their respective companies.

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This seems rather a broad characterisation, but a more accurate definition could bias the preparatory research. An international trade show held in Paris, September 1984, provided a very interesting opportunity to collect direct and rich information on the extent of the association between information technology and innovation. The following sub-section is devoted to introducing this show's main features and the help it provided for the empirical research.

1.1. Presentation of SICOB

SICOB ("Salon International d'Informatique, Telematique, Communication, Organisation du bureau et Bureautique) is an international trade show for data processing, telematics, communications, office organisation and office automation. It is usually held at the CNIT exhibition centre, Paris-La Defense. Created in 1950, SICOB takes place every year and offers an ideal observation point for the evaluation of the European market for information technology. A visit to SICOB helps to position products in relation to competitive equipment, to design a range or to find a sales network. SICOB also offers industrialists an opportunity to strengthen their contacts with distributors and enables them to judge their performance on the spot.²

1.2. Preparatory Research in SICOB

The point was to take the opportunity provided by SICOB to assess the degree to which managers associate information technology with the concept of innovation. Obviously, the question is of great interest since: (i) the present research concentrates on innovations, (ii) both the strategic and phenomenological

perspectives prohibit any arbitrary association (by the researcher) between objects and predicates. The only relevant associations are those made by the actors. Accordingly, the following methodology was employed: for four days, as many visitors as possible were interviewed. A random approach was used, and most of the respondents were interviewed at the end of the conferences or on the exhibition stands.

In accordance with the phenomenological approach, which underscores the risks of the researcher's influencing or biasing the responses, efforts were made to reduce the interviewer's role as much as possible. The first words used to each potential respondent were: "Hello, do you mind telling me what these two words together evoke?" While delivering this short speech, each person was shown two small cards (15cmX15cm). On one was written "Information Technology", on the other, "Innovation".

To ensure that the sequence in which these words were read did not influence the answers, the order of the cards was alternated after each interview. The answers were recorded on tape. The average length of one interview was four minutes. Therefore, most of the interviews were totally unstructured. However, it happened that some interviewees were so interested in the subject that they would expatiate, digress, and sometimes offer an invitation to visit their company. In these (few) cases the interviews could last as long as three hours but were still unstructured. Obviously, it is difficult to compare the information gathered during three hours to that gathered during only four minutes. But there is no epistemological problem here since, for the longest interviews, most of the time was spent discussing questions alien to that of the association between information technology and innovation. The salient points that emerged from the 277 interviews can be summed up as follows:

- (i) Innovation no longer consists of buying computers ("those who buy their first computer now are laggards");
- (ii) Information technology is no longer a new field, but remains an innovative one: the innovation lies in the novelty of the applications (e.g. "computer-based business information systems") which are made of information technologies, not in information technology itself.

From a methodological viewpoint, the lessons of this preparatory research were the following: the conceptual field of study should be limited to recent adoptions, rejections of, or current deferred final decisions related to, computer-based business information systems (in companies not already equipped with such applications).

The physical field was therefore limited to the companies in which such situations could be observed. Thanks to the managers encountered at SICOB and to various connections with a French manufacturer of hard and soft wares, it was possible to select a set of companies belonging to the physical field of study. Eventually, it was the possibility and the authorisation to perform the interviews within the companies which worked as a final filter and determined the organisations from which it was possible to gather information.

SECTION 2 THE CASE STUDIES

This section presents three case studies performed on three French companies. Each case study is based on unstructured interviews with these organisations' actors. Each of the interviews took more than three hours, and numerous actors had to be interviewed twice, if not three times. In the case of Barracuda Corporation, it was necessary to be appointed in the company (for one month) in order to

be allowed to conduct interviews.

As pointed out in the conclusion to Chapter VI, four methods for testing the hypotheses were viewed as compatible with the epistemological constraints of the research:

- (i) Phenomenological protocol analysis (see Exhibit 6.A.);
- (ii) Content analysis (see Chapter VI, 3.2.2.);
- (iii) Strategic analysis, which denotes the practical implementation of the Strategic Theory of Organised Action (see Exhibit 6.C.);
- (iv) A combination of (i), (ii) and (iii), while the log.-linear model was to be used mainly for testing the eighth hypothesis (see Chapter VI, 3.3).

After the first interviews, it soon appeared that phenomenological protocol analysis was not compatible with the problem under consideration. Most of the actors' answers involved technical and economic aspects which did not lend themselves to psychological analysis performed in the framework of phenomenology. Accordingly, when the expression "protocol analysis" appears in the following lines, it means "study of the respondents' answers (i.e. the protocols)" rather than "phenomenological protocol analysis".

On the other hand, it was either impossible to find significant recurrences in the respondents' answers, or the recurrences were poor indicators as to the actors' rationalities and strategies. Consequently, content analysis was not a satisfying technique either.

Conversely, strategic analysis proved highly suitable to the study of organisational problems (with techno-economic implications) from the viewpoint of decision-making and organisational climate. Accordingly, each case study is to be viewed as a strategic analysis performed on the basis of unstructured interviews. All the

interviews were hand-written, and tape-recording was never used.

The case studies appear in appendices, in the following order:

- (i) Shark Corporation: Appendix I.
- (ii) Piranhas Corporation: Appendix II.
- (iii) Barracuda Corporation: Appendix III.

Reading the appendices is necessary in order to follow the next section, as the examination of the hypotheses is essentially based on the case studies.

SECTION 3 EXAMINATION OF THE HYPOTHESES

In accordance with the technique which was used to present the case studies, i.e. strategic analysis, the hypotheses will be examined in the light of the Strategic Theory of Organised Action. It is only for the eighth hypothesis that the problem of whether to use a log.-linear model will appear.

HYPOTHESIS 1: " 'Organisational awareness' is an ambiguous concept."

Shark Corporation

In this case, the first organisational contact of the SSII's sales engineer reorients the latter towards somebody (the Economic Forecasting Researcher) viewed as more relevant for discussing the decision support system (SP). The Economic Forecasting Researcher belongs to the Marketing Department (MD) which will become the decision-making unit for the choice. Therefore, a member of what will become the decision-making unit is made aware of the existence of the innovation through the channel of another member of the

organisation (i.e. the manager of the Operational Research Department). Therefore, the question is the following: when does organisational awareness start? Does it start when the proposal is made to the manager of the Operational Research Department (ORD), or when it is made to the member of the MD?

Then, if the first alternative is chosen, is it really meaningful to refer to "organisational awareness", since the ORD will play no further part in the organisational decision-making process? If the second answer is chosen, one has to conclude that there exist various levels of organisational awareness.

A third perspective can be selected, that of viewing the ORD's decision to reorient the SSII' sales engineer as a decision (rejection of the proposal) in itself. This decision reflects the judgment that SP is not interesting for the ORD, but may be of interest to the MD. Accordingly, organisational awareness seems to have emerged and died in an organisational subunit (i.e. the ORD) before reappearing in another subunit (i.e. the MD).

The first conclusion is that "organisational awareness", at the initial stage, is not a clear nor unequivocal concept, and that it is not always an immediate phenomenon: it may require organisational channels (here, the member of the ORD).

The second conclusion is that "organisational awareness" is not always a continuous process: the phenomenon may disappear, and reappear in various places of the organisation, at various times.

Piranhas Corporation

In this case, two points must be raised: (i) was the Director of the Information Systems Department (ISD) aware of the existence of products similar to MNL or MCO when he first told the sales engineer from Baleine about the problem of real-time supervision of the

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sites? and (ii) was it the Director of the ISD who suggested to the sales engineer from COD that he contact the site agents of Region A for MCO? (A positive answer to the latter question seems almost certain; first, because it is indicated by the sales engineer from Baleine; second, because the presentation of the sales engineer from COD seems so appropriate to the site agents' situation that it is difficult to imagine that he was not briefed by anybody from Piranhas Corporation before his presentation). In this respect, it must be confessed that it was impossible to get in touch with the COD sales engineer to interview him.

If, in both cases, positive answers are put forward, one must conclude that organisational awareness started with the Director of the ISD's awareness of MNL and MCO. But to what extent is it meaningful to refer to "organisational awareness" if the actor did not spread the information within the organisation?

One may resort to an "objective viewpoint", and consider two stages at which organisational awareness of MNL and MCO actually starts within the company. First, when the meeting between the Director of the ISD, the General Secretary and the sales engineer from Baleine takes place, in order to discuss MNL; second, when the site agents are contacted by the sales engineer from COD in order to discuss MCO. Then, the information is spread by these actors throughout the organisation. But, even in this case, it was the Director of the ISD who was at the origin of the organisational awareness, since it was at his instigation that both meetings took place. In this case, one must admit that organisational awareness may be caused by an organisational actor through the mediation of the environment.

In conclusion, there seems to exist at least two levels of organisational awareness. One is discrete and difficult to assess (in the case of the Director of the ISD). The other is obvious and

may result from the former level (i.e. the General Secretary and the site agents have been made aware of the innovations as a result of the Director of the ISD's intervention). Despite its vagueness, the former level of awareness seems more important than the latter.

Barracuda Corporation

Even if, for the external observer, it seems that organisational awareness of the "Big Ticket" system (BGT) started within the Information Systems Division (ISD), the actors' opinions differ as to its origin in the organisation. On top of this, a great ambiguity seems to be attached by the actors to the answer to the following question: who first suggested the use of BGT within the organisation; COD, the ISD, the Installations Department, or some store managers? On the other hand, even presently, the "institutional answer" to this question remains equivocal, since, according to the ITD's training officer, the information given to the stores significantly differs in relation to the person in charge of the seminars.

In conclusion for this hypothesis, even after a long time has elapsed in the decision-making process, the actors may have different opinions about the origin of organisational awareness, and their "answers" may be still very different. On top of this, the understanding of the status of the decision is equivocal in Barracuda Corporation: some actors view the innovation as definitely accepted by the general management (the BGT Project Officer, for example), while others seem to think that the innovation is still undergoing a test (some store managers, for example).

HYPOTHESIS 2: "In each organisation, the actors will differ in the relative importance they attach to the four aspects (i.e. financial, commercial, technical or organisational) of information about the innovation."

Shark Corporation

The Vice-Director of the Marketing Department (MD) views SP as a tool for implementing rational decision-making and a means to provoke more frequent exchanges of information within the department. He stresses the organisational aspect of the innovation.

The Economic Forecasting Researcher questions the compatibility between the type and format of the data needed by the package and the data he can obtain or determine (which data should be fed into the computer in order to use SP). His second argument against SP is that, since the computer is located in the Operational Research Department, the simulations are likely to be performed there: but the lack of expertise in Economics of this department would jeopardise the value of the results of the simulation. Accordingly, the Economic Forecasting Researcher stresses the technical and organisational aspects.

The Commercial Researcher questions the ability of SP to help in reorganising the sales sectors. He stresses the technical and organisational aspects (i.e. capacity of the system, and its effects on the organisation).

The Marketing Researcher underscores the sophistication of the innovation. His opinion is that the company could get a commercial advantage by using SP: that of assessing market responses to marketing decisions faster and better than the competitors could do. This means a potential edge over these competitors. Accordingly,

the Marketing Researcher stresses the technical and commercial aspects of the innovation.

Piranhas Corporation

The Director of the ISD stresses the technical aspects of MNL and MCO as he is mostly interested in assessing the comparative versatility and adaptability of the projects.

The General Secretary stresses financial and organisational aspects, as he stresses that MNL is less expensive than MCO, and that the former would lighten the site agents' administrative tasks.

The Director and the accountant of Region A stress the organisational aspect as they compare MNL and MCO in terms of decentralisation of the management and speed of reaction to deviations in performance compared with budget. The Director of Region A also stresses the commercial aspect when he considers MCO as a way to improve the clients' satisfaction (by enabling faster reactions to changes in requirements).

The site agents are mainly concerned with the respective effectiveness of MCO and MNL in helping to supervise the works on site, to meet the clients' requirements and to analyse and interpret the deviations. Although the comparison is based on technical considerations, it involves an organisational dimension, since the projects' performance is assessed from the viewpoint of autonomy. The site agents stress the commercial, technical and organisational aspects of the projects.

Barracuda Corporation

The members of the Information Systems Division stress the technical aspect of the innovation as they mainly insist on the number of

terminals needed to operate BGT effectively.

The head of the Organisation Department mainly insists on the following points:

- (i) According to him, BGT is aimed at keeping up with the competition;
- (ii) BGT is not expensive;
- (iii) BGT is too sophisticated;
- (iv) BGT as a system is not well understood in the organisation.

Actually, the head of the Organisation Department is one of the few actors who consider all the aspects of the innovation: commercial, financial, technical and organisational.

The Director of the Stock Control Department mainly considers BGT in the perspective of the development of the Handling and Selling Corporation (HSC), which he views as the only possibility for keeping up with the competition. He also considers that BGT is an efficient tool for the Buyer, for the Distribution Manager of the Head Office, and for the store managers. Therefore, the Director of the Stock Control Department stresses the commercial and organisational aspects of BGT.

The BGT Project Officer views the innovation as something decided by the general management and that, consequently, must be implemented. Such a concern seems mainly organisational.

The Buyer and the Distribution Managers (from the Head Office and the warehouses) stress the commercial aspect of the innovation as they mainly mention that BGT allows for meeting the consumers' requirements and gives rise to potential or actual changes in their working practices.

The store managers are mainly concerned with the efficiency of BGT in enabling the stores to meet the clients' needs and requirements, with the economic implications of BGT on their

profits, and with the implications of the system for the personnel level. The store managers stress the commercial, financial and organisational aspects of the innovation.

The other store employees are mainly concerned with the implications of BGT on the sales, and with their ability to handle the system. They stress the commercial and technical aspects.

In conclusion of the examination of this hypothesis, it must be underscored that, although the actors obviously differ in the relative importance they attach to the four aspects, it seems impossible to determine precisely the extent of these differences. A precise assessment would be, for example: for the Barracuda's Buyer, the commercial aspect is twice as important as the organisational aspect. Such a ranking involves scale analysis and is not relevant here.

HYPOTHESIS 3: "For each given aspect of information, within the same organisation, the actors will make different assessments."

Shark Corporation

In this case study, only the Marketing Researcher stresses the commercial aspect, while the technical aspect of the Simulation Program (SP) is viewed unfavourably by both the Commercial Researcher and the Economic Forecasting Researcher. Conversely, the technical aspect is viewed favourably by the Marketing Researcher. The organisational aspect of SP is stressed by the Vice-Director of the Marketing Department, the Economic Forecasting Researcher and the Commercial Researcher. However, the first makes a favourable assessment, while the second and the third make unfavourable assessments.

Piranhas Corporation

In this case study, differences in assessments on the same aspect are again noticeable. The organisational aspect of MNL is considered favourably by the General Secretary, while he considers MCO unfavourably on this aspect. This judgment is opposed to that of the Director and the accountant of Region A, as well as to that of their site agents: they consider MCO (resp. MNL) favourably (resp. unfavourably) on this aspect.

Barracuda Corporation

The members of the Information Systems Division, the head of the Organisation Department and the store sales personnel share an unfavourable assessment of the technical aspect of BGT. However, the first category only complains about the small number of terminals available in the stores and the insufficient preparation of the users, while the other may criticise the program itself (sometimes viewed as too complex for the users).

The commercial aspect of BGT is viewed favourably by the Director of the Stock Control Department, the head of the Organisation Department, the Buyer and the Distribution Manager of the Head Office. On the other hand, this aspect is generally considered unfavourably in the stores. The organisational aspect of the innovation is generally considered favourably, except by the store managers.

In conclusion for this hypothesis, it appears that the actors may stress the same aspect of the innovation and, at the same time, differ (if not oppose themselves) in their assessment of this aspect.

HYPOTHESIS 4: "There is an association between the differences that H(1) and H(2) suggest and the actors' strategies and rationalities."

Shark Corporation

The Vice-Director of the Marketing Department's positive stress on the organisational aspect of SP ("the program may provoke greater exchanges of information within the department") can be associated with his inability to obtain information from his assistants, and therefore with his strategy oriented towards the enforcement of his authority within the department. His technology and marketing-oriented rationality can explain his favour for a device reconciling information technology and marketing.

Thanks to his "complex" and time-taking statistical economic analyses, the Economic Forecasting Researcher enjoys the status of "scientist" and "economist". His legitimacy is rational-legal: he is the economic expert of the Marketing Department. However, this status is not inherent to the Economic Forecasting Researcher: like any status, it depends on the other actors' perception and recognition. The other actors' recognition of his expertise is based on the fact that the Economic Forecasting Researcher alone is able to handle economic analyses: the Economic Forecasting Researcher's legitimacy is tightly linked to the exclusivity of his economic skills (i.e. the uniqueness of his ability, in the department, to perform economic studies). SP does not directly threaten this exclusivity. However, as is explained in the case study, the use of SP for marketing purposes is likely to be extended to the computation of the economic data needed by the package. Accordingly, the Economic Forecasting Researcher's negative stress on the organisational and technical aspects can be associated with

his strategy consisting of maintaining the relevance of his exclusive expertise. SP could deprive the Economic Forecasting Researcher of a fraction of this exclusivity since the system, via the upstream integration of data processing (cf. Appendix I) would allow other actors to perform economic analyses (eg. the Vice-Director or the engineers of the Operational Research Department). In other words, SP is viewed as the potential attrition factor of the basis from which the actor's quantitative-oriented rationality was hitherto deriving a rational-legal status of expert.

The Commercial Researcher's judgment of SP seems all the more questionable as he did not attend the meeting during which the sales engineer introduced SP. His negative judgments can be associated with his strategy (which is aimed at proving his efficiency in organising the sales sectors - which efficiency would be less obvious if this organisation work was performed by SP) and his rationality oriented towards the use of impersonal, formal and abstract methods. Such an orientation would be less exclusive if tasks involving abstract modelling (for example) could be achieved by the Vice-Director by means of SP. These tasks could be that of organising a sales network, optimising a system of distribution and logistics in the regions, etc.

The opinion of the Marketing Researcher can be related to his strategy against the Commercial Researcher. If the latter achieves his mission he could be promoted to a vice-director position and then try to impose on the former a more abstract and formal quantitative approach (which is opposed to the Marketing Researcher's rationality).

Piranhas Corporation

The Director of the Information Systems Department's positive (resp.

negative) stress on the technical aspect of MCO (resp. MNL) can be associated with his rationality and strategy oriented towards the maintenance of his position as a central piece in the "information game" (i.e. the threefold exchange of information between him, the General Secretary and the site agents). Protocol analysis shows that MCO is viewed as much more propitious to such a maintenance than MNL.

The General Secretary's stance can be associated with his strategy to increase his control over the regions. His final change of position can only be understood as resulting from a bureaucratic-oriented rationality: from the viewpoint of the maximisation of control and optimisation of procedures, MCO is evidently more effective than MNL, since the latter would suppress the possibility of the Director of the Information Systems Department's technical control on the procedures (which technical control the General Secretary is unable to exercise).

The site agents' positive (resp. negative) stress on the commercial, technical and organisational aspects of MCO (resp. MNL) can be associated with their strategy to increase their regional autonomy, and with their rationality which appears to be more market-oriented than administration-oriented. The analysis shows that MCO allows both for autonomy and a prompter response to the clients' requirements than MNL would do, since the micro-computers enable the decisions to be made on sites.

Barracuda Corporation

The actors of the Information Systems Division consider that there is a causal relationship between the insufficient number of terminals and the weak realisations of the BGT test. This judgment can be associated with their strategy to limit their

responsibilities to technological developments and initialisation of the system in the stores (the term "initialisation" is defined in Appendix III, 3.1.).

The stance of the head of the Organisation Department can be summarised as follows: "the system is a necessity, but is not implemented well". This opinion can be associated with his strategy which consists of questioning all the solutions he was not at the origin of (his strategy being aimed at increasing the influence of his department in the firm) and with his rationality oriented towards negotiating with the actors. In this respect, he regrets that more attention is not paid to the needs and capacities of the end-users of the system.

The Distribution Manager of the Head Office and the Buyer both view BGT favourably on the commercial dimension, but neither uses it nor promotes its use (the Buyer even ignores its main interest to him, that related to his bonus). This discrepancy can be associated with their strategies and rationalities. Both have a commercial-oriented rationality, but their strategies are opposed. The Distribution Manager is interested in the development of HSC, while the Buyer views this structure as a competitor. As BGT is the key element of HSC, the Buyer cannot back the system, however efficient it may be; on the other hand, the Distribution Manager is too busy securing his own commercial position to pay attention to BGT.

The opinions prevailing in the stores can be associated with the contradictory strategies of the managers who try to maintain their autonomy while confining their assistants' work strictly to selling activities.

In conclusion for this hypothesis, it appears that the different assessments and opinions, through the relative importance attached to the technical, commercial, financial and organisational aspects,

can be associated with the actors' strategies and rationalities.

At this stage, an important feature of the hypotheses must be noted. For example, the fourth hypothesis states that the differences in the second and the third hypotheses are associated with the actors' different strategies and rationalities. In the preceding analysis this statement is generally replaced by the statement that the differences in H(2) and H(3) "can be associated" with the actors' strategies and rationalities. This is an important difference. The use of the second expression is aimed at insisting on the fact that the associations are only conceptual ones. They are inferred by means of strategic analysis based on the actors' expressed feelings and observed or reported actions. Obviously, one cannot be sure that a given opinion or action is actually caused by a given strategy and corresponds to a given rationality. A causal explanation would have required a much more complicated research methodology, involving repetitive psychological tests. Had such a methodology been implemented, it is far from certain that any conclusive causal explanation would have emerged, since the "causal link" will never be physical and, therefore, lend itself to scientific analysis. Still, strategic analysis allows for a meaningful and consistent connection between the actors' opinions or actions and their strategies and rationalities. Such a connection is therefore a conceptual one, and is to be understood in the framework of an exploratory research, interested in providing practical indications for commercial approaches.

HYPOTHESIS 5: "There is an association between the features of the organisational information process for evaluating the innovation and the strategies and rationalities of individual actors."

Shark Corporation

Within the Marketing Department (which will become the decision-making unit for the rejection of SP) information about the system starts with the Economic Forecasting Researcher, because he is viewed as the actor most likely to be interested in information technology (because of his status of expert in numerate disciplines). But the analysis of the Economic Forecasting Researcher's strategy and rationality shows that, what is at stake for him (i.e. his legitimacy based on the uniqueness - in the department - of his expertise in Economics) and the zone of uncertainty affecting him, led him to orient the information process (in which he played an important part since he became the favourite contact of the sales engineer) against the acceptance of the system.

Piranhas Corporation

The Director of the Information Systems Department strategically orients the information process in two ways:

- (i) His presentation of the information related to the projects points out the negative centralising effects of MNL. The analysis of his rationality, of what is at stake for him (i.e. his central position in the organisational exchange of information) and the study of the zone of uncertainty affecting him, allow for understanding his strategy. This strategy implies the setting up of a decentralised system of information (MCO) which contributes to maintaining his central position between the General Secretary and the site agents.
- (ii) He introduced the information related to MCO through the actors viewed as the most likely to be interested in it.

How, otherwise, is it possible to explain his asking the COD sales engineer to contact the site agents of Region A?

The site agents spread the information about MCO throughout the organisation as a counter-project to MNL when they inform the Director of the Information Systems Department and the General Secretary about the existence of the system. Obviously, they did not know the former already knew about MCO. Their decision to spread the information about MCO can be related to their opposition to MNL. In the case study, the analysis of their stakes and of the zone of uncertainty affecting them shows that this opposition can be associated with their strategies and rationalities.

Barracuda Corporation

The information spread by the head of the Organisation Department generally refers to the "over-sophistication" of BGT. The analysis shows that this can be described as part of a strategy against all the informatic procedures he did not originate, and particularly against the development of the Information Systems Division.

The information spread by the Director of the Stock Control Department always refers to BGT as an efficient tool for the development of HSC. The analysis in the case study shows that the development of this structure corresponds to his strategy and rationality directed at counterbalancing the commercial power (as represented by the Sales Division) by recourse to administrative power and legitimacy.

The information spread by an important fraction of the store managers points out the inconsistent and contradictory effects of BGT on the management of the stores (see, in particular, the Murphy's Law Syndrome). The nature of this information can be associated with the store managers' strategy and rationality

oriented towards maximising their autonomy by monitoring their store's internal (human and managerial) and external (commercial) environments.

The fact that the Buyer and the Distribution Manager of the Head Office do not significantly spread information about BGT can be associated with their strategies consisting of securing their own position against each other. In order to uphold their own position, their rationalities seem to orient them to "waging war" on the commercial battle field. The Buyer and the Distribution Manager struggle to monitor both the sources of supplies (upstream environment) and the stores' offer (downstream environment). This leaves no room for BGT.

In conclusion for this hypothesis, it appears that strategic analysis allows one to detect an association between the features of the information processes (for SP, MNL, MCO and BGT) and the strategies and rationalities of the actors who were involved in these information processes.

HYPOTHESIS 6: "The way the actors spread information about the innovation influences the decision-making process."

Shark Corporation

It is difficult to know what would have happened if somebody other than the Economic Forecasting Researcher had been contacted first. The only thing that can be said is the following: the first actor to be contacted about the innovation, and who then became the favourite contact of the sales engineer, was opposed to the project and the innovation was rejected. It is logically invalid to substitute a "therefore" for the "and" in the preceding sentence.

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In order to be predictive, repetitive tests should have been conducted, which, of course, was impossible.

Piranhas Corporation

In this case study, a prominent example is that of the Director of the Information Systems Department. This actor is able to spread information in an apparently neutral way by using COD. To the site agents, the COD sales engineer is an independent source of information, with no link with the Director of the ISD. They then passed on the information about MCO unaware that the Director of the ISD was the original instigator. The analysis of the case study shows that their proposal was important, since MCO was accepted and MNL rejected. But, once again, it is acknowledged that this is an insufficient indication to be predictive. For instance, the following would be an invalid statement: if MCO had been directly introduced by the Director of the ISD, the system would not have been accepted.

Barracuda Corporation

The Information Systems Division convincingly introduced BGT to the Supply and Commercial Systems Division which, in turn, spread the information throughout the organisation. But then the conveyors (the BGT Project Officer, above all) of the information to the potential users of the system failed to significantly convince these potential users. The Murphy's Law Syndrome gives evidence of the lack of clarity and consistency with which the policy of implementation of both BGT and HSC is felt in the stores. It seems logical to relate this feature to the ambiguous status of the decision related to BGT, and to the weak results of the test.

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The comparison of the interviews shows that the store managers are the best conveyors of information within the stores and specially to the potential end-users of BGT (i.e. the sales personnel). Therefore, the managers seem to stand as an important source of internal information and, accordingly, should not have been neglected in COD's commercial approach to Barracuda.

In conclusion for this hypothesis, it appears that some actors spread the information about the innovation in a way more likely to cause the innovation to be accepted. In other words, there seem to exist some propitious vectors for the information process. In Piranhas Corporation, the propitious vectors of information seem to be the site agents. The case study shows that the way they process the information about MCO, influences the decision-making process in a way favourable to this system. But it is worth noting that they were able to play this role only because the Director of the ISD first contacted COD. In Barracuda Corporation, the key vectors of information seem to be the store managers. These actors play a crucial role in the stores since they are the source of most of the information received by the potential end-users of BGT (i.e. the sales staff). Had BGT been "sold" to the store managers, they could have acted as propitious vectors of information about BGT in the stores. It must be remembered that the main obstacle to a final decision of adoption of the system seems to be the low utilisation of BGT in the stores. Some actors of the Information Systems Division were able to introduce BGT in the organisation. But then, these propitious vectors of information were not relayed by other propitious vectors which could have convinced the potential end-users. Clearly, the BGT Project Officer is inadequate in this role. There are strong indications that the store managers could have played this role in an efficient way, had the system been convincingly "sold" to them.

HYPOTHESIS 7: "There is an association between the ability of the actors to influence the decision-making process and these actors' strategies and rationalities."

Shark Corporation

Clearly, if one agrees on the definition of the strategy and rationality of the Economic Forecasting Researcher, it follows logically that the way he influenced the decision-making process can be associated with his strategy and rationality.

Piranhas Corporation

The general strategy of the Director of the Information Systems Department is to maintain his central position within the organisation. In this respect, the control of Region A is only an element of the organisational stake. In the case study, the analysis indicated that MNL was generating a zone of uncertainty for him (and the site agents). If one accepts that the Director of the ISD's rationality is oriented towards the substitution of computerised procedures for manual ones (as the analysis indicates), then it follows that he was more likely to support another computer-based system, than simply to reject MNL. It is therefore consistent with his strategy to back MCO against MNL, the former enabling him to maintain his central position within the organisation.

In conclusion, it appears that the Director of the ISD's ability to influence the decision-making process can be associated with his strategy and rationality.

Barracuda Corporation

If the purpose of the actors of the Information Systems Department was to purchase and adapt the system, then they were obviously able to influence the decision-making process in an effective way. However, the analysis of the protocols reveals that the rationalities and strategies of these actors are more oriented towards the development and installation of new information technologies than towards satisfying the end-users of the related systems. This indicates an association between the ability of the actors to influence the decision-making process and their strategies and rationalities.

The BGT Project Officer's rationality is oriented towards the optimisation of his network within the organisation. His strategy consists of using his sole assets within the organisational game (i.e. his familiarity with the General Inspectors' network) by asking the General Inspectors to control the stores. The analysis of the results (as compared to the objectives of the BGT test) shows that this strategy does not result in a wide and effective use of BGT by the sales personnel. Clearly, such an extensive use of the system in the stores could be a stimulus for a clear final decision of adoption to be made.

Having not been approached in commercial terms about BGT, the store managers implement strategies which are often directed to questioning the efficiency of BGT (particularly on the commercial level) while criticising its financial implications. As their opinions influence their staff, the consequence is the low utilisation of the system in the stores, and, therefore, an absence of final decision.

In conclusion for this hypothesis, it appears that the ability

of the actors to influence the decision-making process can be associated with their strategies and rationalities.

HYPOTHESIS 8: "There is an association between the sequence in which rationalities and strategies become involved in the decision-making process and its outcome (i.e. adoption, rejection, or deferred final decision)."

There are two different ways to account for the hypothetical association: common sense (on the basis of the preceding strategic analysis), or a log.-linear model (on the basis of statistical analysis, as indicated in Chapter VI, 3.3.).

In this respect, it is acknowledged that log.-linear procedures are relevant to the test of some of the hypotheses above as well. However, it was decided, as already mentioned in Chapter VI, to treat these hypotheses by means of qualitative methods. The reason for contemplating the use of a log.-linear procedure for H(8) is that this hypothesis seems to be, at the same time, (i) more complex than the other hypotheses (it involves an analysis in terms of sequence order, an analysis in terms of content of each term of the sequences, and an analysis in terms of the significance of the association between the latter and the outcomes of the decision-making processes) and (ii) more interesting in terms of quantitative analysis (because of the explicit reference to temporal sequence).

The use of a log.-linear model to test this hypothesis presupposes three conditions:

- C(1) To each rationality corresponds one and only one strategy;
- C(2) It is possible to demarcate common phases in the adoption

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process over the sample of companies (e.g. awareness, search for information, study of alternatives, ..., decision);

C(3) It is possible to demarcate common rationalities occurring in the adoption process over the sample of companies being studied.

Then, the point is to use the model to relate the following items over the sample of companies: the phases (in each company), the rationalities and the outcomes (i.e. adoption, rejection, deferred final decision). The statistical nature of the relationship could then be used to detect the hypothetical association which is at the core of the eighth hypothesis. However, it is impossible to execute this scenario, for the following reasons:

- (i) The case studies reveal that C(1) is not satisfied. For example, the General Secretary of Piranhas Corporation eventually changed his strategy against MCO, although his rationality remained unchanged. Similarly, the Director of the ISD of Piranhas Corporation was first interested in the Minitel project, before changing strategy and opposing the project. However, there is no indication of change in his rationality: it remains oriented towards the substitution of computerised procedures to clerical tasks. This means that the same rationality can give rise to several strategies as the stakes change or as the actors' subjective assessments of the stakes change.
- (ii) Either because of the nature of the innovations being considered or because of the nature of the adoption processes under study, it is not possible to observe a general pattern of common phases in the adoption or rejection cycle. Therefore C(2) is not satisfied either. In this respect, it

can be argued that information technology products affect the management in such a way that the number of actors involved may be increased to such an extent that the detection of common phases is rendered too complex. On top of this, the proposed change can affect the very working practices of the actors and therefore involve them in a personal way. This type of involvement is so different from individual to individual that the detection of common phases over companies is rendered all the more elusive.³

- (iii) The case studies tend to indicate that rationalities (and strategies) are only meaningful in the light of organisational stakes and zones of uncertainty. The actor's strategy appears as a meaningful response in the face of the stakes and zones of uncertainty affecting him, the meaningfulness of the response being subjectively determined by the actor. However, the case studies also indicate that the organisational stakes and zones of uncertainty differ deeply over the companies. Therefore, it follows that no common rationalities can be significantly demarcated over the sample of companies. The empirical research tends to indicate that it is not in the nature of strategic analysis to give rise to categorisation of rationalities, be it a posteriori. Accordingly, C(3) is not satisfied either.

It follows from the three preceding points that the log.-linear model cannot be used. However, if the concepts of sequence and categorisation are not compatible with the material of the case studies, another concept appears to be relevant, that of coalition. An analysis in terms of sequence is based on the statistical approach. An analysis in terms of coalition is based on the strategic approach.

A sequence is a network chronologically oriented. If the log.-

linear model could have been used, an outcome of the analysis would have had the following form, for instance: "when an actor with rationality R_i is involved in phase P_j , and an actor with rationality R_k is involved in phase P_l and etc., then the outcome is likely to be adoption, with probability P_u ."

A coalition is a network strategically oriented. Then, a coalition consists of various actors with convergent strategies. In Shark Corporation there are two coalitions: the Vice-Director of the Marketing Department and the Marketing Researcher; the Economic Forecasting Researcher and the Commercial Researcher. In Piranhas Corporation there is one coalition opposing the General Secretary; this coalition consists of: the Director of the Information Systems Department and the site agents (and, to a lesser extent, the other Directors). In Barracuda Corporation there are three coalitions: the Director of the Stock Control Department, the Distribution Manager, the BGT Project Officer, and the General Inspectors; the Systems Department and the Installations Department of the Information Systems Division; the employees of the stores.

When analysing the outcomes of the decision-making processes, it appears that a coalition is all the more successful as it turns upon compatible rationalities. Rationalities are all the more compatible as they are not differently oriented and as the related actors have no opposed stakes. For instance, in Shark Corporation, the first coalition was not successful since SP was not accepted. When examining the rationalities of the actors of this coalition, they appear to be differently oriented: the Vice-Director's rationality is oriented towards quantitative and formal reasonment, while the Marketing Researcher's rationality is more oriented towards qualitative, personal and subjective approaches. Besides, their stakes are opposed, since the Marketing Researcher wants to preserve his autonomy, his qualitative methods and his freedom to

visit the regional customers whenever he wants, while the Vice-Director wants to magnify his control over his staff and aims at generalising quantitative methods in his department.

In conclusion for the eighth hypothesis, it seems that a project is all the more likely to be adopted if it is backed by a coalition of actors whose rationalities are compatible. In other words, there is a strategic association between the actors' involvement in the decision-making process and the outcome (i.e. adoption, rejection or deferred final decision).

Recapitulation

A general feature of the examination of the hypotheses is that the statement that "there is an association" (as it appears in the initial wording of the statement of the hypotheses in chapter VI) is replaced, in the analysis, by the statement that some phenomena "can be associated". This difference is due to the nature of the concepts of strategy and rationality. They do not denote entities amenable to observation. They can only be inferred a posteriori, on the basis of the actors' feelings and actions. Therefore, it is impossible to be assertive in relating an organisational phenomenon to the actors' rationalities or strategies. However, the former concepts prove useful in enabling consistent and meaningful explanations of the organisational phenomena to be made. These explanations must be understood in the framework of an exploratory research, aiming at providing marketers with new conceptual tools amenable to practical and helpful implementation.

Researches based on statistical analysis generally end up with statements such as: "there is an association between phenomenon A and phenomenon B". Actually, this means that, according to the statistical theory which was used (e.g. Chi-square test), an

association between A and B was detected at the 0.05 level of significance (for example). This does not mean that there is a real association between A and B. It only indicates that statistical analysis has allowed for rejecting the null hypothesis that there is no statistical association, with a risk of type I error equal to 5%.

Strategic analysis does not give rise to formalised level of confidence in the association it detects between organisational phenomena. However, it enables the researcher to relate these phenomena in a consistent and meaningful explanation. Therefore, when the relationship inferred by means of strategic analysis is an association, it is proposed to call it a "strategic association". In other words, when strategic analysis enables one to detect an association between given organisational phenomena, the term "strategic association" will be used to denote the relationship between these phenomena. By adding the predicate "strategic", it is meant to emphasise the fact that the association is: (i) conceptual, (ii) inferred by means of strategic analysis, and (iii) not said to be causal.

Accordingly, the results of the analysis of the hypotheses can be summarised as follows:

- (i) The concept of "organisational awareness" is ambiguous, too static and misleadingly neutral.
- (ii) There is a strategic association between the actors' evaluation of the innovation and their situation in the organisational game: the actors' assessments of an innovation can be meaningfully and consistently associated with their strategies and rationalities. In other words, these assessments are not neutral, and cannot be seen as only techno-economic statements: they have a strategic dimension.

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- (iii) The information process about a potential innovation is not a neutral flow of data: some actors may initiate or oppose it, alter its scope, distort its elements, or retain a fraction of it. There is a strategic association between the actors' transmission of information and their situation in the organisational game.
- (iv) There seem to exist some propitious vectors of information in the organisation: if involved in the information process, they seem to be more likely than other actors to cause the innovation to be adopted.
- (v) The ability of these actors, or propitious vectors, to influence the decision-making process can be associated with their rationalities and strategies: there is a strategic association between the actors' situation in the organisational game and the way they influence the decision-making process. Still, this ability is not a function of the actors' character or psychology. It is related to their situation in the organisational game (assets, opportunities, threats) and to the way they perceive it. This ability depends on the actors' understanding of what is at stake for them, and on the zones of uncertainty by which they feel affected.
- (vi) Some organisational coalitions are more likely than others to cause an innovation to be adopted. The efficiency of such coalitions can be associated with the compatibility of the rationalities of their members: there is a strategic association between the outcome of the decision-making process and the compatibility of the coalitions involved in this decision-making process.

From a practical viewpoint, various lessons can be drawn. First, the preceding analysis can enrich the studies based on

classical models of adoption. Consider, for example, Baker's model (discussed in chapter V). Clearly, propitious organisational vectors and coalitions are to be considered as elements of the "Precipitating Circumstances"; the actors' rationalities must be taken into account when examining the "Selective Perception"; the propitious vectors' strategies must be seen as elements of the "Enabling Circumstances", etc.

Second, it clearly appears that the propitious vectors of information (which, of course, are not the same actors for different innovations) must not be neglected by sales engineers.

The third lesson is that the selling efforts must take into consideration the various coalitions that may react to an innovation proposal, and adapt accordingly.

The fourth lesson is that a micro-segmentation is possible on the basis of the prevailing coalitions existing in the firms which compose each macro-segment. In this respect, it is worth noticing that the decision-making unit itself cannot furnish any basis for micro-segmentation, as the features of such "unit" vary over the organisations in terms of:

- (i) Clearness of location: for Shark Corporation, it is obviously the Marketing Department; but in the case of Piranhas Corporation, it is difficult to demarcate a precise decision-making unit (the Information Systems Department, the Region A, or the General Management?); the same question arises for Barracuda Corporation (the stores, the Information Systems Division, the Stock Control Department, etc.?).
- (ii) Seniority of the actors involved: there is no indication that higher management has more weight than middle or lower management. For example, in the case of Piranhas Corporation it seems that the highest management is at the centre of the

decision-making process (the General Secretary and the Director of the Information Systems Department), but, in the case of Barracuda Corporation, it seems that the lower management, if not the rank and file, play an important role in the deferment of the final decision. It seems that the zones of uncertainty monitored by the actors are more relevant and determinant than their actual position in the hierarchy.

Finally, it is worth noting that the potential end-users are not always those playing a determinant part in the decision-making process. In the case of Piranhas Corporation, it seems that the site agents (potential end-users) play a decisive role (as do the Director of the ISD and the General Secretary) while, in Barracuda Corporation, the store managers play a much more important part than the sales personnel (actual or potential end-users). Once again, the relevance of the zones of uncertainty monitored by the actors seem to be more determinant than their "objective" status (i.e. "end-userness", here).

From an epistemological viewpoint, the lesson of the empirical research is that the actors' rationalities and strategies cannot be considered in a vacuum, but are to be understood as highly dependent upon the organisational zones of uncertainty and stakes. Therefore the early postulate that the actors' strategies and rationalities are parts of the elements of organisational climate (see the conclusion to chapter III) must be completed by the following proposition: both organisational stakes and zones of uncertainty are important components of organisational climate.

4. Conclusion of the Seventh Chapter

This chapter has successively introduced the preparatory research (Section 1), summarily presented the case studies (Section 2) and, finally, discussed the hypotheses (Section 3).

The validity of the hypotheses was examined in the light of the information brought about by the cases studies. Two types of limits to this validity are to be considered:

(i) External limits: what is true within the sample cannot be generalised for the whole population of companies and technological innovations. First, only one type of innovation was considered. Nothing tends to indicate that strategic analysis would yield similar conclusions for innovations alien to information technology. Second, only large companies were investigated: nothing tends to support the view that similar conclusions would be drawn from smaller companies.

(ii) Internal limits: all the conclusions are grounded on strategic analysis performed on the basis of unstructured interviews. Therefore, the internal validity of the conclusions has two limitations; that of unstructured interview designs and that of the Strategic Theory of Organised Action. These limits are studied in Chapters III, V and VI.

The conclusions mentioned above give rise to operational suggestions for the marketing of innovations related to information technology. These suggestions are exposed in Chapter VIII, which provides a general conclusion to the thesis.

NOTES AND REFERENCES

1- See, for examples:

- Butler, J.L. Comparative criteria for minicomputers. In A practical guide to minicomputers application, edited by F.F. Coury. New York, IEEE Press, 1972.

- Bilbrey, C.P. An analysis of the impact of minicomputers upon businesses and an investigation of user selection criteria. Ph.D. thesis, University of Arkansas, 1981.

2- The following fields are represented at SICOB:

- (i) Data processing: computers, micro-computers, printers, disks and floppy disks, peripherals, networks, maintenance equipment, magnetic data medium.
- (ii) Telematics: videotex, electronic mail, facsimile, electronic fund transfer.
- (iii) Communications: telephony, audiovisual management aids, wall indicators, document carriers.
- (iv) Office organisation: mail processing, copiers, etc.
- (v) Office automation: word processing, local networks, computer output microfilms, document retrieval systems, terminals.

The main features of SICOB may be summarised as follows:

- (i) Exhibitors: 260 data processing and office equipment exhibitors present some 2200 international makes from 28 different countries.
- (ii) Exhibition space: 90,000 square metres of indoor exhibition space.
- (iii) Visitors: About 120,000 professional visitors attended the trade show, including 20,000 international visitors. Total attendance was in the order of 425,000 persons.
- (iv) Congresses and conferences: the 1984 session included conferences on themes such as "Training the Users of New Office Tools", "Information Cost", "Dialogue between the Sales Manager and his Information Systems Department", "Information Technologies for Marketing".

These conferences were of a twofold interest for the research: first, they provided insights into fields hitherto rather unknown and, second, they furnished a priceless opportunity to meet managers dealing with information technology. Some of these managers were solicited for further interviews in their companies. (Information can be obtained from: SICOB, 4 Place de Valois, 75001 Paris.)

3- For a discussion of the specificity of managerial involvement caused by information technology, see:

- Crozier, M. Implications for the organisation. In New office technology: human and organisational aspects, edited by H.G. Otway and M. Peltu. London, Frances Pinter Ltd, 1983, pp.86-101.

FINAL PROPOSITIONS, LIMITS AND ORIENTATIONS FOR FURTHER RESEARCH

0. Introduction

Beyond possible variance in its formulation, the fundamental question of this research is: How can we consistently understand, and thus efficiently adapt our commercial efforts to, the factors influencing the adoption of technological innovations?

This interrogation raised theoretical, methodological and practical problems.

Chapter I introduced the question and identified the implications for the structure of the research ("What are the issues to consider, in which sequence and from which perspective?").

Chapter II treated the problem in more detail and sketched how the question is usually dealt with in the literature ("What are the alternative viewpoints from which to tackle the problem?").

Chapter III studied the origin, practice and status of the approach resorted to, before underscoring some inherent difficulties ("What is the theoretical basis of the organisational climate approach; How is it implemented; Is it a theory, a model or a paradigm?").

Chapter IV considered the other side of the problem and questioned some perspectives on the production and acceptance of

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innovations ("How are technological innovations generated or adopted, could some perspectives be amended?").

Chapter V dealt with reconciling both sides of the problem and, accordingly, studied decision-making ("How can we relate non-strictly techno-economic corporate idiosyncracies to innovation adoption?").

Chapter VI synthesised the various suggestions derived from the preceding analyses in the form of hypotheses, before suggesting a methodology to assess their validity ("If the preceding criticism and suggestions are correct, what should we observe in the reality; How can we observe and analyse this reality?").

Chapter VII assessed the validity of the hypotheses and drew practical conclusions ("What can be considered as valid propositions; Are these propositions of any utility?").

The above questions were answered in the body of the thesis. However, answers may be felt scattered, or not precise enough. Accordingly, this final chapter is devoted to recapitulation and clarification of the theoretical and practical implications of the research. Sections 1 and 2 are respectively devoted to these problems, and stress the limits of the solutions being proposed. Methodological problems are examined in both sections. The conclusion to the chapter suggests how further research could find a way to move beyond these limits.

SECTION 1 THEORETICAL IMPLICATIONS

Various points have been mentioned about corporate idiosyncracies and organisational climate in the thesis. Chapter III was mainly devoted to the study of these concepts and concluded with the epistemological status of the approach to which they give rise.

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Organisational climate is a paradigm of organisational theories, but there is not, properly speaking, a theory of organisational climate. In the same chapter, it was postulated that organisational rationalities and strategies are elements (or components) of organisational climate. Then, in the light of the empirical findings, it appeared that a logical implication of this postulate is that stakes and zones of uncertainty are also important organisational idiosyncracies and thus should be considered as elements of organisational climate (see conclusion to Chapter VII). However, the expression "are components or elements of" is rather vague. Is it meant that the strategic factors play the same role as norms, values, degree of centralisation, stress, etc. (i.e. the classical organisational idiosyncratic conditions and constructs usually mentioned in the literature) in influencing organisational processes? Or do the strategic factors have a different type of effect? In turn, an answer to these questions would help understanding the interface (decision-making) between non-strictly techno-economic corporate idiosyncracies (or organisational climate) and the adoption of technological innovations. Answers are derived from both the theoretical and empirical researches carried out in the preceding chapters. Two sets of considerations are involved:

- (i) Strategic analysis: clarification of the strategic concepts;
- (ii) Organisational climate: how it influences organisational processes and the nature of the specific influence of strategic factors.

These considerations furnish the basis of the arguments of Section 1.

CHAPTER VIII

1.1. Strategic Analysis

The following lines aim at providing clear definitions of the concepts on which hinges strategic analysis. This clarification could only be done in the light of the empirical work, and is all the more important as the marketing recommendations of Section 2 are based on a practical implementation of strategic analysis. However, before defining the concepts of rationality, strategy, stake and zone of uncertainty, some preliminary definitions must be given. This will both assist clarity and avoid circularity. Some of the following definitions may be slightly different from those previously proposed. The possible variance results from the supplement of information brought about by the empirical research.

ACTOR

A member of the organisation, liable to act or make decisions.

ENVIRONMENT

A set of more or less accurately perceivable objects or phenomena; when these entities are already (correctly or not) perceived by an actor, they belong to his actual environment; when they are not, they belong to his virtual environment.

ACTION

A transformation of the environment.

END/GOAL

A desired state of the environment. The passage from virtuality to actuality may result from an adequate combination of actions.

TACTIC

A set of actions with a common goal or end.

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PROCESS

A more or less distinct sequence of actions giving rise to an identifiable outcome in the organisation.

ORGANISATIONAL DECISION-MAKING

A process by which judgments are made, preferences are developed, coalitions are formed and decisions are taken in the organisation.

ORGANISATIONAL GAME

A process by which actors exchange, absorb or generate uncertainty, and compete for stakes in their pursuing strategies. The strategies may be task-oriented (e.g. "I must complete this research within the deadlines fixed by my Marketing Director) or more personally-oriented (e.g. "I must become Marketing Director").

COALITION

A set of actors with common stakes. It seems that coalitions are all the more successful as their actors' strategies and rationalities are less opposed.

STRATEGY

A set of tactics and associated goals. Since one cannot "know" the actors, but can only observe their behaviour and ask questions, strategies must be inferred by the analyst, ex post facto, on the basis of regularities observed in behaviours and answers.

STAKE

What an actor needs to pursue and to secure to achieve his strategy, or what he has at risk by being involved in an organisational game.

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ZONE OF UNCERTAINTY

An actual state of the environment about which an actor feels he lacks information, or a virtual state of the environment to the actualisation of which the actor cannot assign a probability value of one (the actualisation is certain) or zero (the actualisation is impossible).¹

RATIONALITY

Objectivist definition

A property of human actions or decisions. Rationality is a continuous predicate, and there are various degrees of rationality. This definition is "polarised": the higher the degree of rationality, the better. The degree of rationality is assessed against objective standards or values.

Subjectivist definition

An attribute of human reason. Rationality is a discontinuous predicate, without degrees or scale to assess it (i.e. one actor cannot be said to be "more rational" than another). Instead, there are various types of rationality which can only be inferred by the analyst in the light of how the actors seem to perceive stakes and uncertainties in the organisation. The features of an actor's rationality are characterised by the analyst on the basis of what seems to be the basic orientation of his participation in the organisational game. Strategic analysis resorts to the subjectivist definition.

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1.2. Organisational Climate

In the light of both the empirical research and the literature review, the following lines purport to help understanding how organisational climate may influence corporate processes. Besides, the question of the specific nature of the influence of strategic factors will have to be answered. Unless otherwise specified, "organisational climate" will refer, in the following lines, to the set of corporate idiosyncracies usually mentioned in the literature: norms, values, objectives, myths, etc.

1.2.1. Synthesising the Classical View

The literature indicates that various perspectives have been adopted by researchers to define the concept. Some adopt a deterministic viewpoint and consider that organisational climate exerts a direct influence on corporate processes, while others adopt a more phenomenological viewpoint and suggest that, in fact, the overall effect depends on how the actors perceive the idiosyncrasy of their world of work. Whatever their perspective, researchers generally agree on the form of the elements which constitute organisational climate (although the number of elements they quote may vary). Classically, organisational climate is viewed as consisting of corporate idiosyncracies such as: organisational values, norms, objectives, goals, myths, legends, level of stress, etc. The case studies do not provide enough material to test the influence of each of these. However, the influence of some elements (for example: values, history and goals) was often particularly noticeable. Some instances of such influences are examined in the remainder of the section.

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Accordingly, the point now is not so much to assess the "impact" of organisational climate as to express as clearly and synthetically as possible how it influences corporate processes. A sociological theory of human action may be useful.

According to Max Weber, individual actions can be determined by tradition (behaviour is guided by long-standing habits), emotion (behaviour is guided by strong feelings) or rationality (behaviour is guided by reflection). Besides, Weber distinguishes between "end-rationality" ("Zweckrationalitat") and "value-rationality" ("Wertrationalitat"). An actor is end-rational when his actions are guided by ends. Whereas he is value-rational when he wants his actions to be consistent with some set of values. Of course, these are "ideal-typical" divisions, and Weber considers that most human actions are compromise between these possibilities.² However, Weber's distinction helps expressing the influence of organisational climate in a synthetical way. If one applies Weber's categories at the organisational level, it is possible to view four channels through which organisational idiosyncratic constructs and conditions may influence corporate processes:

- (i) Tradition: real or supposed past circumstances (memories, legends, myths, etc.) are viewed to influence, more or less directly, actors' behaviour and participation in current organisational processes.(See, below, the example from Barracuda Corporation).
- (ii) Emotion: organisational affective conditions (stress, "warmth of support", etc.) are viewed to influence, more or less directly, actors' behaviour and choices. See for example, in Appendix III, the stress affecting the sales assistants who have to implement what they feel as contradictory policies, and their low use of the innovation system.
- (iii) End-rationality: the organisational objectives and goals are

viewed as idiosyncratic standards against which the actor's performance is assessed by the other participants (see, below, the example from Appendix II).

- (iv) Value-rationality: the organisational values and norms are viewed as idiosyncratic standards against which the actor's actions are assessed by the other participants (see, below, the example from Appendix I).

In recapitulation, it can be said that organisational climate is viewed as influencing corporate processes through tradition, emotion and rationality (end- or value- oriented). This perspective is that of the classical attempts to assess or identify the effect of organisational climate on corporate life. The empirical research supports this perspective, but indicates that the role of strategic factors should be considered as well.

1.2.2. Taking Strategic Factors into Consideration

In order to understand how strategies, rationalities, stakes and zones of uncertainty can be viewed as components of organisational climate, it is necessary, first, to examine how these strategic elements interact with the classical corporate idiosyncracies usually quoted in the literature. The case studies indicate that the actor's perception of organisational climate on the one hand; and his perception of stakes, zones of uncertainty, his strategy and rationality on the other hand, are tightly tied up. In the following example, "organisational climate" refers to the classical corporate idiosyncratic constructs and conditions generally encountered in the literature.

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STAKES

An obvious example is that of the Economic Forecasting Researcher of Shark Corporation (Appendix I). Strategic analysis indicated that the Researcher's legitimacy is mainly of the "rational-legal" type and based on his "numerate" activity. Besides, the case study showed that the Researcher felt that the innovation system (SP) would deprive him of the exclusivity of statistical research (and render some of his computations useless). On the other hand, interviews indicated that technological and "numerate" activities are valued highly at Shark (see, in particular, the Personnel Director's remarks). This idiosyncratic feature of the organisational climate (in terms of values) shows how an "objectively" limited change in job definition may be felt as involving a crucial stake: a reduction of legitimacy. This interaction between perception of organisational climate and stakes contributes to explaining the Economic Forecasting Researcher's opposition to SP.

ZONES OF UNCERTAINTY

A remarkable instance is that of Piranhas Corporation (Appendix II). The case study showed that, at Piranhas, particular emphasis is put on the promptness of response to clients' change in requirements (new specifications) or deviation from initial costing (budget). Interviews indicated that the actors view prompt feedback as a critical success factor for the company. This conspicuous concern pervades the whole company's life, and is particularly noticeable through the efforts for optimising site control. This idiosyncratic feature of the company's climate (in terms of objectives) contributes to explaining why the actors most affected by

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uncertainty on site (i.e. the site agents, as indicated by strategic analysis) chose to support the innovation system allowing for real-time control (on site) over construction works and opposed the project which only allowed for sequential, deferred and remote control (from the Head Office).

STRATEGIES

In some respect, both the above points also show how perception of the features of organisational climate and the actors' (more or less conscious and deliberate) choice of strategy can interact. However, another example of such interaction can be found in the third case study (Barracuda Corporation, in Appendix III). Interviews indicated that the whole history of this retailing company is marked by the "sales complex". Up until very recently, the motto was "fill the customer's car boot". Selling is still the basic activity of 60% of the employees, even if more management-oriented concerns emerge at the Head Office. The selling commitment pervades all the points of sales and various Head Office divisions (in particular, the Product Division and the Sales Division). This idiosyncratic feature of the company's climate (in terms of history, if not mythology) contributes to explaining why the actors most affected by the sales complex (i.e. the store managers and their sales assistants) developed a strategy of opposition to an innovation system implying less direct and immediate sales from the stores, and likely to develop home-delivering from the regional warehouses of distribution.

RATIONALITIES

The interaction between organisational climate and the actor's

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rationality does not seem to be as direct as it is for other strategic factors. The actor's rationality is what enables him to develop strategies in front of stakes and uncertainty (inasmuch as he is affected by these). Strategic analysis indicated that the actor's rationality is how he weights, assesses, evaluates and compares strategies in the light of how he perceives corporate idiosyncracies. In short, it seems that rationality is what allows the actor to relate (in a more or less conscious and deliberate way) his perception of organisational climate features to his perception of stakes and uncertainty and to develop strategies accordingly (see the above examples). It is in this (indirect) way that organisational climate and rationalities seem to interact.

The above considerations suggest that there is an interaction between the influence of norms, values, objectives, history, etc. on organisational phenomena and the influence of strategic factors on the same organisational phenomena. At this stage, the specific nature of the influence of strategic factors must be demarcated, so as to justify the proposition that they can be viewed as organisational climate components. Three major points allow for delineating this specificity and thus justifying the view.

COALITIONS

The case studies and strategic analysis showed that strategic factors play an essential part in the formation and development of coalitions. The influence of organisational coalitions on corporate life was shown to be so important (see, in particular, the test of hypothesis 8 in Section 3 of Chapter VII) that their foundations (i.e. strategic factors) must logically be viewed as components of organisational climate.

MEDIATION

The strategic categories (i.e. rationality, strategy, stake, zone of uncertainty) are derived from micro-sociology and system analysis. Strategic analysis takes the view that the actor's behaviour is guided by the way in which he assesses his position (assets, threats, opportunities, etc.) in the organisation, identifies zones of uncertainty limiting his information, impairing his judgment or involving some stakes. The underlying principle is that, although bounded, the actor's rationality is irreducible and will always enable him to develop strategies in front of perceived stakes and zones of uncertainty. On the basis of this theory, it is therefore arguable that, at the individual level, the actor's perception of organisational climate is conditioned by the way in which his rationality (more or less consciously and deliberately) assesses stakes and uncertainty and develops strategies accordingly. The case studies support this view (without proving it) by indicating that the influence of organisational climate on the actor's behaviour is often a function of his rationality, perceived stakes and uncertainty, and related strategy. The validity of this argument is limited by the fact that the observed function can always be the inverse function of the real one.

In fact, this view does nothing but elaborate on some contemporary perspectives. According to some researchers, organisational climate is not a straight forward determinant of organisational behaviour; rather, its influence depends on how actors perceive their world of work.³ The only innovation of the present view is: (i) to suggest that this "how" may hinge on strategic factors; (ii) to include this "how" (mediating variable) into organisational climate. Accordingly, it is suggested to consider strategic factors as mediating variables through which

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idiosyncratic organisational constructs and conditions such as values, norms, objectives, stress, etc. may influence the actor's behaviour.

However, the property of being "mediating variables" does not ipso facto qualify for membership of the set of idiosyncratic elements which constitute organisational climate. Indeed, it could be argued that rationalities, strategies, perceived stakes and zones of uncertainty are more individual than collective factors. Consequently, it could be put forward that strategic factors cannot be viewed as components of organisational climate. This is an interesting objection, which allows for identifying which strategic factors can usefully be considered as organisational climate components, and which cannot. However, before tackling this point in the following section ("Aggregation"), it is worth noting an intrinsic limitation to the objection. "Individual" does not mean "personal". For each actor, all the strategic factors are company-related, and none is an exclusive function of his traits or psychological characteristics. On the other hand, organisational norms, values, objectives, etc. are usually viewed by researchers as general constructs and, therefore, considered as elements of organisational climate. However, each actor has his own perception and understanding of these elements. If "risk-taking" is an idiosyncratic value in company A, it is highly probable that all Company A's actors would define "risk-taking" in a different way.

AGGREGATION

The case studies showed that, although essentially individual elements, strategic factors can be aggregated at the sub-organisational level (see, in particular, the situation of the site agents in Appendix II, and Appendix III). In other words, it

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appears that some stakes and zones of uncertainty may affect, or be felt by, most or various actors of a given category, department or division of the company. In the same way, it appears that actors may develop convergent strategies according to similar rationalities. In short, it seems possible to derive some collective features of strategic factors from their individual features. This attribute of strategic factors (i.e. their ability to affect or characterise sub-organisational behaviour) furnishes a third justification for including rationalities, strategies, stakes and zones of uncertainty among the components of organisational climate.

In recapitulation: all strategic factors, be they individual or sub-organisational, can be viewed as mediating variables through which norms, values, goals, objectives, history, etc. influence corporate processes; but only such strategic factors which are amenable to aggregation (i.e. which seem to affect or characterise organisational sub-units) can be viewed as elements of organisational climate. When strategic factors appear to be essentially relating to individual actors and thus are not amenable to aggregation, they must be considered as individual mediating variables, but cannot be viewed as elements of the organisational climate.

Some examples will clarify the distinction. In Piranhas Corporation, the stake relating to the control over the Regions is an element of the company's climate. In Barracuda Corporation, the zone of uncertainty related to the potential development of BGT and HSC is an element of the chain's climate; similarly, the rationality of the store managers is an element of Barracuda's climate. By contrast, in Shark Corporation, the strategy of the Economic Forecasting Researcher is not an element of the organisational climate (although it seems arguable that it is an element of the

Department's climate).

The classical components of organisational climate have been characterised as to their type of influence on organisational phenomena: traditional, emotional and rational influences. Strategic factors have been characterised as to their function (i.e. mediating variables) and condition of membership of the set of idiosyncratic elements which constitute organisational climate (that is, they must affect or characterise sub-organisational units). These characterisations can be summarised into the following tentative definition:

ORGANISATIONAL CLIMATE

A set of collective emotional conditions, traditional circumstances, rational standards and strategic factors whose combination, perception and use by the actors, influence the latter's participation in the organisational game.

The main novelty of this definition is to suggest, in the light of the case studies, that organisational climate is not always an idiosyncratic "given" that actors cannot but undergo. Because of their strategic situation, they can "play" (in a more or less deliberate and conscious way) on some of its features. Consider, for example, Piranhas site agents: their strategy can be viewed as a way of using a feature of the company's climate (i.e. the organisational idiosyncratic emphasis put on prompt feedback and site control) in order to justify their choice of a system which, in fact, enables them to preserve their autonomy.

1.3. Limits of Theoretical Propositions

There is an inherent limit in the above considerations. The proposition that strategic factors are mediating the influence of "classical" organisational climate (i.e. organisational idiosyncracies such as norms, values, objectives, etc.) is more a theoretical than empirical-based standpoint. This research methodology was hardly powerful enough to test the sequence in which respective influences are exerted. Any research design aiming at answering this question should concentrate on the following problems:

- (i) Influence of variation in strategic factors on the perception and effect of "classical" organisational climate;
- (ii) Influence of variation in "classical" organisational climate on the perception and use of strategic factors.

The question of the possibility of a suitable and valid research method for such a design can be raised. Any answer to the two sub-problems above supposes that the researcher is able to distinguish, for each perception or behaviour, what is ascribable to "classical" organisational climate from what must be attributed to the influence of strategic factors. This supposes a mutual exclusive classification of correspondences between actions and perceptions on the one hand, and "classical" organisational climate (i.e. idiosyncratic constructs or conditions such as norms, objectives, stress, etc.) and strategic factors on the other hand. Such a correspondence can only be theory-based since, as we are not supposed to know what are the respective influences of "classical" organisational climate and strategic factors (if we did it would be pointless to do the research), we are not able to classify them.

Therefore, even such a complex design would have, at one time,

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to make theoretical and non-empirical-based statements. To have made such theoretical statements in the conclusion of the thesis does not impair its practical validity. Theoretical commitment (and, therefore, potential empirical erroneousness) is the price for consistency. Strategic analysis furnishes the basis of the research methodology, and it is consistent with this approach to view strategic factors as mediating the influence of "classical" climate: "The actor's rationality is irreducible".

However, evaluating the respective influence of "classical" organisational climate and strategic factors has never been the goal of the research. Rather, it was aimed at indicating the influence of corporate idiosyncracies on decision-making processes, and to suggest an enriched conception of the organisational climate concept so as to allow for more effective commercial approaches. This first section shows that the first dimension of this objective is satisfied. The following section concentrates on the second dimension and proposes a methodology to guide selling efforts.

SECTION 2 PRACTICAL IMPLICATIONS

The analysis of the case studies and discussion of the hypotheses gave rise to various propositions which are summarised in the conclusion to Chapter VII. In the light of these propositions, it seems possible to suggest a practical methodology for the marketing of industrial innovations related to information technology. This methodology resorts to strategic analysis, whose basic concepts were clarified in Section 1.

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2.1. Approach Methodology

The following lines indicate a sequence of phases aimed at guiding the selling efforts which are directed towards the addressed systems. The research involved can be carried out either by the addressing system's marketing analysts or by specialised consultants.

FIRST PHASE

Among all the basic strategic factors discussed above, those of stake and zone of uncertainty are the least likely to give rise to error in assessment. To some extent, they are the most subject-free and company-related concepts. Of course, both zones of uncertainty and stakes do not exist in themselves and may be experienced and assessed differently by various actors. Yet, they have a deep objective foundation: the company. Moreover, the case studies suggest that there is always a zone of uncertainty attached to the outcome of the decision-making process. On the other hand, the three case studies indicate that the potential adoption of the innovation may always involve stakes for the actors. These uniformities provide an important starting point and bed-rock for the analysis.⁴

Accordingly, it is suggested to start the strategic analysis of the potential customers by concentrating on how these two kinds of strategic factors (i.e. stakes and zones of uncertainty) are instanced in their organisations.

Then, which of these two concepts should be studied first in the target organisations (i.e. those of the macro-segments)? Of course, it is possible that, sometimes, one of the zones of uncertainty or stakes will be so obvious or determinant that the analyst will

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"naturally" start by concentrating his analysis on it and then structure his diagnosis accordingly. However, it may be helpful to provide an answer here, in the event of an absence of such an obvious and idiosyncratic feature of the target organisations.

To answer the question of which of the two concepts of zone of uncertainty and stake should be looked for first, it is fruitful to return, for a moment, to the concept of decision itself.

A decision irreducibly supposes two sets of elements: judgments, and preferences. It has been argued in Chapter V that there is not always a clear preference function underlying all the decisions, but this does not mean that the actors have no preferences.

Rather, these preferences may involve contradictory criteria (see, for example, the Marketing Director of Shark Corporation), but they always seem present.

On the other hand, it seems logically valid (and is supported by the case studies) to suggest that opinions and decisions based on strong, clear and unambiguous preferences are likely to be strongly defended in the organisation (see the Economic Forecasting Researcher in Shark, the site agents in Piranhas and the store personnel in Barracuda). Along the same line, it seems logical (and is supported by the case studies as well) to suggest that opinions and decisions which are strongly defended are likely to have a determinant influence on the decision-making process and its outcome (SP is rejected, MCO is accepted, and no definite decision has been made about BGT so far).

What is the conclusion from these considerations? Clearly, that marketing analysts must first focus attention on the actors likely to have strong, clear and non-ambiguous preferences. In fact, these actors do not appear to be those able to express sound and "profound" judgments, or to articulate comprehensive and subtle

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analyses.

Consider, for example, the head of the Organisation Department in Barracuda: his judgments are sound, his analyses are wide-reaching, but it seems that his ability to weigh the pros and cons inhibits him from forming unambiguous preferences. However, in a more strategic perspective, it could be argued that this actor's strategy may precisely consist of expressing ambiguous opinions, which is a means to maintain or generate uncertainty.

Then, what are the strategic implications? Clearly, preferences must be related to stakes. What an actor has at stake is what he prefers not to lose, or prefers to get so as to pursue and achieve his strategy.

Accordingly, the first strategic factor on which the addressing system's analysts should focus attention is that of stake. In the absence of any obvious zone of uncertainty, the first question to answer is thus the following:

QUESTION 1

In the target organisations, what are the actors with clear, non-ambiguous and crucial stakes? (Q1)

To answer Q1 is to identify the actors likely to play an influential part in the decision-making process. Of course, the relative weight of their influence depends on their assets, resources and ability to develop coalitions in the organisation. It must already be noted that some actors may be influential without being in favour of the innovation. In fact, some influential actors' strategies may well be opposed to the adoption of the innovation (see, for instance, the General Secretary of Piranhas Corporation).

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SECOND PHASE

Once Q1 is answered, the strategic factor on which analysts should focus attention is that of zone of uncertainty. The practical question to answer is the following:

QUESTION 2

Among the actors identified in the preceding phase, who are those monitoring relevant and determinant zones of uncertainty which are critical: (i) at the earliest stage of the introduction, and/or (ii) later on in the decision-making process? (Q2)

To answer Q2 is to detect possible propitious vectors of information and their possible relays. To assist clarity of presentation, the concept of relay must be precisely characterised. A propitious vector of information is an actor who, at the earliest stage of the decision-making process, is in favour of the innovation ("passive positive" role) and spreads "positive" information about the innovation ("active positive" role); by contrast, a relay is an actor who is in favour of the innovation but who is also able to play an active part later on in the decision making process. As the following lines indicate, the distinction between vectors and relays is important (the role of relays will be seen to be all the more important as propitious vectors may lose their "propitiousness" as the decision-making process evolves over time). A possible relay is an actor who is able to play an active part in the intermediate phases of the decision-making process: he is able to spread influential information about the innovation. The adjective "possible" is meant to stress the fact that this information may,

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indeed, be "negative" (if the possible relay is opposed to the innovation); when the information is positive, the actor will be called a relay.

In other words, relays are actors in favour of the innovation who monitor zones of uncertainty being critical in the further phases of the decision-making process. An explanation will clarify the concept.

A decision-making process is a sequential organisational phenomenon generating a series of zones of uncertainty, involving various stakes in which several actors will participate as the process evolves over time. It has already been shown that what makes some actors propitious vectors of information is not their personal characteristics (i.e. their psychology), but their situation in the organisational game (i.e. the way they perceive their assets and resources, the latter being a function of the relevance of the zones of uncertainty they monitor). Accordingly, since the "propitiousness" of the vectors of information is highly dependent on the relevance of the zone of uncertainty they monitor, some actors will no longer be propitious vectors as the evolution of the decision-making process entails shift in relevance. An example will assist understanding. Consider the case of Barracuda Corporation. The actors of the Information Systems Division (ISD) are propitious vectors of information in the early stage of the decision-making process: they successfully introduce the system by describing it as an excellent tool for stock control. At this stage, a critical uncertainty is attached to the technical value of the system: "Is this tool really excellent and suitable?" The ISD monitors this uncertainty: "The system is already excellent, but our experts can render it even more suitable by adapting it to the company's needs." However, once the BGT system is adapted, it must be tested. And the test will be positive (which would entail a

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final decision to be made) only if the system is effectively used in the stores. At this stage, the technical zone of uncertainty monitored by the ISD is no longer relevant: the (previously) propitious vectors of information must be relayed by other vectors. Strategic analysis shows that the relay which is provided by the organisation (i.e. the BGT Project Officer) does not master the uncertainty attached to this stage of the process: he fails to act as a propitious vector. In fact, at this stage, the critical zone of uncertainty relates to how the system is described, evaluated, adopted and effectively used in the stores. The store managers are the real source of information in the points of sales: strategic analysis shows that the opinions of the sales staff (i.e. the potential end-users of the system) are highly influenced by those of their manager. Accordingly, the store managers monitor the critical zone of uncertainty attached to this stage of the decision-making process: the information they spread may, or may not, be favourable to the system. In short, the store managers were possible effective relays for the ISD. So much for the explanation.

To answer Q2 is all the more informative as analysts do not try to resort to a priori criteria for relevance and decisiveness; relevance and decisiveness must be assessed in the light of the actors' own opinions, feelings and actions. On the other hand, the division of the decision-making process into phases is not operated in abstracto (on the basis of the classical sequences of the hierarchy of effects models) but in concreto (on the basis of the zones of uncertainty whose relevance and criticalness may change as the decision-making process evolves).

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THIRD PHASE

At this stage, analysts must move to more subtle problems and try to answer the following question:

QUESTION 3

Among the actors identified in the preceding phase, who are those likely to be in favour of the innovation, and who are likely to reject it? (Q3)

To answer Q3 is to identify the propitious vectors of information and their relays. This question involves a reflection on the actors' strategies. Once again, analysts must beware of a priori judgments. Indeed, it is necessary to study and understand the actors' feelings, opinions and actions in order to assess the extent to which they consider the potential innovation as prohibitive, permissive or facilitative for the development of their strategies.

In fact, analysts may a priori expect stances which prove, a posteriori, different - if not opposed - to those of the actors (cf. in Shark Corporation: the SSII sales engineer had very good a priori reasons to expect the Economic Forecasting Researcher to be in favour of the innovation; nonetheless, the Researcher's strategy proved to be opposed to the adoption of SP).

Due to their strategies, possible relays may, in fact, oppose the innovation. Consider, again, the example of Barracuda's store managers. They were identified in the preceding phase as possible relays of information for BGT.

However, the case study showed that they played a different role. Their strategy, oriented towards maintaining their autonomy from the Head Office, lead them to oppose the system. They could be

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viewed as negative relays of information. However, the analysis carried out in Chapter VII indicated that, had the system been correctly "sold" to them, the store managers could have played the role of positive relays.

FOURTH PHASE

At this stage, analysts must focus on the most difficult concept of strategic analysis: that of rationality. This phase is devoted to identifying coalitions. If information is sufficient, analysts should answer the following question:

QUESTION 4

Among the actors identified in the preceding phase, who are those with: (i) compatible rationalities; (ii) non-conflicting stakes; and (iii) non-opposed strategies? (Q4)

To answer Q4 is to identify propitious coalitions (the concept is characterised in Chapter VII; see Hypothesis 8 and Recapitulation). What is interesting about these coalitions is that they consist of propitious vectors or relays of information. Strategic analysis and the case studies suggested that actors are all the more powerful as they are able to develop or join organisational coalitions.

The rationale of the practical recommendations is that the selling efforts are all the more likely to succeed as they are directed towards actors identified by "later" phase questions. This argument can be synthesised by the following figure.

Fig.33- Strategic analysis and selling efforts

Strategic factors	Identification question	Selling efforts directed towards	"Intuitive" index of likelihood of success
Stakes	Q1	"Influential" actors	-1 or 1
Zones of uncertainty	Q2	Possible propitious vectors and possible relays of information	-2 or 2
Strategies	Q3	Propitious vectors and relays of information	3
Rationalities	Q4	Propitious coalitions of vectors and relays of information	4

Obviously, the " 'intuitive' indices" have no predictive or quantitative pretention. They are uniquely meant to suggest that the level of strategic information available about the addressed systems, and the preciseness of the adaptation of selling efforts to that information, appear to be critical success factors for the marketing of information technologies. By ascribing possible negative indices to the first two phases, it is intended to point out a real commercial threat (which was badly experienced by the SSII sales engineer, in the first case study): it may be misleading, to say the least, to concentrate selling efforts on "influential actors" or "possible propitious vectors and relays" if analysts have not answered the question of whether these are likely to be in favour of, or against the innovation. A preliminary study of the actors' stakes, uncertainties and strategies may, at least, enable selling efforts to be adapted to these actors' possible opposition to the innovation.

For innovations which do not involve a long and continuous sequence of adoptions before the product is bought, marketers may

well succeed by concentrating on Q1 only, if they are lucky or manage to know who is likely to be in favour of the innovation and who is not. But this kind of adoption process is very rare in information technology. Most of the time, companies are more interested in selling peripheral devices, services and developing loyalty than in selling a unique software to a client. To be sure, COD is more interested in equipping all Piranhas Regions with micro-computers than in selling MCO to its Information Systems Department. Similarly, the same COD is not so much interested in selling BGT to Barracuda than in equipping all its stores with terminals. More precisely, both types of operations are tightly linked.

A more serious objection hinges on the problem of the availability of strategic information to the addressing systems.

2.2. Limits of Practical Propositions

On the basis of the information collected throughout the four phases mentioned above, potential customers belonging to macro-segments could be regrouped into micro-segments according to their strategic characteristics. This could enable addressing systems both to concentrate and adapt their selling efforts to the idiosyncracies of the decision-making processes or procedures of their potential customers.

However, the whole methodology above is based on strategic analysis of the addressed systems towards which the addressing system intends to direct its selling efforts. Is such analysis always possible?

The question raises a crucial point, that of the "penoptimal" (i.e. nearly optimal) implementation of methodologies whose

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scientific requirements are incompatible with the conditions of economic and commercial actions. In short, can we call "strategic analysis", in the sense of the Strategic Theory of Organised Action, an analysis based on second-hand information (via the addressing system's salesmen, for example) about the addressed systems' actors? Indeed, it would be pure illusion to imagine that the addressing system' experts will be able to carry out genuine direct analysis, since the latter hinges on deep individual interviews. In this respect, the second case study is interesting, since the indications from the Baleine sales engineer play an important part in the analysis.

However, it would be equally illusory to think it is possible to confine strategic analysis to circumstances allowing for direct optimal research methodologies. When a new conceptual tool emerges in the environment, it is desirable for marketing experts to test its commercial efficiency, even if such was far from being the major concern of its originators.

Accordingly, the following points suggest how indirect information could be collected, and how marketing experts could reduce inherent biases:

- (i) Information about the feelings, opinions and actions of the addressed systems' actors could be collected by marketing experts through:
 - (1) Personal contacts on the occasion of trade exhibitions, seminars, congresses, etc.
 - (2) The addressing systems' salesmen: they may have already been in contact with these actors on the occasion of previous transactions, trade shows, congresses, etc.
 - (3) Any middle men holding such information. Such actors are likely to belong to the environment of the addressed systems (upstream, downstream or horizontal): suppliers,

customers, previous employees, consultants, etc.

- (ii) For each indirect information, marketing experts should ask themselves: "What could be the influence of our informers' strategies on the information they provide us with? To what extent is this information biased by their own strategic situation?" (Second order strategic analysis)

The feasibility, efficiency and economic profitability of these suggestions should receive some attention. In particular, the question of opportunity costs and the limit of the "return on information" should be raised. Another limit to the generalisation of the practical recommendations is that they are uniquely based on the study of information technologies. This point is stressed in the discussion of Hypothesis 8 and the conclusion to Chapter VII.

3. Conclusion of the Eighth Chapter

The chapter has recapitulated the final suggestions which derive from the research. Section 1 dealt with theoretical propositions, and concluded on how "classical" organisational climate and strategic factors interact in influencing corporate processes. In this respect, it is worth stressing that the research infirms rather than confirms the normative theory of group decision-making in organisational buying behaviour. Two major reasons account for this:

- (i) The a priori "normative sequentialisation" of the process was found to be misleading. Classical phases such as awareness,

definition of the problem, study of alternatives, determination of the solution (the "decision") etc. only mask a deep political process in which actors with different rationalities and strategies compete for some stakes and cope with uncertainty. Moreover, zones of uncertainty are often far from being directly related to the techno-economic dimension of the project itself. In other words, the "group decision" is influenced by an array of strategic factors, and not only determined by the objectives features of the proposal.⁵

- (ii) Organisational buying behaviour was not found to be rational in the classical sense of the normative theory of group decision. That is, the purchase or rejection decisions could hardly be seen as optimal solutions to clearly stated corporate problems. However, from the viewpoint of strategic analysis, the decisions could be viewed as resulting from organisational processes in which participants implemented rational strategies. That is, individual strategies could be seen as rational responses in front of uncertainty and individual or sub-organisational stakes generated by the projects.

In short, this research's conclusion is a departure from the normative theory of group decision-making in buying behaviour for the following reason: the rationality of organisational buying behaviour did not seem to lie in the objective rationality of both the transaction object ("a mere technological device") and the buying unit ("an organisation governed by unambiguous techno-economic goals"), but in the subjective rationality of the actors themselves. In other words, if organisational buying behaviour seemed to be rational, it is not because it involved organisations and technologies, but because it involved individuals. A conclusion

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diametrically opposed to the normative theory of group decision-making in buying behaviour.

Section 2 concentrated on practical propositions and suggested a methodology aimed at guiding selling efforts directed towards potential customers. Three major interrogations emerge from the research:

- (i) Are the conclusions valid for innovations alien to information technology ?⁶
- (ii) What is the relative importance of "classical" organisational climate (i.e. norms, values, objectives, goals, (hi)stories, and all the other idiosyncratic corporate constructs and conditions usually quoted in the literature) and strategic factors in influencing corporate processes ?
- (iii) Is it always feasible and/or profitable to perform strategic analysis before approaching potential customers ? As the answer is likely to be negative, the subsequent interrogation should be: When is it feasible and/or profitable to perform strategic analysis before approaching potential customers ?

It is hoped that these questions will receive some attention. Clear answers would magnify the power of the tools with which this research aims at equipping the marketing of technological innovations.

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NOTES AND REFERENCES

1- Brunsson suggests that analysts should consider two kinds of uncertainty:

- (i) The actor cannot assign a probability value of one or zero to a possible event.
- (ii) The actor is not certain whether the model he is using to predict events is the correct model.

See: Brunsson, Nils. The irrational organisation... Op.cit.

2- See: Weber, M. Economy and society. Op.cit.

3- See, in particular, note 92 of Chapter III.

4- It is acknowledged that a uniformity is not a law. The difference between a local, or partial, uniformity and a law is stressed in the first four chapters of:

- Armstrong, D.M. What is a law of nature? Cambridge, Cambridge University Press, 1985.

5- This does not mean that all organisational buying behaviour models are useless or, worse, misleading. In fact, some practical models do not reason in terms of substantive temporal-procedural sequences, but in terms of formal conceptual-behavioural sequences. That is, some operational models do not try to suggest (more or less a priori) the content of what should happen according to some chronology, but indicate the conditions, circumstances and structures that will influence and characterise the adoption process. If one returns to Chapter IV, Section 2, models of the substantive first type as those by Milo, Shepard, Hage and Aiken, Wilson, Zaltman et al., while models of the formal second kind are those by Webster and Wind, Sheth, Choffray and Lilien, and Baker. Another major difference between the two types (which accounts for the success of the latter and the failure of the former) is that the first models are normative, while the second are descriptive/predictive.

6- Several Researchers have recently used information technology projects to illustrate a conceptual framework that, they believe, can describe organisational innovation processes in general. Readers interested in comparing the present research's conclusions with such investigations into the adoption of computer-based information technologies can fruitfully resort to:

- Bikson, T.K., C. Stasz & D.A. Martin. Computer-mediated work: individual and organisational impact in one corporate headquarters. Santa Monica, The Rand Corporation, R-3308-OTA, November 1985.

BIBLIOGRAPHY

- Abend, C.J. Innovation management: the missing link in productivity. *Management Review*, vol.68 (6), 1979, pp.25-28 and 38.
- Ackoff, R.L., & F.E. Emery. *On purposeful systems*. London, Tavistock, 1972.
- Ackoff, R.L. *Redesigning the future: a systems approach to societal problems*. New York, John Wiley, 1974.
- Adorno, T.W., et al. *The authoritarian personality*. New York, Harper, 1950.
- Alexis H.M., G. Haines, & L. Simon. Consumer information processing: the case of woman's clothing. In Marketing and the new science of planning, edited by R. King. Chicago, AMA, 1968, pp.197-205.
- Allison, G.T. *The essence of decision: explaining the Cuba missile crisis*. Boston, Little, Brown, & Co., 1971.
- Anon. A contingency model of participative decision-making: an analysis of 56 decisions in three Dutch organisations. *Journal of Occupational Psychology*, vol.56 (1), 1983, pp.1-18.
- Anon. Creativity and innovation study: progress report. *Planned Innovation*, vol.1 (5), May 1978, p.186.
- Ansoff, H.I. *Corporate strategy*. New York, McGraw-Hill, 1965.
- Appel, P. Discours et réalités de la décision dans l'entreprise. *Revue Française de Gestion*. Janvier-Février 1977, pp.11-20.
- Argyris, C. *Integrating the individual and the organisation*. New York, Wiley, 1964.
- Argyris, C. *The applicability of organisational sociology*. Cambridge, Mass., Harvard University Press, 1972.
- Armstrong, D.M. *What is a law of nature?* Cambridge, Cambridge University Press, 1985.
- Asai, K., H. Tanaka, & T. Okuda. Decision-making and its goal in a fuzzy environment. In Fuzzy sets and their applications to cognitive and decision processes, edited by L.A. Zadeh, K.-S. Fu, K. Tanaka, & M. Shimura. New York, Academic Press, Inc., 1975, pp. 257-277.

BIBLIOGRAPHY

- Ashby, W.R. An introduction to cybernetics. New York, Sciences Editions, 1966.
- Axinn, S. The logic of degree of rationality. Proceedings of the 6th Congress on Cybernetics. Namure, Belgium, 1971, pp.1269-1276.
- Baker, M.J., & S.T. Parkinson. Predicting the diffusion of industrial product innovations. Department of Marketing, University of Strathclyde, Glasgow. 1976.
- Baker, M.J. (Editor) Industrial innovation: technology, policy, diffusion. London, Macmillan, 1979.
- Baker, M.J. Industrial buying behaviour and the adoption of innovations. In Industrial innovation: technology, policy, diffusion, edited by M.J. Baker. London, Macmillan, 1979, pp. 345-367.
- Baker, M.J. Marketing: an introductory text (third edition). London, Macmillan, 1979.
- Baker, M.J. Marketing new industrial products. London, Macmillan, 1975.
- Baker, M.J. Market development: a comprehensive survey. Harmondsworth, Penguin Books, 1983.
- Baker, M.J. (Editor) Marketing: theory and practice. London, Macmillan, 1976.
- Barnard, C.I. The functions of the executive. Cambridge, Mass., Harvard University Press, 1938.
- Baumgartel, H., L.E. Dunn & G.I. Sullivan. Management education, company climate and innovation. Journal of General Management, vol.4 (2), Winter 1976-77, pp.17-26.
- Bazerman, M.H., & F.D. Schoorman. A limited rationality model of interlocking directorates. Academy of Management Review, vol.8 (2), 1983, pp.206-217.
- Belkaoui, A. Standard setting for oil and gas accounting: an analysis using Allison's approach. Accounting and Finance, vol.23 (1), May 1983, pp.64-73.
- Bellman, R.E., & L.A. Zadeh. Decision-making in a fuzzy environment. Management Science, vol.17, pp. 141-164.
- Bela Gold, S. Peirce, & G. Rosegger. Diffusion of major technological innovations. In Technological change: economy, management and environment, edited by Bela Gold. Oxford-New York, Pergamon Press Ltd., 1975, pp.129-147.
- Bennis, W.G. Changing organisation. New York, McGraw-Hill, 1966.

BIBLIOGRAPHY

- Berger, A. Factors influencing the locus of innovation activity leading to scientific instrument and plastic innovations. SM thesis, MIT, Sloan School of Management, June 1975.
- Berger, P.L., & T. Luckman. The social construction of reality: a treatise in the sociology of knowledge. New York, Doubleday, 1966.
- Bertalanffy, von, L. Problems of general system theory. Human Biology, vol.23, 1951, pp.302-312.
- Bettman, J.R. Information processing models of consumer behaviour. Journal of Marketing Research, vol.7, 1970, pp.370-376.
- Bierhoffalfermann, D., et al. Sex-typical behaviour in fairy tales - A content analysis. Psychologie in Erziehung und Unterricht, vol.29, 1982, pp.129-139.
- Bikson, T.K., C. Stasz & D.A. Martin. Computer-mediated work: individual and organisational impact in one corporate headquarters. Santa Monica, The Rand Corporation, R-3308-OTA, November 1985.
- Bilbrey, C.P. An analysis of the impact of minicomputers upon businesses and an investigation of user selection criteria. Ph.D. thesis, University of Arkansas, 1981.
- Black, W.C. An analysis of the post-adoption period in the diffusion of innovations. Ph.D. thesis, The University of Texas at Austin, 1980.
- Blake, R.R., & J.S. Mouton. The managerial grid. Houston, Gulf Publishing Company, 1964.
- Blau, P.M., & R.A. Schoenherr. The structure of organisation. New York, Random House, 1970.
- Blau, P.M. The formal theory of differentiation in organisation. American Sociological Review, vol.35, 1970, pp.201-218.
- Blin, J.M., & P. Whinston. Fuzzy sets and social choice. Journal of Cybernetics, vol.4, 1974, pp.3-28.
- Bono, E., de. Lateral thinking for management. London, McGraw-Hill, 1971.
- Booz, Allen & Hamilton, Inc. Management of new products, 1965.
- Boyden, J. A study of the innovation process in the plastics additives industry. SM thesis, MIT, Sloan School of Management, January 1976.

BIBLIOGRAPHY

- Braithwaite, R. Models in the empirical sciences. In Logic methodology and philosophy of science, edited by E. Nagel, P. Suppes, & A. Tarski. Stanford University Press, 1962, pp.224-231.
- Bridgewater, A.V. Morphological methods: principle and practice. In Technological forecasting, edited by R.V. Arnfield. Edinburgh University Press, 1969.
- Bright, J.R. Evaluating signals of technological change. Harvard Business Review, January-February 1970.
- Briscoe, G. Some observations on new industrial product failures. Industrial Marketing Management, vol.2, February 1973, pp.151-162.
- Brubaker, R. The limits of rationality. London, George Allen & Unwin, 1984.
- Brunsson, Nils. The irrational organisation: irrationality as a basis for organisational action and change. Chichester, John Wiley, 1985.
- Bryman, A. Organisation studies and the concept of rationality. Journal of Management Studies, vol.21, 1984, pp.391-408.
- Bunge, M. Scientific research. Berlin, Springer, vol.I & II, 1967.
- Burgoyne, J.G., & V.E. Hodgson. An experiential approach to understanding managerial approach. Paper presented at the Seventh Biennial Conference on Leadership and Managerial Behaviour, Oxford, May 1982.
- Burgoyne, J.G. The judgement process in management students' evaluation of their learning experiences. Human Relations, vol.28, 1975, pp.543-509.
- Burns, T. Micro-politics: mechanisms of institutional change. Administrative Science Quarterly, vol.6, 1961, pp.257-281.
- Burns, T. & G.M. Stalker. The management of innovation. London, Tavistock, 1961.
- Butler, J.L. Comparative criteria for minicomputers. In A practical guide to minicomputers application, edited by F.F. Coury. New York, IEEE Press, 1972.
- Butler, R.J., W.G. Astley, D.J. Hickson, G. Mallory, & D.C. Wilson. Strategic decision-making concepts of contents and process. International Studies of Management & Organisation, vol.9 (4), Winter 1979-1980, pp.5-36.

BIBLIOGRAPHY

- Cadwalder, M. The cybernetic analysis of change in complex organisations. *American Journal of Sociology*, vol.65, 1959, pp.154-157.
- Calantone, R.J., & R.G. Cooper. A typology of industrial new product failures. In 1977 Educator's Conference Proceedings, edited by Greenberg & Bellenger. Chicago, AMA, 1977, pp.492-497.
- Cardozo, R.N., & J.W. Cagley. An experimental study of industrial buyer behaviour. *Journal of Marketing Research*, vol.8, August 1971, pp.329-334.
- Carley, M. Rational techniques in policy. London, Heinemann Educational Books, 1981.
- Carter, C.F., & B.R. Williams. Industry and technical progress: factors governing the speed of application of science. London, Oxford University Press, 1957.
- Carter, D.E. Corporate identity manual. Ashlands, Century Communications Unlimited, 1976.
- Cecez-Kecmanovic, D. The value of information in decision-making. In Processes and tools for decision support, edited by H.G. Sol. Amsterdam, North-Holland Publishing Company, 1983, pp.7-23.
- Chandler, A.D., Jr. Strategy and structure. Cambridge, Mass., MIT Press, 1962.
- Child, J. Organisational structure, environment and performance: the role of strategic choice. *Sociology*, vol.6, 1972, pp.1-22.
- Choffray, J.-M. A methodology for investigating the structure of the industrial adoption process and the differences in perception and evaluation criteria among potential decision participants. Ph.D. thesis, MIT, Sloan School of Management, April 1977.
- Choffray, J.-M., & G. Lilien. Assessing response to industrial marketing strategy. *Journal of Marketing*, vol.42, April 1978, pp.20-31.
- Choffray, J.-M., & G.L. Lilien. Market analysis for new industrial products. New York, John Wiley and Sons, 1980.
- Churchman, C.W. Design of enquiring systems, basic concepts of systems and organisation. New York, Basic Books, 1971.
- Clarkson, G.P.E. A model of trust investment behaviour. In Computer and thoughts, edited by E. Feigenbaum & J. Feldman. New York, McGraw-Hill Book Company, 1963, pp.347-371.

BIBLIOGRAPHY

- Coch, L., & J.R.P. French. Overcoming resistance to change. In Human factors in management, edited by S.D. Hoslett. New York, Harper & Row Publishers, Inc., 1951, pp.242-268.
- Cohen, M.D., & J.G. March. Leadership and ambiguity: the American College president. New York, McGraw-Hill, 1974.
- Cohen, M.D., J.G. March, & J.P. Olsen. People, problems, solutions, and the ambiguity of relevance. In Ambiguity and choice in organisations, edited by J.G. March and J.P. Olsen. Oslo, Universitetsforlaget, 1976.
- Comte, A. System of positive policy. London, Longman, Green & Co., 1877, vol.IV.
- Comte, A. The progress of civilisation through three states. In Social change - Sources, patterns and consequences, edited by A. & M. Etzioni (second edition) New York, Basic Books, 1964, pp.15-26.
- Coombs, C.H. Psychological scaling without a unit of measurement. *Psychological Review*, vol.57. 1950, pp.145-158.
- Cooper, R.G. Project New-Prod. McGill University, 1979.
- Cooper, R.G. Why new industrial products fail. *Industrial Marketing Management*, December 1975, pp.315-326.
- Coughlan, R.J., R.A. Cooke, & L.A. Safer, Jr. An assessment of a survey feedback- Problem solving- Collective decision intervention in schools. Final Report, U.S. Office of Education, Small Grant Division, Area V. Project No. O-E-105, Contract No. OEG-5-70-0036(509).
- Cournot, A. Recherches sur les principes mathématiques de la théorie des richesses. Paris, Louis Hachette, 1838. (English version: *Researches into the mathematical principles of the theory of wealth*. New York, Augustus M. Kelley, 1960.)
- Cox, W.E., Jr. Industrial marketing research. New York, John Wiley and Sons, 1979.
- Crow, L.W., R.W. Olshavski, & J.O. Summers. Industrial buyers' choice strategies: a protocol analysis. *Journal of Marketing Research*, vol.17, 1980, pp.34-44.
- Crozier, M., & E. Friedberg. L'acteur et le système. Paris, Editions du Seuil, 1977. (English edition: *Actors and systems*. Chicago Press, 1980)
- Crozier, M. Implications for the organisation. In New office technology: human and organisational aspects, edited by H.G. Otway and M. Peltu. London, Frances Pinter Ltd, 1983, pp.86-101.

BIBLIOGRAPHY

- Cycle Supérieur de Sociologie de l' Institut d'Etudes Politiques de Paris. Exercice d'analyse d'une situation vécue. Paris, March 1985. (Course note, with permission)
- Cyert, R.M., & J.G. March. A behavioural theory of the firm. Englewood Cliffs, N.J., Prentice-Hall, Inc., 1963.
- Czepiel, J.A. The diffusion of major technological innovation in a complex industrial community: an analysis of social processes in the American steel industry. Ph.D. thesis, Northwestern University, 1972.
- Czepiel, J.A. Word of mouth processes in the diffusion of a technological innovation. Journal of Marketing Research, vol.11, 1974, pp.172-180.
- Dalton, G.W., et al. The distribution of authority in formal organisation. Boston, Harvard University Division of Research, 1968.
- Dandridge, T.C. Celebrations of corporate anniversaries: an example of modern organisational symbols. Working paper, State University of New York at Albany, 1979.
- D'Arcy W. Thompson. On growth and form. Cambridge University Press, 1942.
- Davies, S. The diffusion of process innovations. Cambridge University Press, 1979.
- Deal, T.E., & A.A. Kennedy. Corporate Cultures; the rites and rituals of corporate life. Reading, Mass., Addison-Wesley Publishing Company, 1982.
- Descartes, R. Discours de la méthode pour bien conduire sa raison. Paris, Union Générale d'Édition, 1951. (modern edition)
- Descartes, R. A discourse on method: method of right conducting the reason ... Translated from the French by J. Veitch. London, J.M. Dent and Sons, Ltd., 1957.
- Deutsch, K.W. The nerves of government: models of political communication and control. New York, The Free Press, 1961.
- Dimock, M. A philosophy of administration. New York, Harper, 1958.
- Drevdahl, J.E. Factors of importance for creativity. Journal of Clinical Psychology, vol.12 (21), 1956.
- Dyas, G.P., & H.T. Thanheiser. The emerging european enterprise, strategy and structure in French and German industry. London, Macmillan, 1976 .

BIBLIOGRAPHY

- Dyckman, T.R. The intelligence of ambiguity. *Accounting, Organisations and Society*, vol.6 (4), 1981, pp.291-300.
- Eckrich, D.W., & J.P. Peter. Identifying adopter categories: a suggested design. *AMA Combined Proceedings*, No.37, 1975, pp.187-190.
- Edwards, P. (Editor in chief) *The encyclopedia of philosophy*. New York, the Macmillan Company and the Free Press, 1967.
- El-Sherbeny, A.F.M. Behavioural and organisational influences upon the adoption of industrial products innovation. Ph.D. thesis, University of Strathclyde, 1978.
- Emery, F.E., & E.L. Trist. The causal texture of organisational environment. *Human Relations*, Vol.18, 1965, pp.21-32.
- Engel, J.F., D.T. Kollat, & R.D. Blackwell. *Consumer behaviour*. New York, Holt, Rinehart & Winston, Inc., 1968.
- Evan, W.M. Indices of the hierarchical structure of industrial organisation. *Management Science*, vol.9, 1963, pp.468-477.
- Festinger, L. *A theory of cognitive dissonance*. New York, Harper, 1957.
- Finetti, de, B. *Probability, induction, and statistics: the art of guessing*. New York, John Wiley and Sons, Inc., 1972.
- Fitzpatrick, M.A. Book review of: *Life on television: content-analysis of United States T.V. drama*. (a book by B.S. Greenberg). *Quarterly Journal of Speech*, vol.68, 1982, pp.341 and 342.
- Fliegel, F.C., J.E. Kivlin, & G.S. Sekhon. A cross cultural comparison of farmers' perception of innovations as related to adoption behaviour. *Rural Sociology*, vol.33, December 1968, pp.437-449.
- Forehand, G.A., & B. Gilmer. Environmental variations in studies of organisational behaviour. *Psychological Bulletin*, vol.62 (6), December 1964.
- Forrester, J. *Principles of systems*. Cambridge, Wright Allen Press, 1969.
- Foucault, M. *Histoire de la sexualite, tome I: la volonte de savoir*. Paris, Gallimard, 1976.
- Foxall, G. Marketing models of buyer behaviour: a critical review. *European Research*, September 1980, pp.195-206.

BIBLIOGRAPHY

- Fung, L.W., & K.-S. Fu. An axiomatic approach to rational decision-making in a fuzzy environment. In Fuzzy sets and their applications to cognitive and decision processes, edited by L.A. Zadeh, K.-S. Fu, K. Tanaka, & M. Shimura. New York, Academic Press, Inc., 1975, pp.227-256.
- Galtun, J. On power. In Global planning and resource management: towards international decision-making in a divided world, edited by A.J. Dolman. New York, Pergamon Press, 1980, pp. 119-145.
- Gavin, J.F. Organisational climate as a function of personal and organisational variables. *Journal of Applied Psychology*, vol.60 (1), pp.135-139.
- Georgopoulos, B.S. Normative structure variables and organisational climate. *Human Relations*, vol.18, 1965, pp. 115-170.
- Ghertman, M. La prise de décision. Paris, Presses Universitaires de France, 1981.
- Gibson, D.V. Determinants of organisational structure and process: technological versus cultural explanations concerning innovation management. Ph.D. thesis, Stanford University, 1983.
- Gilmer, B. Industrial psychology (second edition). New York, McGraw - Hill, 1965. (Mentioned by M.J. Baker, in Industrial Buying Behaviour, op.cit., p.351.)
- Gödel, K. On completeness and consistency. In Two fundamental texts in mathematical logic, edited by Van Heijenoort. Cambridge, Mass., Harvard University Press, 1970.
- Goffman, E. The presentation of self in everyday life. New York, Doubleday, 1959.
- Gordon, W.J.J. Synectics: the development of creative capacity. New York, Harper, 1961.
- Grayling, A.C. An introduction to philosophical logic. Brighton, Harvester Press Ltd, 1982.
- Greene, de, K. Sociotechnical systems: factor analysis, design and management. Englewood Cliffs, N.J., Prentice-Hall, Inc., 1973.
- Gregory, S.A. (Editor) Creativity and innovation in engineering. London, Butterworths, 1972.
- Grinyer, P.H., M. Yasai-Ardekany, & S. Shawki Al-Bazzaz. Strategy, structure, the environment, and financial performance in 48 United Kingdom companies. *Academy of Management Journal*, vol.23, 1980, pp.193-226.
- Grossman, J.B. The Supreme Court and social change. *American Behavioural Scientist*, vol.4, 1970.

BIBLIOGRAPHY

- Gulas, S. Possibilities of taking advantage of psychotronics in creative activity with substituting the factor of casualness by the factor of information. Paper presented at the first International Conference on Psychotronics and Parapsychological Research, Prague, 19 June 1973.
- Gulfillan, S.C. The sociology of invention. Chicago, University of Chicago Press, 1935.
- Guttman, L. The basis for scalogram analysis. In Measurement and prediction, edited by S.A. Stouffer. Princeton, N.J., Princeton University Press, 1950.
- Haefele, J.W. Creativity and innovation. New York, Reinhold, 1962.
- Hagen, C.E. On the theory of social change. Homewood, Ill., Dorsey Press, 1962.
- Hage, J., & Aiken, M. Social change in complex organisations. New York, Random House, 1970.
- Haire, Mason. Size, shape and function in industrial organisations. Human Organisations, vol.14(1), 1955, pp.17-22.
- Hakanson, H., & B. Wootz. Supplier selection in an industrial environment: an experimental study. Journal of Marketing Research, vol.12, February 1975, pp.46-51.
- Hakanson, H. (Editor) International marketing and purchasing of industrial goods: an interaction approach. New York, Wiley, 1982.
- Hall, R.H., J.E. Hass, & J.N. Johnson. Organisational size, complexity and formalisation. American Sociological Review, vol.32, 1967, pp.903-912.
- Hall, R.H. The concept of bureaucracy; an empirical assessment. American Journal of Sociology, vol.69, 1963, pp.32-40.
- Handy, C.B. Understanding organisations (second edition). Harmondsworth, Penguin Books, 1982.
- Harlow, H.F., & C. Mears. The human model: primate perspectives. London, Wiley, 1979.
- Harre, R., & P.F. Secord. The explanation of social behaviour. Oxford, Blackwell, 1972.
- Harvey, E., & R. Mills. Pattern of organisational adaptation: a political perspective. In Power in organisations, edited by Mayer N. Zald. Nashville, Tenn., Vanderbilt University Press, 1970.

BIBLIOGRAPHY

- Harvey, E. Technology and the structure of organisation. *American Sociological Review*, vol.33, 1968, pp.247-259.
- Heidegger, M. Poetry, language, thought - The origin of work of art. Translated from German by A. Hofstadter. New York, Harper and Row, 1971.
- Hellriegel, D., & J.W. Slocum. Organisational climate: measures, research, and contingencies. *Academy of Management Journal*, vol.17 (2), 1974.
- Henderson, J.M., & R.E. Quandt. Microeconomics theory: a mathematical approach. New York, McGraw-Hill, 1958.
- Herzberg, F. Work and the nature of men. Cleveland, World Publishing Company, 1966.
- Hickson, D.J., et al. The culture-free context of organisation culture: a tri-national comparison. *Sociology*, vol.8, 1974, pp.59-81.
- Hickson, D.J., et al. A strategic contingency theory of intra-organisational power. *Administrative Science Quarterly*, vol.16 (2), pp. 216-229.
- Hickson, D.J., et al. Operation technology and organisation structure: an empirical reappraisal. *Administrative Science Quarterly*, vol.14, 1969, pp.378-397.
- Hillier, T. Decision-making in the industrial buying process. Ph.D. thesis, The Management Center, University of Bradford, 1972.
- Hillier, T. Decision-making in the corporate industrial buying process. *Industrial Marketing Management*, June 1975, pp.99-106.
- Hill, W. How organisational philosophy influences management development. *Personnel Journal*, vol.59 (2), 1980, pp.118-120.
- Hill, W. The nature of industrial buying decisions. *Industrial Marketing Management*, vol.2 (1), 1972, pp.45-55.
- Hinings, C.R., et al. An approach to the study of bureaucracy. *Sociology*, vol.1, 1967.
- Hippel, E.A., von. Transferring process equipment innovations from user-innovators to equipment manufacturing firms. *R & D Management*, October 1977.
- Hippel, E.A., von. Successful industrial products from customer ideas. *Journal of Marketing*, vol.42 (1), January 1978, pp.39-49.

BIBLIOGRAPHY

- Holt, K. Product innovation. London, Newness-Butterworths, 1977.
- Homans, G.C. The human group. New York, Harcourt, Brace, 1950.
- Homans, G.C. Contemporary theory in sociology. In Handbook of modern sociology, edited by R.E.L. Faris. Chicago, Rand McNally & Co., 1964, pp.951-977.
- Hoogendoorn, D. The system of human organisation and the cybernetic view of management. Proceedings of the 6th International Congress on Cybernetics. Namur, Belgium, September 1970, pp.994-1010.
- Hopkins, D.S., & E.L. Bailey. New-product pressures. The Conference Board Record, vol.7 (6), June 1971.
- Howard, R.A., J.E. Matheson, & K.L. Miller. Reading in decision analysis. Menlo Park, Cal., Stanford Research Institute, Decision Analysis Group, 1976.
- Huber, G.P. Organisational science contributions to the design of decision support systems. In Decision support systems: issues and challenges, edited by G. Fick & R.H. Sprague, Jr. Oxford, Pergamon Press Ltd, 1980, pp.45-55.
- Huczinski, A.A., & I.B. Mmubuosi. Introduction to phenomenology and its application to social science research. Working paper, University of Glasgow, Department of Management Studies, 1983.
- Husserl, E. Formale und transzendente Logik. Halle, Niemeyer, 1929.
- Hutt, M.D., & T.W. Speh. Industrial marketing management. New York, CBS College Publishing, The Dryden Press, 1981.
- Isenson, R. Project Insight: an empirical study of the sources of ideas utilised in operational weapon systems. In Factors in the transfer of technology, edited by W. Gruber & D. Marquis. Cambridge, Mass., MIT Press, 1969.
- Jabes, J. Individual decision-making. In Decision-making: approaches and analysis, edited by A.G. McGrew & M.J. Wilson. Manchester, Manchester University Press, 1982, pp.53-59.
- Jager, H.W. Market segmentation and innovation. European Journal of Marketing, vol.14 (9), 1980.
- James, R., & A.F. Jones. Organisational climate, a review of theory and practice. Psychological Bulletin, vol.81, 1974, pp.1074-1112.
- Jantsch, E. Technological forecasting in perspective. Paris, OECD, 1967.

BIBLIOGRAPHY

- Kant, I. Critique of practical reason. London-New York, Garland, 1976. (modern edition)
- Kant, I. Critique of pure reason. Translated from German by J.M.D. Meiklejohn. London, G. Bell & Sons, Ltd., 1924. (modern edition)
- Kaplan, M.F., & S. Schwartz. Human judgment and decision processes in applied settings. New York, Academic Press, Inc., 1977.
- Katz, D., & E. Stotland. A preliminary statement of a theory of attitude structure and change. In Psychology: a study of science, edited by S. Koch (vol.3) New York, McGraw-Hill, 1959.
- Katz, D., & R. Kahn. The social psychology of organisation. New York, Wiley, 1966.
- Katz, D. The functional approach to the study of attitudes. Public Opinion Quarterly, vol.24, 1960, pp.163-264.
- Keen, P.G.W., & M.S.S. Morton. Decision support systems: an organisational perspective. Reading, Mass., Addison-Wesley Publishing Company, 1978.
- Kmietowicz, Z.W., & A.D. Pearman. Decision theory and incomplete knowledge. Aldershot, Hampshire, Gower Publishing Company, Ltd, 1981.
- Knight, K. A descriptive model of the intra-firm innovation process. Journal of Business, vol.40, October 1967, pp.478-496.
- Kolb, D. On management and the learning process. In Organisational psychology, edited by D. Kolb, I. Rubin, & J. Intyre. Englewood Cliffs, N.J., Prentice-Hall, Inc., 1974.
- Krishnamurthy, R. Some adaptations of innovation diffusion models. D. Eng. thesis, Asian Institute of Technology, Thailand, 1981.
- Kuhn, T.S. The structure of scientific revolutions (second edition, enlarged). Chicago, University of Chicago Press, 1970.
- Lancaster, R. Consumer demand, a new approach. New York-London, Columbia University Press, 1971.
- Langrish, J., M. Gibbons, W.G. Evans & F.R. Jevons. Wealth from knowledge. London-New York, Macmillan, 1972.
- Larçon, J.P., & R. Reitter. Structures de pouvoir et identité de l'entreprise. Paris, Nathan, 1979.
- Lavoisier, A.L. Traité élémentaire de chimie, présenté dans un ordre nouveau et d'après les découvertes modernes. Paris, Cuchet, 1789.

BIBLIOGRAPHY

- Lawrence, P.R., & J.W. Lorsch. Organisation and environment: managing differentiation and integration. Harvard Business School, 1967.
- Lawrence, P.R., & J.W. Lorsch. Developing organisations: diagnosis and action. Reading, Mass., Addison-Wesley, 1969.
- Lederrey, J.L. Création d'entreprises: l'Europe a besoin d'une "industrie du capital-risque". Journal de Genève, JA No. 110, Mai 1985.
- Lehman, D.R., & J. O'Shaughnessy. Differences in attitude importance for different industrial products. Journal of Marketing, vol.38, April 1974, pp.36-42.
- Le Moigne, J.-L. La théorie du système général. Paris, Presses Universitaires de France, 1977.
- Likert, R.A. A technique for the measurement of attitudes. Archives of Psychology, No.140, 1932, pp.1-55.
- Likert, R. New patterns of management. New York, McGraw-Hill, 1960.
- Lindblom, C.E. The intelligence of democracy. New York, Wiley, 1958.
- Linton, R. The study of man. New York, Appleton-Century-Crofts, 1936.
- Lin, N., & G. Zaltman. Dimensions of innovations. In Processes and phenomena of social change, edited by G. Zaltman. New York, Wiley-Interscience Publication, 1971, pp.656-657.
- Littler, D.A. How to lessen the risk factor in innovation. Industrial Advertising and Marketing, vol.11 (1), 1974, p.33.
- Litwak, E., & L.F. Hylton. Interorganisational analysis: a hypothesis on coordinating agencies. Administrative Science Quarterly, vol.6 (4), 1962, pp.395-420.
- Litwin, G.H., & R.A. Stringer. Motivation and organisational climate. Division of Research, Graduate School of Business Administration, Harvard University, Boston, 1968.
- Litwin, G.H., & R. Stringer. The influence of organisational climate in human motivation. Paper presented at a conference on organisational climate, Foundation for Research on Human Behaviour, Ann Arbor, March 1966.
- Luce, R.D., & H. Raiffa. Games and decisions. New York, John Wiley and Sons, Inc., 1957.
- Lupton, T. On the top floor. London, Pergamon, 1963.

BIBLIOGRAPHY

- Lynton, R.P. Linking an innovative subsystem into the system. *Administrative Science Quarterly*, vol.14 (3), 1969, pp.398-416.
- Mansfield, E., & S. Wagner. Organisational and strategic factors associated with probabilities of success in industrial R & D. *Journal of Business*, vol.48, April 1975, pp.178-198.
- Mansfield, E. *The economics of technological change*. New-York, Norton, 1968.
- Mansfield, E. The speed of response of firms to new techniques. *Quarterly Journal of Economics*, May 1963.
- March, J.G. For a technology of foolishness. In Organisations of the future, edited by H. Leavitt, L. Pinfield, & E. Webb. New York, Praeger Publishers, 1974.
- March, J.G. The technology of foolishness. In Ambiguity and choice in organisations, edited by J.G. March & J.P. Olsen. Bergsen-Oslo, Universitetsforlaget, 1976, pp. 69-81.
- March, J.G., & J.P. Olsen. *Ambiguity and choice in organisations*. Oslo, Universitetsforlaget, 1976.
- March, J.G., & J.P. Olsen. Organisational choice under ambiguity. In Ambiguity and choice in organisations, edited by J.G. March and J.P. Olsen. Oslo, Universitetsforlaget, 1976, pp. 15-16.
- March, J.G., & H.A. Simon. *Organisations*. New York, John Wiley, 1958.
- Marchione, A.R., & J. English. Managing the unpredictable... A rational plan for coping with change. *Management Review*, vol.71 (2), 1982, pp.52-57.
- Marcuse, H. Industrialisation and capitalism. In Max Weber and sociology today, edited by O. Stammer. New York, Harper and Row, 1971.
- Marret, C.B. On the specification of interorganisation dimensions. *Sociology and Social Research*, vol.61, 1972, pp.83-99.
- Martilla, J.A. Word of mouth communication in the industrial adoption process. *Journal of Marketing Research*, vol.8, 1971, pp.173-178.
- Martin, J., & M.E. Powers. Truth or corporate propaganda: the value of a good war story. In Organisational symbolism, edited by L.R. Pondy, P. Frost, G. Morgan, & T. Dandridge. Greenwich, C.T., JAI Press (forthcoming).
- Maslow, A.H. *Motivation and personality*. New York, Harper, 1954.

BIBLIOGRAPHY

- Materials Advisory Board, Division of Engineering, National Research Council. Report on the Ad Hoc Committee on Principles of Research-Engineering Interaction, Publication MAB-222-M. Washington, D.C., National Academy of Sciences-National Research Council, July 1966, pp.15-16.
- Materna, A.T. Study of management factors affecting innovation diffusion of high technology. Ph.D. thesis, Claremont Graduate School, 1981.
- Mayo, E. The social problems and industrial civilisation. Cambridge, Mass., Harvard University Press, 1939.
- McGregor, D. The human side of enterprise. New York, McGraw-Hill, 1960.
- McGrew, A.G., & M.J. Wilson (Editors). Decision-making: approaches and analysis. Manchester, Manchester University Press, 1982.
- Meadows, D. Estimate accuracy and project selection models in industrial research. Industrial Management Review, Spring 1969.
- Meadows, D. Data Appendix: accuracy of technical estimates in industrial research planning. MIT, Sloan School of Management, Working paper No.301-67, 1967.
- Metayer, G. Cybernétique et organisation. Proceedings of the 6th International Congress on Cybernetics. Namur, Belgium, September 1970, pp.773-787.
- Miller, E.J., & A.K. Rice. Systems of organisation: the control of task and sentient boundaries. London, Tavistock, 1967.
- Miller, D.W., & M.K. Starr. Executive decisions and operations research. Englewood Cliffs, N.J., Prentice-Hall, 1960.
- Milo, N. Health care organisations and innovations. Journal of Health and Social Behaviour, vol.12, 1971, pp.163-173.
- Mintzberg, H. The nature of managerial work. Englewood Cliffs, N.J., Prentice-Hall, Inc., 1973.
- Mobley, W.H., & B.M. Meglino. A behavioural choice model analysis of the budget allocation behaviour of academic deans. Academy of Management Journal, vol.20, 1977, pp.564-572.
- Mohr, L.B. Organisations, decisions and courts. Law and Society Review, vol.10, 1976, pp.621-642.
- Morse, J., & J. Lorsch. Beyond theory Y. Harvard Business Review, May-June 1970. Mentioned by Handy, C.B., in Understanding Organisations (second edition) Harmondsworth, Penguin Books, 1981, p.202.

BIBLIOGRAPHY

- Moser, C.A., & G. Kalton. Survey methods in social investigation (second edition). London, Heinemann Educational Books, 1981.
- Murray, J.A. Toward a contingency model of strategic decision. International Studies of Management and Organisation, vol.8 (4), Winter 1978-1979, pp.7-34.
- Myers, S., & D.G. Marquis. Successful industrial innovations. National Science Foundation, NSF 69-17, 1969.
- Nabseth, L., & G.F. Ray (Editors). Diffusion of new industrial processes: an international study. Cambridge University Press, 1974.
- Narayanan, V.K., & L. Fahey. The micro-politics of strategy formulation. Academy of Management Review, vol.7 (1), 1982, pp.25-34.
- Newell, A., & H.A. Simon. Human problem solving. Englewood Cliffs, N.J., Prentice-Hall, Inc., 1972.
- Nicholson, R.L.R. Technological forecasting as a management technique. HMSO, 1968.
- Normann, R. Organisational innovativeness: product variation and reorientation. Administrative Science Quarterly, vol.16(4), 1971, pp.203-215.
- Offenberg, R.M., & V. Cernius. Assessment of idiographic organisational climate. Journal of Applied Behavioural Science, vol.14 (1), 1978, pp.79-86.
- Osgood, C.E., et al. The measurement of meaning. Urbana, Ill., University of Urbana Press, 1957.
- Ozanne, U.B., & G.A. Churchill, Jr. Five dimensions of the industrial adoption process. Journal of Marketing Research, vol.8, 1971, pp.322-328.
- Paolillo, J.G., & W.B. Brown. How organisational factors affect R & D innovation. Research Management, vol.21 (2), 1978, pp.12-15.
- Papineau, D. Theory and meaning. Oxford, Clarendon Press, 1979.
- Parker, J.E.S. The economics of innovation - The national and multinational firm in technological change. London, Longman, 1974.
- Parkinson, S.T. The role of information in the adoption of industrial innovation. M.Sc. thesis, University of Strathclyde, 1975.
- Parson, T. Essays in sociological theory, pure and applied. Glencoe, Ill., The Free Press, 1949.

BIBLIOGRAPHY

- Pascale, R.T., & A.G. Athos. The art of Japanese management (third edition). New York, Penguin Books, 1983.
- Payne, J.W. Task complexity and contingent processing in decision-making: an information search and protocol analysis. *Organisational Behaviour and Human Performance*, vol.16, 1976, pp.366-387.
- Peplow, M.E. Design acceptance. In The design method, edited by S.A. Gregory. London, Butterworths, 1960.
- Perrow, C. A framework for the comparative analysis of organisations. *American Sociological Review*, vol.32, 1967, pp.194-208.
- Perrow, C. *Organisational analysis: a sociological view*. London, Tavistock, 1970.
- Peters, M.P., & M. Venkatesan. Exploration of variables inherent in adopting an industrial product. *Journal of Marketing Research*, vol.10, 1973, pp.312-313.
- Peters, T.J., & R.H. Waterman. *In search of excellence*. New York, Harper and Row, 1982.
- Peters, T.J. Symbols, patterns and settings: an optimistic case for getting things done. *Organisational Dynamics*, vol.7, 1978, pp.3-29.
- Pettigrew, A.M. On studying organisational cultures. *Administrative Science Quarterly*, vol.24, 1979, pp.570-581.
- Pfeffer, J. Management as symbolic action: the creation and maintenance of organisational paradigms. In Research in organisational behaviour, edited by L.L. Cummings & B.M. Staw. Greenwich, C.T., JAI Press, 1981, vol.3, pp.1-52.
- Pondy, L.R., & I.I. Mitroff. Beyond open system models of organisation. In Research in organisational behaviour, edited by L.L. Cumings & B.M. Staw. Greenwich, C.T., JAI Press, vol.1, 1979, pp.3-39.
- Popper, K.R. *The logic of scientific discovery* (fifth edition, first published 1935). London, Hutchinson & Co., 1968.
- Porter, L.W., & E.E. Lawler. Properties of organisation structure in relation to job attitudes and job behaviour. *Psychological Bulletin*, vol.64, 1965, pp.23-51.
- Pras, B., & J.-Cl. Tarondeau. *Comportement de l'acheteur*. Paris, Editions Sirey, 1981.
- Prince, G.M. *The practice of creativity: a manual for group problem solving*. New York, Harper and Row, 1970.

BIBLIOGRAPHY

- Pritchard, R., & B. K. Karasick. The effects of organisational climate on managerial job performance and job satisfaction. *Organisational Behaviour and Human Performance*, vol.10, 1973.
- Pugh, D.S., et al. The context of organisational structures. *Administrative Science Quarterly*, vol.14, 1969, pp.91-114.
- Pugh, D.S., et al. Dimensions of organisation structure. *Administrative Science Quarterly*, vol.13, 1968, pp.65-105.
- Quinn, R.E., & M.R. MacGrath. Moving beyond the single solution perspective: the competing values approach as a diagnostic tool. *Journal of Applied Behavioural Science*, vol.18 (4), 1982, pp.463-472.
- Quinn, J.B. Managing innovation: controlled chaos. *Harvard Business Review*, May-June 1985, pp.73-84.
- Ragade, R.K. Fuzzy sets in communication systems and in consensus formation systems. *Journal of Cybernetics*, vol.6, 1976, pp.21-38.
- Rawls, J. A theory of justice. Oxford, Clarendon Press, 1972.
- Reve, T., & L.W. Stern. Interorganisation relations in marketing channels. *Academy of Management Review*, vol.4 (3), 1979, pp.405-416.
- Richardson, J.J., & A.G. Jordan. Governing under pressure. London, Martin Robertson & Co. Ltd., 1979.
- Rickards, T. Brainstorming in an R & D environment. *R & D Management*, vol.3, June 1973.
- Robinson, P.J., & C.W. Faris. Industrial buying and creative marketing. Boston, Allyn and Bacon, 1967.
- Robinson, P., & C.W. Faris. Industrial buying and creative marketing. Boston, Allyn and Bacon, 1967.
- Roethlisberger, F.G., & W.J. Dickson. Management and the worker. Cambridge, Mass., Harvard University Press, 1939.
- Rogers, E.M. Diffusion of innovations. New York, The Free Press, 1962.
- Rogers, E.M., & F. Shoemaker. Communication of innovations: a cross cultural approach (second edition). New York, The Free Press, 1971.
- Rosenberg, M.J. A structured theory of attitude dynamics. *Public Opinion Quarterly*, vol.24, 1960, pp.319-340.

BIBLIOGRAPHY

- Rosenberg, M.J. An analysis of affective cognitive consistency. In Attitude organisation and change, edited by C.I. Hovland & M.J. Rosenberg. New Haven, Conn., Yale University Press, 1960, pp.15-64.
- Rothberg, R.R. (Editor) Corporate strategy and product innovation (second edition). New York, The Free Press, 1981.
- Rothwell, R., C. Freeman, A. Horsley, V.T.P. Jervis, A.B. Robertson, & J. Townsend. Sappho updated - Project Sappho phase II. Research Policy, vol.3, 1974, pp.258-291.
- Rothwell, R. From invention to new business via the new venture approach. Management Decision, vol.13 (1), 1975, p.15.
- Rousseau, J.-J. Du contrat social. Paris, Union Générale d'Édition, 1973. (modern edition)
- Sands, S., & K.M. Warwick. Successful business innovation: a survey of current professional views. California Management Review, vol.20 (2), 1977, pp.5-16.
- Savage, L.J. The foundations of statistics. New York, John Wiley and Sons, Inc., 1954.
- Schein, E.H. Organisational psychology. Englewood Cliffs, N.J., Prentice Hall, 1965.
- Schumpeter, J. Business cycles. New York, McGraw-Hill, 1939.
- Schütz, A. Der sinnhafte Aufbau der sozialen Welt: ein Einleitung in die verstehende Soziologie. Vienna, Julius Springer, 1932.
- Scott, J.E., & P.D. Bennet. Cognitive models of attitude structure: "value importance" is important. In Relevance in marketing: problems, research, action, edited by F.C. Allvine. Chicago, AMA, 1971.
- Scott, W.G. Organisation theory: an overview and an appraisal. Academy of Management Journal, vol.4, April 1961, pp.7-26.
- Secord, P.F., & C.W. Backman. Theories of attitude organisation. In Concepts and controversy in organisational behaviour, edited by W.R. Nord. Pacific Palisades, Cal., Goodyear Publishing Company, Inc., 1972, pp.398-342.
- Sfez, L. Critique de la décision. Paris, Armand Colin, 1973.
- Shannon, C.E. The mathematical theory of communication (fifth edition, first published 1949). Urbana, Ill., University of Illinois Press, 1972.
- Shepard, H.A. Innovation-resisting and innovation-producing organisations. Journal of Business, vol.40 (4), 1967, pp.470-477.

BIBLIOGRAPHY

- Sheth, J.N. A model of industrial buying behaviour. *Journal of Marketing*, vol.37, 1973, pp.50-56.
- Sheth, J.N. Présentation d'un model de comportement des acheteurs industriels. *Encyclopédie du Marketing*, vol.1, 1976, pp.1-8.
- Sheth, J.N. Recent developments in organisational buying behaviour. University of Illinois, College of Commerce and Business Administration. Working paper No.317, August 1976.
- Shrink, J.L., E.D. Poole, & R.M. Regoli. Sexual myths and ridicule: a content analysis of rape jokes. *Psychology*, vol.19, 1982, pp.1-6.
- Simon, H.A. Administrative behaviour (second edition). New York, Macmillan Company, 1957.
- Simon, H.A. Models of man. New York, Wiley, 1957.
- Simon, H.A. The new science of management decision. New York, Harper and Row, 1960.
- Simon, H.A. From substantive to procedural analysis. In Method and appraisal in economics, edited by S.J. Latsis. Cambridge, Cambridge University Press, 1976, pp.129-149.
- Simon, H.A. The sciences of the artificial (second edition, first published 1969). Cambridge, Mass., MIT University Press, 1981.
- Singh, J. Information theory, language and cybernetics. London, Constable & Co., Ltd., 1966.
- Smircich, L. Concepts of culture and organisational analysis. *Administrative Science Quarterly*, Vol.28, 1983, pp.339-358.
- Soelberg, P. Unprogrammed decision-making: Papers and Proceedings, 26th Annual Meeting. Academy of Management, December 1966, pp.27-29.
- Spillman, B., J. Bezdek, & R. Spillman. A study of coalition formation in decision-making groups: an application of fuzzy mathematics. *Kybernetes*, vol.8, 1979, pp.203-211.
- Spillman, B., R. Spillman, & J. Bezdek. A fuzzy analysis of consensus in small groups. In Fuzzy sets: theory and applications to policy analysis and information systems, edited by P.P. Wang & S.K. Chang. New York, Plenum Press, 1980, pp. 291-308.
- Steiner, G. The creative organisation. Chicago, University of Chicago Press, 1965.
- Stephenson, W. The study of behaviour: Q-technique and its methodology. Chicago, University of Chicago Press, 1953.

BIBLIOGRAPHY

- Stevens, S.S. Mathematics, measurement, and psychophysics. In Handbook of experimental psychology, edited by S.S. Stevens. New York, Wiley, 1951.
- Stopford, J.M. Growth and organisational change in the multinational firm. D.B.A. dissertation, Harvard Business School, 1968.
- Tagiuri, R. The concept of organisational climate. In Organisational climate: exploration of a concept. Boston, Harvard University Press, 1968.
- Tarde, G. The laws of imitation. New York, Henry Holt & Co., 1903. (Quoted by M.J. Baker in Industrial buying behaviour, op.cit.).
- Taylor, J. Introducing social innovation. Journal of Applied Behavioural Science, vol.6, 1970, pp.69-77.
- Terborgh, G. Business investment policy. Washington, D.C., Machinery and Allied Products Institute, 1978, p.52.
- Theil, H. Applied economic forecasting. Amsterdam, North Holland Publishing Company, 1966.
- Thom, R. Structural stability and morphogenesis: an outline of a general theory of models. Translated from the French by D.H. Fowler. Reading, Mass., W.A. Benjamin, Inc., 1975.
- Thompson, V.A. Bureaucracy and innovation. University, Alabama, University of Alabama Press, 1969.
- Thurstone, L.L. (Editor) The measurement of social attitudes. Chicago, Chicago University Press, 1929, pp.129-134.
- Tilton, J.E. International diffusion of technology- The case of semi-conductors. Washington, D.C., The Breeking Institution, 1971.
- Tinbergen, J. Economic policy: principles and design. Amsterdam, North Holland Publishing Company, 1956.
- Torgerson, W.S. Theory and methods of scaling (sixth edition). New York, Wiley, 1965.
- Trice, H.M., & J.M. Beyer. The ceremonial effect: manifest function or latent dysfunction in the dynamic organisation. Paper presented at the Conference on Myths, Symbols, and Folklore: Expanding the Analysis of Organisations. Los Angeles, University of California, March 1983.
- Turner, B.A. Exploring the industrial subculture. London, Macmillan, 1971.
- Twiss, B.C. Managing technological innovation (second edition). London, Longman, 1980.

BIBLIOGRAPHY

- Utterback, J. The process of innovation: a study of the origination and development of ideas for scientific instruments. IEEE Transactions on Engineering Management, November 1971.
- Vickers, D. The theory of the firm: production, capital and finance. New York, McGraw-Hill, 1968.
- Vroom, V.H. Work and motivation. New York, Wiley, 1964.
- Walker, C.J., & R.H. Guest. The man on assembly line. Cambridge, Mass., Harvard University Press, 1952.
- Wang, P.P., & S.K. Chang (Editors) Fuzzy sets: theory and applications to policy analysis and information systems. New York, Plenum Press, 1980.
- Watts, R.D. The elements of design. In The design method. London, Butterworths, 1966.
- Weaver, W. Recent contribution to the mathematical theory of communication. In The mathematical theory of communication, by C.E. Shannon & W. Weaver (fifth edition, first published 1949). Urbana, Ill., University of Illinois Press, 1972, pp.1-28.
- Weber, M. Wirtschaft und Gesellschaft. Tubingen, 1922. (English translation by A.M. Henderson & T. Parsons: The theory of social and economic organisation. Glencoe, Ill., The Free Press, 1957.)
- Weber, M. Economy and society. Edited by G. Roth & C. Wittich. Berkeley, University of California Press, 1978.
- Weber, M. The protestant ethic and the spirit of capitalism. Translated by T. Parsons. New York, Scribner's, 1958.
- Weber, M. The theory of social and economic organisation. Translated from German by A.M. Henderson & T. Parsons. New York, the Free Press, 1947.
- Weber, M. Selections in translations. Edited by W.G. Runciman, translated by E. Matthews. Cambridge, Mass., Cambridge University Press, 1978.
- Webster, F., Jr. Industrial marketing strategy. New York, John Wiley and Sons, 1979.
- Webster, F., Jr., & Y. Wind. A general model for understanding organisational buying behaviour. Journal of Marketing, vol.36, April 1972, pp.12-19.
- Weiss, C.H. Knowledge creep and decision accretion. Social science research and decision-making. New York, Columbia University Press, 1980.

BIBLIOGRAPHY

- Whiteley, P. The analysis of contingency tables. In Data analysis and the social sciences, edited by D. McKay, N. Schofield, & P. Whiteley. London, Frances Pinter, 1983, pp.72-120.
- White, D.J. The nature of decision theory. In Theories of decision in practice, edited by D.J. Whyte & K.C. Bowen. London, Hodder & Sloughton, 1975.
- Whorton, J.W., & J.A. Worthley. A perspective on the challenge of public management: environmental paradox and organisational culture. Academy of Management Review, vol.6, 1981, pp.357-363.
- Whyte, W.F. Street corner society. Chicago, University of Chicago Press, 1941.
- Whyte, W.F. An intercultural context for organisational research. In Organisational behaviour, theory and application, edited by W.F. Whyte. Homewood, Ill., Irwin, Dorsey Press, 1969, pp.719-742.
- Wiener, N. Cybernetics: control and communication in the animal and the machine (third edition). New York, Wiley, 1949.
- Wiener, N. The human use of human beings: cybernetics and society (fourth edition). New York, Avon Books, 1970.
- Wiidt, A.R., & A.V. Bruno. The prediction of preference for capital equipment using linear attitude models. Journal of Marketing Research, vol.11, May 1974, pp.203-205.
- Wilkins, A., & J. Martin. Organisational legends. Working paper, Graduate School of Business, Stanford University, 1980.
- Williamson, O.E. Markets and hierarchies: analysis and antitrust implications. New York, The Free Press, 1975.
- Wind, Y., T.S. Robertson & C. Fraser. Industrial product diffusion by market segment. Industrial Marketing Management, vol.11 (1), 1982, pp.1-8.
- Wind, Y., & R. Cardozo. Industrial market segmentation. Industrial Marketing Management, vol.3, 1974, pp.153-166.
- Wind, Y. Applying the behavioural theory of the firm to industrial buying decisions. The Economic and Business Bulletin, vol.10, 1968, pp.22-28.
- Wind, Y. Issues and advances in segmentation research. Journal of Marketing Research, vol.15 (3), 1974, pp.318-337.
- Wind, Y. Organisational buying behaviour. In Review of marketing, edited by G. Zaltman & I. Bonoma. Chicago, AMA, 1978, pp.160-193.

BIBLIOGRAPHY

- Woodward, J. Management and technology. London, HMSO, 1958.
- Woodward, J. Industrial organisation: theory and practice. London, Oxford University Press, 1965.
- Woodward, J. (Editor) Industrial organisation: behaviour and control. London, Oxford University Press, 1970.
- Wrigley, L. Divisional autonomy and diversification. D.B.A. dissertation, Harvard Business School, 1970.
- Yager, R.R. Satisfaction and fuzzy decision functions. In Fuzzy sets: theory and applications to policy analysis and information systems, edited by P.P. Wang & S.K. Chang. New York, Plenum Press, 1980, pp.171-194.
- Zadbeh, L.A. Fuzzy sets. Information and Control, vol.8, 1965, pp.338-353.
- Zadeh, L.A. Calculus of fuzzy restrictions. In Fuzzy sets and their applications to cognitive and decision processes, edited by L.A. Zadeh, K.-S. Fu, K. Tanaka, & M. Shimura. New York, Academic Press, Inc., 1975, pp.1-39.
- Zadeh, L.A. & E. Polak. System theory. New York, McGraw-Hill, Inc., 1969.
- Zalesnik, A., & D. Moment. The dynamics of interpersonal behaviour. New York, Wiley, 1964.
- Zaltman, G., R. Duncan, & J. Holbeck. Innovations and organisations. New York, Wiley-Interscience Publication, 1973.
- Zwicky, F. The morphological method of analysis and construction, in Studies and essays. New York, Interscience, 1948.

SHARK CORPORATION

0. Introduction

The following analysis is based on a two-month study of Shark Corporation. The study was initiated when I was informed that a French software house had recently approached Shark to sell a decision support system.

Thanks to a contact in Shark, it was possible to be introduced to the Director of the Marketing Department and then to perform the interviews.

This case is a study of the response of a large French firm's marketing department to a proposal for innovation. From a techno-economic viewpoint, the innovation appears as a potential advantage for the department.

Moreover, the direct competitor of Shark has just adopted a similar system. However, Shark did not adopt the innovation and so the researcher's question is: Why was such a technically efficient tool, which has been purchased by an important competitor, rejected by the marketing department of an innovative and technologically advanced organisation ?

Far from neglecting the economic, financial and technical dimensions of the proposal, strategic analysis will be used in order to assess the extent to which these objective constraints and the formal relationships within the organisation enabled the actors to

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unfold strategies which resulted in the rejection of the proposal.

This investigation, and the answer it should bring to the introductory question, will be led through the following steps:

- (i) Presentation of the company;
- (ii) The Marketing Department: organisation, missions and objectives;
- (iii) The innovation system: principles and implications;
- (iv) The actors' experience: feelings and actions;
- (v) Analysis of the zones of uncertainty: organisational stakes, rationalities and strategies

1. Presentation of the Company

Shark Corporation is a multinational company incorporated in France. Its Head Office is located outside Paris and employs more than 500 people. Shark Corporation employs about 30,000 people, and is present in about 80 countries, where it runs several hundreds of plants and operates through about 200 subsidiaries.

Shark is mainly involved in the chemical industry, and its products have various applications in agriculture, papermaking, glassmaking, fine chemicals, pharmaceuticals, biology and medicine.

Shark is a highly innovative firm, and particular emphasis is put on R & D. Research is carried out in several centres located in the country.

In 1983, the company's net sales amounted to more than 20,000,000 thousand of French francs. Net earnings were in the

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range of 1,000,000 thousand of French francs.

Stability is an essential characteristic of the company and a critical success factor in terms of career is to have an engineering qualification, preferably from Ecole Polytechnique or Ecole Centrale.

The company appears as a mixture of tradition (and sometimes decrepitude) and dynamism. The Personnel Director illustrates this climate with a metaphor:

"Shark Corporation is a sparkling old Cadillac, able to catch up any brand new sport car. But what is there under its bonnet? I hope we will never have to open it. She would not survive a check..."

2. The Marketing Department: Organisation, Missions and Objectives

Shark Corporation is made up of several divisions, each of them managing various activities. The French network is divided into "regions", each region running its production plants and commercial units. Then, each region is divided into sales sectors. Within each of the divisions, the marketing functions are performed by sales engineers on an informal basis.

In fact, the company seems to have a product orientation, and marketing is often equated to selling and merchandising. The product orientation is most obvious at the engineer levels, of course, but even actors involved in planning and general management activities, including the definition of business strategies, seem keener on trying to design the best product than on trying to understand market needs.

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Actually, only the French Gases and Related Products Division has a department specialising in marketing. The specialisation of the Marketing Department (MD) is such that the various divisions can resort to it for studies and researches whose complexity exceeds the divisions' normal abilities. Actually, the MD can be considered as an internal consulting agency. The activity of the MD includes: conceiving, planning, organising and implementing market researches, commercial prospecting, merchandising researches and economic forecasting. The MD employs seven people: the Director of the department, the Vice-Director of the department, the Marketing Researcher, the Economic Forecasting Researcher, the Commercial Researcher and two secretaries.

2.1. The Director of the MD

Leon Robac is 62-year old and holds his engineer degree from Ecole Centrale. He is a specialist in metalurgy, a discipline in which he has become an indisputable expert after one year of training in a specialised training centre. After five years of service as chief engineer in the Working Stock Department, where he got to know all the various products of the company, Robac was appointed as the head of the MD, two years ago. Accordingly, he is in charge of negotiating the budget both with his staff and the general management, defining the conditions and deadlines for completion of the researches with the various divisions which may resort to the MD, supervising and co-ordinating the researches the department is asked to perform. Robac is currently expecting to be promoted to a position of regional director.

2.2. The Vice-Director of the MD

Alain du Paty, 37, is a chemist and attends evening English lectures at the University, in order to get a BA ("licence de lettres"). He was appointed only 18 months ago. Before, du Paty had worked for

various competitors as chief engineer. During his first 10 months at Shark Corporation, du Paty underwent a six-month marketing training (theory of consumer behaviour, segmentation theory, market evaluation theory). Then he had to visit some of the company's production plants in the country, while studying the firm's products and activities intensively. His main mission within the MD is to assist the Director in supervising the researches being carried on. Moreover, du Paty is in charge of proposing to the Director a set of measures in order to reorganise the department. The suggestions should include a new distribution of the specialisations and responsibilities within the MD. It seems that a significant aspect of this mission is to limit the Marketing Researcher's autonomy. Finally, if need be, the Vice-Director may have to define the plans of more complex commercial or marketing researches to be performed by other members of the staff. In the medium run, according to the success of his reorganisation proposal, du Paty could be promoted to the head of the MD, after Robac's promotion.

2.3. The Economic Forecasting Researcher

Pierre Guyard, 55, holds a degree from Ecole Supérieure des Sciences Economiques et Commerciales (ESSEC). He has always worked for Shark, and has held his current position since the MD was created. He is in charge of the economic forecasts and their use. Accordingly, his main concern is to assess the level of future demand, to estimate future prices and operating costs, and to foresee the evolution of economic trends. His methods usually resort to classical approaches such as time series analysis, linear or polynomial extrapolation and exponential smoothing. His work is regular and routine-like. Guyard will use the same indicators and parameters every year, and collecting this information is easy: the various series and chronologies are indicated in technological

publications while the various elements of the costs are available from the production divisions. Guyard's main task consists of achieving the forecasts he is asked to make within suggested time limits. The deadlines are usually decided after negotiations between Robac and the directors of the divisions interested in the forecasts. Guyard is said to be a particularly active unionist.

2.4. The Marketing Researcher

Jean-Jacques Villier, 48, holds a degree from Ecole Supérieure de Commerce de Paris (ESCP). It is worth noting that at the time when Villier was a student, ESCP had no marketing courses. Villier started his career at Shark and, before working for the MD - in which he has worked ever since the department was set up - Villier was in charge of defining the product catalogue. This mission involved frequent meetings with the customers and the sales engineers.

At present, Villier's mission consists of implementing studies related to customer and retailer attitudes and segmentation. Such work is very irregular, and may require considerable travelling in all the regions. Accordingly, a single survey may take as long as eight months, of which more than two thirds are spent in collecting data, while the rest of the time is spent writing the report. Then, one month may elapse before Villier is charged with another research. This intermediate period of relative inactivity is generally used to inform the various members of the interested divisions about the results of the survey. This feedback activity takes place in Paris and in the regions.

Respecting the time limits for his surveys is an imperative for Villier. However, it is on his ability to answer the real questions of the interested divisions that Villier will be assessed. This may cause some problems to Villier, as most of the researches are intended for technological divisions. Villier's business

degree does not predispose him to understand all the technological implications of the marketing researches he may be asked to perform. As a result, Villier will resort to Robac's expertise in technology in order to understand the nature of the problems faced by the other divisions, since these divisions will make decisions partly in the light of Villier's results. All Villier's reports are read and amended (if need be) by Robac before they are printed. When travelling, Villier's expenses are reimbursed to a certain extent. However, the bills must be accepted by the Director of the MD.

2.5. The Commercial Researcher

Michel Lemoine, 26, holds a degree from Ecole des Hautes Etudes Commerciales (HEC). He joined Shark Corporation immediately after his national service less than two years ago. His first year at Shark was devoted to complete a training programme, including visits to production plants in the various regions.

Unlike the other researchers, his present mission is not clearly defined. Lemoine is in charge of an organisation mission: he must propose a reorganisation of the relationships between the French Gases Division's sales engineers and their customers (mostly retailers). This mission implies a new definition of the nature and the management of the client lists as well as a new deal for the sales sectors and quotas for the sales engineers. This reorganisation should lead to a standardisation of the methods used by the sales engineers in approaching the retailers and transmitting information to the production divisions (type, nature, and quantity of the orders). Clearly, such a standardised and formalised system contrasts with the idiosyncratic way in which this information has been handled hitherto: each sales engineer has his own "note-book", in which information about his clients is maintained; the nature, structure and depth of this information vary according to

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the sales engineers. Each sales engineer considers his note-book as his own property and it is not rare to be told: "the day I am sacked, they will be pretty embarrassed when I take my note-book with me." Obviously, the standardised system would promote much more flexibility in the distribution of the sectors. Sectors could be exchanged and new sales engineers could readily have information about the sectors which they are appointed to manage. This would be the end of personal association of sectors to salesmen, and some sales engineers are already fearing they will have to change sector:

"If I am given a new sector, the company will lose the benefit of the excellent relationships I have built with the retailers there... No system of client listing would enable me to be accepted by the retailers of a new sector..."

In spite of the opposition of the sales engineers, Lemoine will be assessed on his ability to set up the system.

In terms of career, Guyard, Villier and Lemoine are facing different prospects. At Shark, being an engineer remains a critical success factor. According to the Personnel Director:

"The average executive here is from Centrale and views HEC and ESSEC as modern Sodom and Gomorrah... let alone the other business schools... However, the new Deputy Chairman holds a degree in business administration, this can mean a lot... And youth is always an asset here: a young man from HEC may hope to become a regional director, one day - if he manages to get respect from the engineers."

In other words, only Lemoine can anticipate a significant promotion.

3. The Innovation System: Principles and Implications

The mission of the Operational Research Department (ORD) of Shark Corporation is similar to that of the MD: under the request of the other departments or divisions, it may be asked to carry out various studies and works as an internal consulting agency. Most of these studies are related to optimisation of flows.

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The ORD is equipped with two Baleine micro-computers. This fact may explain why the ORD was contacted by SSII ("Societe de Service en Ingenierie Informatique") in its commercial approach to Shark Corporation. SSII specialises in designing and commercialising softwares and turn-key packages usable on Baleine hardwares. SSII had recently appointed Philippes Lacroix, and his mission was to approach big companies already equipped with Baleine computers. He was specially in charge of selling a decision support system for market analysis (SP).

To resume describing the sequence: first, the sales engineer from SSII contacts the manager of the ORD (Paul Lafargue); then, because of the nature of his product, the sales engineer is immediately reoriented towards the Marketing Department. However, owing to the quantitative aspect of the innovation, Lafargue advises Lacroix to contact the Economic Forecasting Researcher "whose mission predisposes him to sympathy towards information technology" (these words were reported to the Economic Forecasting Researcher by Lacroix). After being contacted by the sales engineer, the Economic Forecasting Researcher informs the Director of the MD about the proposal. A meeting is then organised, with the sales engineer, the Director of the MD, the Economic Forecasting Researcher and the Marketing Researcher. The Commercial Researcher could not attend the meeting, as he was interviewing salesmen in Lyon's regional headquarters. The meeting is devoted to presenting SP. The product is a package able to handle marketing simulations. The program includes a criteria system, parameters and variables for testing the efficiency and the impact of variations in the marketing mix on the market response (gross sales). The program is adapted to industrial marketing and is not a mere replica of existing simulation packages for consumer goods. The sales engineer bolsters his presentation by explaining that

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Shark's major French competitor recently purchased a program similar to SP (not from SSII).

The simulation program is versatile and can be operated on the micro-computers of the Operational Research Department. According to the sales engineer, the advantages of the system are the following:

- (i) SP enables an optimal distribution of sales sectors according to their size and potential demand;
- (ii) SP enables one to estimate a potential market in volume and value, segment by segment;
- (iii) SP enables one to estimate the economic indicators that are needed by the model to operate the simulations;
- (iv) SP enables one to combine economic, financial and accounting forecasts with market response estimations;
- (v) SP provides a formal and structured framework for decision-making: it is a genuine decision support system;
- (vi) The data needed by the program can be obtained easily in a large company like Shark, where "information can be channeled and centralised",

4. The Actors', Experience: Feelings and Actions

4.1. The Director of the MD

Robac confesses that he did not know anything about marketing when he was appointed head of the department: "... actually, it is Viillier who taught marketing to me ...". Robac considers marketing as an interesting experience and has his own definition of this activity:

"... marketing is about ensuring that the link between production and commercialisation is efficient. However, marketers are not practical enough, too often they are in the clouds; so it is not bad for them to be managed by a fact-minded engineer..."

Robac considers that his colleagues are efficient, but that they are too independent, and do not resort enough to his technological background in order to understand the divisions' requirements. When he talks about SP, Robac admits that its principle is interesting, but he wants his decision of adoption or rejection to reflect his colleagues' opinion. SP is not an important issue for him, and he seems much more worried about his career: the MD is only a "stage" that enables him "to get used to a so far somewhat neglected aspect of management". He looks to a "brighter management function", such as one of regional director. However, such a promotion will not be offered to him until his Vice-Director is able to replace him. But this seems rather remote:

"The trouble with du Paty is that he meets unexpected difficulties in being accepted in the MD. The three researchers will never ask for his advices, and when he dares to give some, it is never followed. Actually, he is not high-handed enough. I have to be an interface between him and the researchers, though it is him who should be a relay between them and me."

4.2. The Vice-Director of the MD

Du Paty indicates that he is disappointed by his short experience within the MD. Still, he stresses that his present position is enriching, and that he is fond of new challenges. According to him, this feature of his character explains that he was "one of the handful of students in his school who would attend information technology courses and the only one who applied for marketing jobs". Moreover, he declares he was fascinated by his six-month training in marketing and that this enabled him to learn in six months what "others still ignore after three years of studies in management and ten years of routine-like experience". So he wonders why the Marketing Researcher never asks for his advice, and does not take the opportunity of learning new marketing techniques from him. Du Paty adds that Villier will stay for months in the regions for his

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surveys, without giving any information about how he is getting on, about the progress of his work. Moreover, du Paty considers that the Marketing Researcher's reports are too qualitative. The Vice-Director is less critical about his two other assistants, although he finds it difficult to make them understand the nature of his reorganisation mission. In the same respect, he regrets that both the Economic Forecasting Researcher and the Commercial Researcher will give him very little information about their findings and their work, to the extent that he is often left "surmising whether they will complete their researches, projects and missions within the deadlines". The Vice-Director is very enthusiastic about SP:

"... this is the future, sooner or later we will have to resort to such a decision support system. Why not get used to it as soon as possible ?"

Du Paty adds that US universities' marketing courses are highly mathematics-oriented and resort to models that only information technology is able to handle. According to him, SP would enable the MD to make much more rational and objective decisions, as well as to promote exchange of information within the MD (since "SP needs various types of data, each type being more or less associated with each researcher's specialisation, operating the program supposes that these various types of data are, to some extent, available to all of us"). He wonders why the Commercial Researcher and the Economic Forecasting Researcher are - to the best of his knowledge - opposed to SP. He does not understand why Guyard is not more enthusiastic about SP:

"Actually, SP could ease Guyard's tedious analyses. Moreover, since the system can assess prospective economic parameters, Guyard could leave this kind of job to the machine and concentrate on more marketing-related researches."

Even more surprising to him is the positive reaction of the Marketing Researcher:

"Villier, who is so inclined to give marketing a subjective and qualitative orientation, he would not like SP at all, if he had understood what the system actually means..."

As far as his reorganisation mission is concerned, du Paty asserts that his future career at Shark depends closely on his ability to propose an acceptable blue-print and to implement it. From his point of view, the general management has understood that he will never be accepted by the members of the MD unless he proves able to impose a new form of organisation and a new definition of the tasks and responsibilities. He has the feeling that his main opponent in this game is the Marketing Researcher (Villier) "who thinks he is the sole depository of marketing knowledge in the department". On the other hand, he views Lemoine as a crucial help, "by community of interests", because he too is facing a reorganisation problem".

4.3. The Economic Forecasting Researcher

Guyard has become the favourite contact of the sales engineer from SSII. Guyard asserts that this privileged position in the decision-making process is due to his scientific approach ("which predisposes [him] to information technology"), results from the quantitative nature of his work, and from the fact that his computations could be used as raw material for SP. The Economic Forecasting Researcher's opinion is that his work calls for scientific methods which contrast with Villier's "gastronomical" approach to marketing. This expression is meant to characterise the type of relationships that the Marketing Researcher establishes between him and the sales engineers or clients during his travelling in the regions.

In general, Guyard will transmit the results of his computations directly to Robac (the Director of the department), although these

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results could often be of interest to Villier. His estimations may concern the Commercial Researcher as well, but Lemoine's mission keeps him in the regions and they cannot find opportunities to exchange information. Guyard regrets that Lemoine must stay away from the department so often, because the Commercial Researcher's "methodical approach" and "nearly scientific way of thinking" appeals to him.

As far as SP is concerned, Guyard asserts to be much taken by "such an innovative project" but he thinks that the program is not what the department really needs, for various reasons. First, this package requires, according to Guyard, a computerised processing of economic data which is not compatible with his own method of computation. Second, the type of data that should be fed in the micro-computer is different from what his usual indicators and parameters enable him to obtain. Moreover, since the micro-computers are located within the ORD, he foresees that the information processing and the simulations on SP would be performed in this department, which "would be a nonsense: they don't know a word about Economics".

"Objectively", the latter argument may seem incorrect: it seems unlikely that SP would be used by the members of the ORD since its manager decided that SP did not correspond to the needs of his department. However, on Robac's request, the ORD could be asked to operate the program on behalf of the MD. Moreover, even if the argument is "objectively" incorrect, it may play a strategic part in the decision-making process.

Guyard asserts that, should Robac say "yes" to SP, he would not change his working practices:

"... SP is neither adapted to what we need, nor to the data I can get, nor to my methods. Be it only for the department's reputation, I will never use SP: I don't want to jeopardise the quality of my surveys, and the reputation of the MD."

4.4. The Commercial Researcher

Lemoine is rarely in the MD. His mission requires long periods in the regions, where he interviews the sales engineers in order to redefine their working practices and reorganise the sales sectors. He considers that his task is one of the worst a young manager could be assigned, and complains about his uncomfortable position "between the devil and the deep blue sea" (i.e. the salesmen and the general management). His opinion is that the general management has assigned him a mission which most of the head office's staff would have managed to turn down, and that the general management bets upon his youth as a key to success. He is far from considering his age as an asset, as he thinks he is faced with the "older sales engineers' foxiness". In this respect, the Commercial Researcher's judgment is categorical:

"The sales engineers don't want to listen to a word about a standardisation of the procedures for collecting, organising and retrieving the information related to the company's clients: they consider the customers as their goodwill, their property..."

The Commercial Researcher has been informed about the innovation proposal and knows that his advice will be taken into account by the Director of the MD, because his "education and present mission are unusual in this department". Lemoine says he considers the SP project as somewhat of a joke:

"If a package suffices to reorganise, to improve and to standardise a whole commercial system, including its information and distribution dimensions, they would have appointed it rather than an HEC graduate they pay FF 130 per hour, jet throughout the country and accomodate in three-star hotels..."

Besides, he is not surprised by the Marketing Researcher's approval of the SP project:

"In the ever lasting dispute between quantitative and

qualitative approaches, the fact that a technological device could replace an expert in quantitative methods would stand as an unexpected victory for the holders of the qualitative approach: we are devoured by our own monsters... This would comfort Villier's reliance on door-to-door commercial strategies."

Lemoine says he knows that the Vice-Director is in favour of the program, but adds that he does not want to argue with him, as he views du Paty as his sole support before the sales engineers. According to Lemoine, du Paty would be able to give a much more dynamic and rational aspect to the department if it was he who was managing it. Actually, the Commercial Researcher considers that his future is rather in the MD than in a region (be it at the top level). He knows that du Paty may succeed Robac at the head of the department. The Commercial Researcher's opinion is that a successful completion of his mission would improve his status (because this would demonstrate an ability to manage the sales force) to such an extent that he could be promoted to a vice-director position, after du Paty's succeeding Robac.

4.5. The Marketing Researcher

Villier's view is that he is the only member of the MD who is doing real marketing. Villier is always referring to the previous (and first) Director of the MD, who taught him "marketing in general and industrial marketing in particular". In turn, Villier claims that he communicated this knowledge to Robac, the present Director of the department. However, according to the Marketing Researcher, "it seems as though Robac had still not understood what marketing is about". To support his case, Villier exhibits Kotler's textbook and points out that:

"marketing, even industrial marketing, must be upstream of production... But Robac cannot admit it."

In Villier's opinion, the marketing of future products,

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specially in an innovative firm like Shark, "requires contact with Shark's present clients, so that they can give their opinion about the market, their own customers' new requirements, and contribute suggestions". According to the Marketing Researcher, this approach explains his controversial long periods in the regions:

"The sedentary nature of our staff, at the Head Office, is inherited from the golden age of the product orientation. I understand that engineers will still await the clients for their best mousetrap, but it is disappointing to spot such an attitude in marketing men. I am convinced that it is impossible to perform real marketing without moving from your armchair in one of the highest buildings of La Defense [a business area outside Paris]."

Villier sounds rather sarcastic about the Vice-Director's mission of reorganisation of the department. The Marketing Researcher's opinion is that he knows his work well enough and he does not see the "point in a chemist (i.e. the Vice-Director) interfering in marketing research". Besides, Villier blames the Economic Forecasting Researcher for his unionist commitment which he assumes to be linked with his economist function: "extrapolation and smoothing lead easily to utopia..."

On the other hand, Villier questions the relevance of the Commercial Researcher's quantitative approach to solve the problem of how to reorganise the sales sector:

"He has not understood that the problem is less one of optimising figures than one of convincing people... and the more he tells the sales engineers about abstract management principles and organisation theory the less they will listen to him. If he limits his role to that of a cold robot, a package is less expensive..."

Actually, Villier perceives his mission as very compatible with SP. He assumes he will always have enough work with tasks which information technology will never handle: "that of listening to the clients' requirements, suggesting to them new concepts of products, services or applications and understanding their reactions to these". Nevertheless, the Marketing Researcher views SP as a very

sophisticated and efficient program, that can be helpful in performing sensitivity analyses, assessing potential market responses, as early and fast as possible, which is an advantage in front of Shark's competitors: "the computer is better at doing marketing in an ivory tower than any expert, but then, people like me are still necessary to a complete marketing strategy".

The Marketing Researcher's technical assessment of the capacity of SP (i.e. "sophisticated", "efficient") must not be over-emphasised as, during the interviews, Villier was unable both to explain these notions and to explain what he actually meant.

However, it is not because an actor expresses a judgment which may seem objectively inconsistent that one must ignore this judgment. Actually, such a judgment may be part of a strategy, and its "correctness" is less enlightening for the analysis than its logical relationship with other judgments (i.e. contradiction, agreement, indifference).

5. Analysis of the Zones of Uncertainty: Organisational Stakes, Rationalities and Strategies

One month after SP was first presented to the MD, the Director informed the SSII's sales engineer that the proposal was turned down by his staff. In between, he had set down the opinions of his colleagues during short interviews (sometimes by telephone). Actually, the financial aspect of the proposal has never been mentioned by Robac. This tends to indicate that the MD's budget could have afforded the investment and that other factors must account for the rejection of the innovation system.

In the following lines, strategic analysis will be used in order to assess the factors whose combination led to the rejection of the proposal. The analysis carried out in the preceding paragraphs suggests a number of zones of uncertainty affecting one actor, a fraction of the MD, or all its members.

5.1. First Zone of Uncertainty

The first zone of uncertainty is related to the results that the Vice-Director will achieve in his reorganisation task. What will come out of his investigations ? To what extent will the activities of the three researchers be altered ? Will the Economic Forecasting Researcher be allowed to stay in his ivory tower in which he carries out his lonely and hand calculator-helped computations ? Will the Marketing Researcher be obliged to put a stop to his long periods in the regions and accept a more sedentary activity, basing his reports on the information that the sales engineers can get from the clients rather than on the information he used to gather after his discussions with the latter ? Will du Paty succeed in his mission of reorganising the department and being accepted by its members ? The Director's promotion is indirectly linked to this question. On the other hand, du Paty is preoccupied by the importance of this question since he has the feeling that his career in the company depends strictly on his success at this "test": the zone of uncertainty relates to the result of his mission, and what is at stake is his future career at Shark. In his mission, du Paty's main problem is to let the other members of the department admit his legitimacy. Moreover, his three colleagues are well aware of the fact that if du Paty succeeds in his mission, he is likely to become their next director.

5.2. Second Zone of Uncertainty

The second zone of uncertainty is related to the Commercial Researcher's mission. Of course, this uncertainty affects the regional sales engineers in first place. Still, this zone of uncertainty affects the very MD: first, the Commercial Researcher's success would magnify his prestige within the departments and - which is highly significant for a marketing man - such a success

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would mean that he was able to exert authority towards the sales engineers. This achievement, combined with his educational background (of a relatively high level within the MD) could increase his power: as the favourite marketing contact of the technological divisions (because of his "acceptable" educational background), and as the now natural interface between the Head Office and the regional sales engineers, Lemoine would enjoy in the MD a key position that neither Villier nor Guyard could counterbalance. Such a power can be described as positional power, as opposed to resource power.¹ Until now, the Marketing Researcher could put forward that he was the only member of the MD who was really doing marketing. He had succeeded in spreading this opinion up to the other divisions' highest levels and in the regions through the sales engineers. But, if the Commercial Researcher succeeds in his mission, he will have no difficulty in promoting other methods of work (helped with the respect he will have gained both at the medium level and at the top of the hierarchy) and then could stand as a potential new vice-director for the Marketing Department.

5.3. Third Zone of Uncertainty

The actors' interviews suggest a third zone of uncertainty, generated by the SP project. The Director of the MD does not seem to be worried about the project. He leaves the decision in the hands of his colleagues. The same applies to the Marketing Researcher, who understands that SP would not deeply alter his working practices and habits. On the other hand, the Vice-Director and the two other researchers are much more worried about the outcome of the decision-making process: each considers, for different reasons, that the future configuration of the department is at stake.

The analysis of the zones of uncertainty helps understand the nature of the organisational stakes, the strategies the actors

developed in the decision-making process about whether to adopt SP, and the corresponding rationalities.

At Shark Corporation, relevance is based on technology. The MD is influenced by the technological rationality, and both its director and vice-director are engineers. Still, the mission, the title and the specialisation of the department induce another factor of relevance: marketing skill.

From this bipolarisation follows a swinging power game: towards the other divisions, it is technological skill that confers legitimacy while, within the department, this role is played by marketing skill. In this respect, it is worth noting that each of the actors of the MD will readily give his own definition of marketing, thereby laying the rules of the game according to his own conceptions. At this stage, it is possible to summarise the situation for each of the actors.

5.4. The Director of the MD

What is at stake: his promotion to a position of regional director.

Rationality: is mainly technology and production-oriented.

Strategy: consists of putting forward his experience and the exactness which his engineering background confers to the works of his researchers (while waiting for his promotion).

Zones of uncertainty: Robac is affected by the uncertainty related to the Vice-Director's success (on which his promotion is dependent). On the other hand, Robac masters the uncertainty attached to his potential support to any of the members of the MD, and the uncertainty attached to the final decision of adoption or rejection of SP.

5.5. The Vice-Director of the MD

What is at stake: his success in his mission, on which depends his future career at Shark.

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Rationality: du Paty is the sole member of the MD who is able to play on both keyboards: the technological and the marketing ones. His rationality is oriented towards the optimisation of a combination of these capacities by use of quantitative and formal analyses.

Strategy: consists of trying to enforce his authority within the department. So far, such an authority only results from the demonstration of authority towards the regional sales engineers. Now, SP provides du Paty with an alternative solution to beef up his authority within the MD. First, because only du Paty knows enough about computer science to carry out (himself or with the help of the ORD) the simulations. Such an ability would confer on him a "rational-legal" type of authority (i.e. based on expertise, formalistic and abstract knowledge). Second, because the information needed by SP supposes frequent meetings within the MD. Until now, du Paty was experiencing difficulties in setting meetings which would allow him to control researchers' activity more tightly and enable him to give them methodological recommendations. His general strategy, when applied to the SP choice, consists of backing up the project. What are his assets in the game, what coalition can he resort to? Before the Director, du Paty can put forward the fact that SP, allowing him to base and exercise an authority, would help him to manage his reorganisation mission which, in turn, would enable Robac to leave the department and be promoted (obviously, du Paty should be more implicit than explicit in playing this game...). Among the three researchers, only Villier is not opposing the project. Still, a coalition between du Paty and Villier supposes, between the two men, contacts and relationships which are, hitherto, very few and far between. More, such a coalition would mean some concessions from du Paty. Such concessions would not be compatible with du Paty's mission which is - to a large extent - directed

against Villier's frequent and long absences.

Zones of uncertainty: du Paty is affected by the uncertainty attached to the outcome of the decision-making process related to SP. On the other hand, his mission enables him to master a fraction of the uncertainty attached to the future organisation of the MD.

5.6. The Economic Forecasting Researcher

What is at stake: the possibility of maintaining his status among the researchers. His particular status in the department is tightly linked to his exclusive expertise (i.e. unique in the department and maybe in the company) in Economics. Actually, Guyard masters the uncertainty related to the economic studies: he is the only actor able to handle "complex" economic researches. This key position in the organisational game would be undermined by the use of SP for economic computations (all the more so as Guyard asserts he would never use SP).

Rationality: is oriented towards the optimisation of a rational-legal legitimacy resulting from an exclusive expertise and a quantitative approach (this approach being geared to the "numerate" values upheld in the company).

Strategy: consists of putting forward his ability to achieve statistical analyses and economic forecasting. Guyard's main assets are chiefly related to his exclusive expertise. In other words, his strategy consists of maintaining and maximising the relevance of this exclusive expertise in the organisational game. This relevance and this exclusivity were hitherto unquestioned and unchallenged as economic studies are necessary, and as the only actor able to handle these was Guyard. This was (and still is) conferring on Guyard a particular status allowing him to be the only MD researcher able to stand up to the engineers. Applied to the

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decision-making process, Guyard's strategy consists of opposing the project in front of the Director of the MD, while pretending to be interested in front of the sales engineer from SSII.

Zone of uncertainty: the uncertainty affecting Guyard boils down to two questions: (i) will SP be accepted, and (ii) if SP is accepted, what will be the implications for the Economic Forecasting Researcher? First, the adoption of the system would question Guyard's "manual" methods (with the help of a hand calculator). Second, as suggested by the Vice-Director, the use of SP for the simulations would readily be extended to the determination of the data needed by SP to perform these simulations (cf. the classical upstream integration in information technology in particular, and in technology in general). A significant fraction of these data are of the economic order, and assessing these economic data constitutes the core of Guyard's work. It has already been indicated that the Economic Forecasting Researcher's legitimacy and status (the "economist", the "expert", the "scientist") are based on his ability to perform these "complex" economic computations. The use of SP (either by the Vice-Director who learnt computer science, or by the engineers of the Operational Research Department) would deprive Guyard of the basis on which he was hitherto grounding his "relevance" and therefore his legitimacy (the basis is: an exclusive ability to perform economic analyses).

5.7. The Commercial Researcher

What is at stake: his status in the MD, and his career in the company (which are linked to the success of his mission).

Rationality: is oriented towards the implementation of formal, impersonal (i.e. theoretical, based on general knowledge, principles or models) and abstract methods in management (of people or things).

Strategy: consists of competing with the Marketing Researcher for the control of the downstream environment of the head office (i.e.

mostly the regional sales engineers). However, protocol analysis suggests that such a control is not an end in itself for Lemoine; it is rather a means to magnify his legitimacy in the department, in order to stand as a potential vice-director if du Paty is promoted. As a matter of fact, a successful completion of his mission would enable the Commercial Researcher to ascertain the supremacy of his impersonal and formal approach upon the Marketing Researcher's qualitative methods. Clearly, the adoption of SP - whatever its efficiency - would deprive the Commercial Researcher of a portion of his legitimacy, since a portion of his organisation mission (that related to the optimisation of the sales sectors distribution, for instance) can be handled by SP. This may account for Lemoine's strategy when applied to the choice related to the project: he opposes SP through regular phone-calls to the Director of the MD.

Zones of uncertainty: clearly, the Commercial Researcher masters a fraction of the uncertainty affecting the Marketing Researcher; a successful completion of his mission would signify the superiority of Lemoine's impersonal and formal approach over Villier's methods. On the other hand, protocol analysis suggests that Lemoine is highly affected by the uncertainty related to the outcome of the decision-making process about SP.

5.8 The Marketing Researcher

What is at stake: his autonomy both in visiting the regions and in choosing his research methods.

Rationality: is mainly oriented towards the use of qualitative, personal, ad hoc methods and subjective judgments.

Strategy: consists of confirming himself as the only "real marketing man" in the department. Villier's assets in implementing this strategy are substantial: he is the one who "initiated" Robac to marketing, and his researches are always much appreciated by the

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various divisions which resort to him. Villier uses the decision-making process related to SP in an optimal way in what may be viewed as a win-lose game. He knows that the Commercial Researcher and the Vice-Director favour opposed potential outcomes of the decision-making process (Lemoine is against the project, while du Paty supports it) although they have similar methods and approaches (these approaches and methods being radically different from Villier's). Accordingly, whatever Villier could win in taking sides with one would be lost in opposing the other. The Marketing Researcher's strategy consists of playing up to the actor whose power is actual and certain (du Paty is already the Vice-Director of the department), and opposing the actor whose power is only potential and conditional (Lemoine may be promoted if he completes his mission successfully). Accordingly, like du Paty, Villier supports the project when Robac asks for his advice.

Zones of uncertainty: Villier is affected by two zones of uncertainty. The first uncertainty is related to the project of reorganising the department. This project is conducted by the Vice-Director of the department. What will be the implications of the reorganisation for Villier's autonomy? The second uncertainty is related to the potential emergence of the Commercial Researcher: a successful completion of his mission would question Villier's methods and working practices and, consequently, entail some pressure on Villier (to induce him to change his "subjective and qualitative" methods). Should Lemoine succeed du Paty at the head of the department, this pressure would be even more powerful.

6. Conclusion

The situation may be summarised as follows: an actor chooses a strategy of deferred decision (the Director), two actors oppose the project (the Economic Forecasting Researcher and the Commercial Researcher), and two are in favour of it (the Vice-Director and the

Marketing Researcher). From a hierarchical point of view, the weight of the proponents is greater than that of the opponents. Nevertheless, the outcome of the decision-making process is that the proposal is rejected. In the light of the preceding analysis, the explanations of this outcome may be summarised as follows:

- (i) The favourite contact of the sales engineer from the addressing system is, in fact, against the adoption of the system.
- (ii) The "objectively" more important coalition (in terms of position in the hierarchy) did not work. This may be explained by the fact that this coalition was based on actors with conflicting rationalities and stakes: the Vice-Director's rationality is formal and quantitative-oriented and, most of all, his mission is to reorganise the department (this reorganisation is mainly aimed at reducing Villier's autonomy); on the other hand, the Marketing Researcher's rationality is qualitative-oriented and, most of all, his goal is to maintain his autonomy (in visiting the regions and selecting his research methods). More than the differences in rationalities, it seems that the opposition between the stakes accounts for the failure of this coalition.
- (iii) The opposition to the project is exerted by a coalition based on actors with compatible rationalities and stakes. Both the Economic Forecasting Researcher and the Commercial Researcher have a formal, abstract, quantitative-oriented rationality ("scientific" and "nearly scientific" according to the Economic Forecasting Researcher). Their stakes are similar as both view SP as a threat to their legitimacy and status.

Two questions may arise, of unequal difficulty. First, one may wonder why the actors with compatible rationalities did not ally:

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the Vice-Director, the Economic Forecasting Researcher and the Commercial Researcher.

The answer seems to be in the fact that the innovation is not assessed in the same way by these rationalities. According to the Vice-Director, SP is an asset: it may enable him to improve his control and rational-legal authority on the department's members (cf. his strategy) in order to stand as a potential director (cf. his stake).

According to the two researchers, SP is a threat: they consider that the innovation may hinder their maintaining or magnifying their status (cf. their strategies) and, consequently, prevent them from achieving their objectives (cf. their stakes).

The second question is that one may wonder why there was no coalition between the Director and his Vice-Director. Objectively speaking, they have correlated goals: the promotion of Robac (to a regional director position) is conditioned by the success of du Paty in his mission, while the promotion of du Paty (to the head of the MD) is conditioned by the promotion of Robac. Accordingly, one might have expected Robac's active involvement in the decision-making process, in favour of the project. This did not happen. Why ?

There is no definite and conclusive answer to this question. In the light of Robac's interview, it seems that he was very confident about his promotion, the uncertainty being more on the delay than on the actual possibility of the promotion. Accordingly, an explanation is that the Director did not want to interfere in the decision-making process and thereby do half of du Paty's work: a strong norm at Shark Corporation is that one must prove oneself, in an hostile environment.

NOTES AND REFERENCES

1- The concept of positional power derives from the structure-oriented perspective on power. The concept of resource power derives from the actor-oriented perspective on power. In the latter perspective, the exercise of power is deliberate and intended. Power comes in discrete quanta, according to an identifiable sequence of actions: the quotas of bad or good distributed to the other. In the former perspective, power no longer comes in discrete quanta, or at least this is not a fruitful perspective. The exercise of power is not deliberate, conscious, premeditated.

The power exercised according to the actor-oriented perspective is called resource power; the powerful has an excess, or at least uses an excess of, resources: the goods, the bads, the standards (to know what constitutes goods and what constitutes bads).

The power exercised according to the structure-oriented perspective is called positional power; what the powerful has and others do not have is a certain position in a social structure.

For a more complete presentation of these concepts, see:

- Galtun, J. On power. In Global planning and resource management - Towards international decision-making in a divided world, edited by A.J. Dolman. New York, Pergamon Press, 1980, pp. 119-145.

PIRANHAS CORPORATION

0. Introduction

This case is a study of Piranhas Corporation's response to two commercial proposals. These commercial proposals are projects related to new applications of information technology and were proposed by two competing companies (the "addressing systems").

The first manufacturer is one of the largest French hardware and software manufacturers (Baleine), the second is an American-based multinational group (Computer Omnium Data, or COD).

The study is based on a one month-long period of interviews which started when my contact at Baleine informed me that a recent proposal by his firm had just been turned down by Piranhas Corporation. It was then possible to be introduced to Piranhas' Information Systems Director by this contact. Through the Information Systems Director it was possible to interview all the actors who were involved in the selection process.

The two projects were objectively different: one of the systems was less powerful than the other overall, but the expected functioning of these systems being unsophisticated, one may consider that adopting the former would not be a handicap for Piranhas.

After various meetings and passionate debates, Piranhas Corporation eventually opted for the more powerful system. The researcher's astonishment can therefore be summed up as follows: Why did the choice divide Piranhas so much, and how is it possible to explain the acceptance of the more powerful (and more costly) project which the General Secretary was against? The answers to these questions will be achieved through the following steps:

- (i) Piranhas Corporation: organisation, missions and objectives;

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- (ii) The innovation systems: principles and implications;
- (iii) The actors' experience: feelings and actions;
- (iv) Analysis of the zones of uncertainty: organisational stakes, rationalities and strategies.

1. Piranhas Corporation: Organisation, Missions and Objectives

The company is a one hundred-year-old building concern, which employs 8,000 people. It is a French group with an average annual turnover of FF 3,000,000,000. Its field of activity ranges from making kerbstones to the construction of cooling towers for nuclear power stations. It covers public, private, domestic and international markets through overseas branches in Central America, Africa and the West Indies. This diversification (both geographic and in terms of products) means that Piranhas must adapt to its various clients' managing practices and organisation. Piranhas Corporation's field of activity is very competitive and most of the critical success factors hinge on a rigorous administration of costs in order to offer the lowest market prices. Accordingly, most of the investment projects (which are not very numerous) are related to information technology and computers are viewed, by some organisational members at least, as critical success factors for such a rigorous administration.

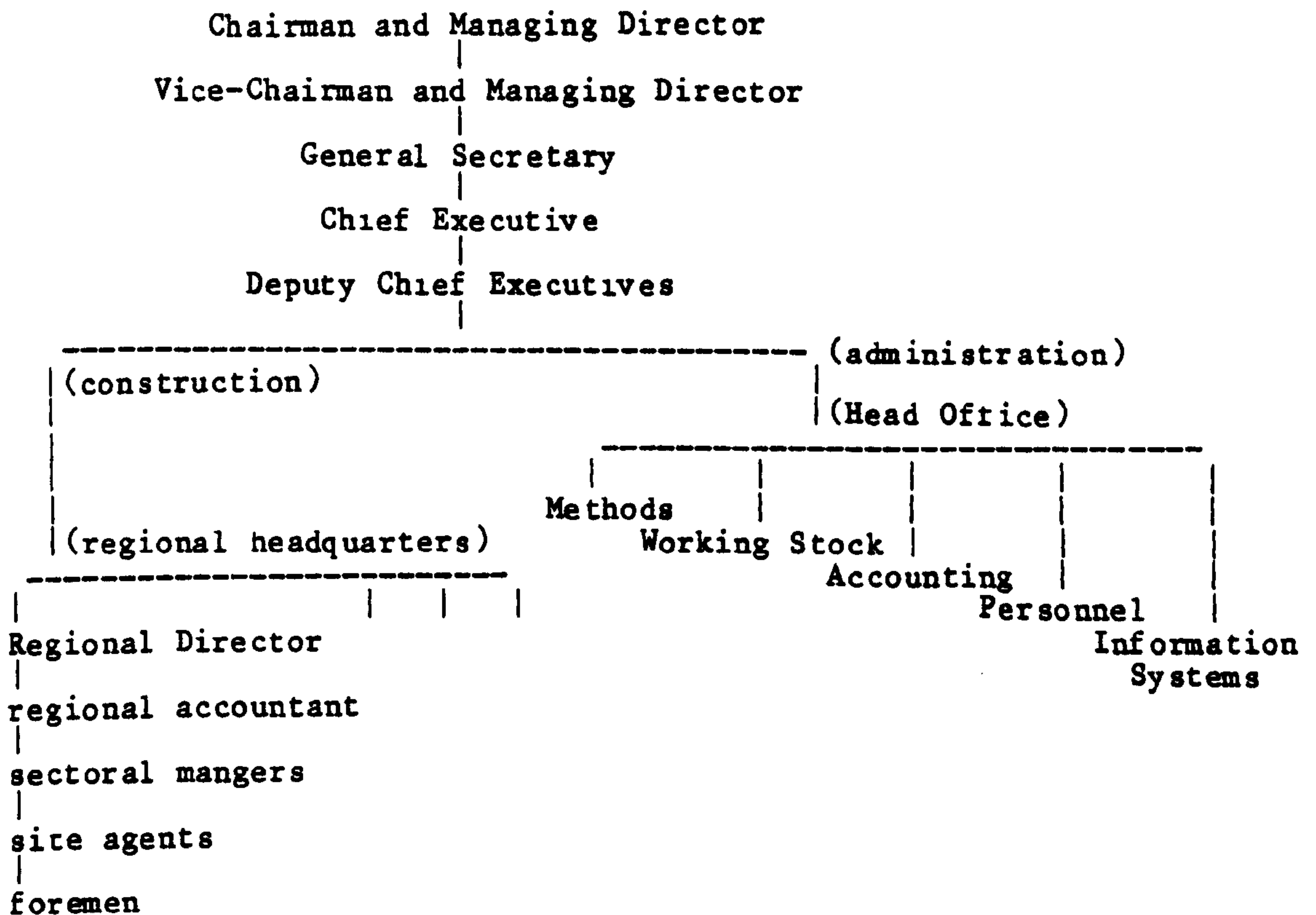
The firm's most significant development has taken place in the last 15 years, under the direction of the same management team: the Chairman and Managing Director (63, an engineer from Ecole des Ponts et Chaussees), the Vice-Chairman and Managing Director (61, same school) who deals with public relations, the General Secretary (61, a chartered accountant) who is responsible for the auditing and financial management of the company, the Chief Executive (51, from Ecole des Ponts et Chaussees) who deals with technological matters, and four Deputy Chief Executives. The latter have clear cut tasks: one is specially in charge of building activity in overseas

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branches, another supervises the whole civil engineering activity, another manages the private building activity in the Paris area, while the last is responsible for supervising the private building activity in the country. All these people work at Piranhas' Head Office, near Paris.

In addition, Piranhas Corporation has various regional headquarters in charge of executing and managing the construction work in progress on site (the national area is divided into various "Regions"). Each regional headquarters have a Regional Director, a regional accountant, two or three sectoral managers, various site agents and foremen.

The twenty-one interviews conducted by the author suggest that technology is the basis of legitimacy in Piranhas, and particularly construction technology. Management is very centralised in this firm which was, until 15 years ago, a family business. The following figure displays the simplified organisational chart:



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In order to understand the potential organisational implications of the projects, various points of this chart must be explained.

1.1. The Information Systems Department

When expansion was first decided upon (15 years ago), it was recognised that an information systems department (ISD) was required, and that was duly put into operation. So far, this department has been used mainly for monitoring and paying the salaries of the company. The invoicing and the management of the clients' accounts were gradually computerised. The department employs seven people, whose tasks and mission are briefly described below.

1.1.1. The Director of the ISD

Etienne Tarbes, 36, is a computer scientist. His brief is the following: every month, he must check that all the relevant data are available to feed the computer so that the salaries can be calculated. This information is sent from the Regions to the Head Office either by mail or by the Transpac network (French packet switch network). The latter mode of transmission is made possible because each regional headquarter is equipped with a micro-computer; these may be used to transmit the relevant data to the Head Office's main computer. On top of this, since the setting up of a direct costing system which enables the company to assess on a monthly basis the profitability of each site, Tarbes is in charge of checking that the data needed by direct costing has been made available. Once this data is collected, Tarbes runs programs on the mainframe to obtain monthly accounting statements showing each site's profitability and the deviations from the initial costings and

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budget.

Another duty, less formalised, is that Tarbes must keep in touch with information technology advances and adapt the company to them. As a result, at his instigation, word processing and the use of the Transpac network were adopted. To have his investment projects accepted, Tarbes must obtain the General Secretary's agreement.

1.1.2. The First Project Manager

Simon Roland, 32, holds a "baccalaureat" (roughly equivalent to O-grades) and has attended further education courses in computer science. His brief is to assist the Director of the ISD in the application of new information technologies. He was in charge particularly of installing the word processors.

1.1.3. The Second Project Manager

Serge Gueron, 30, holds a "baccalaureat" of technician in computer science. He is mainly responsible for the management of the salary roll and the maintenance of the software.

1.1.4. The Computer Operators

There are four of them, and they are not highly qualified. It is they who receive the information from the regional headquarters and feed it into the Baleine computer of the Head Office.

1.2. The General Secretary

Georges Saby, 61, is a chartered accountant. He is in sole charge of the financial management and control of the company. Apart from

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the technical operations which he takes no part in, he manages all the firm's operations. His agreement is necessary for any investment project. Similarly, he is the key to all budget discussions. He is also in charge of playing a fundamental part in the liaisons between Piranhas Corporation and its environment: he must increase the confidence that the share-holders and the financial institutions have in the company.

1.3. The Deputy Chief Executive for Building in the Country

Marcel Jupien, 54, is a graduate from Ecole Superieure des Travaux Publics. He started working for Piranhas as a site agent, 30 years ago, before becoming Regional Director and, some years later, being promoted to his present position. His function consists of assisting the Regional Directors in their coordination of the various sites, in consolidating the financial information from the regional headquarters, and in reporting these to the management board. Accordingly, Jupien must keep in touch with the sites' evolution, which he manages by asking frequently for information from the Regional Directors. When an important decision must be taken and if the proposition comes from a regional headquarter, the usual decision-making process sequence is the following: ... ----> Regional Director ----> Jupien ----> Saby (General Secretary).

1.4. Region A of Piranhas Corporation

Of all the company's Regions, Region A is the one which gives rise to the largest turnover. Region A's activity being mainly based on private building, this Region is placed under the management of Jupien. Each Region comprises various sites and is managed by a Regional Director who is assisted by a regional accountant.

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Ideally, the Director is to concentrate on the technical coordination of the various sites, while the accountant is to deal with administrative issues. Within each Region, the sites are supervised by sectoral managers who are assisted by site agents. In turn, each site is placed under the responsibility of a foreman.

1.4.1. The Director of Region A

Luc Rio, 45, is a graduate from Ecole Superieure des Travaux Publics. Ten years ago, he started working for Piranhas as a site agent. His present position involves the coordination of his Region's seven sites. This coordination consists of optimising the use of machinery and building material and labour force under the constraint of each site's budget (deadlines and costing). Rio is judged by the management board on his capacity to achieve this coordination in minimising costs. There are numerous reasons for this. Building activity is undergoing a deep crisis in France, and most of the weapons in the contractors' war boil down to adequate pricing. Since construction techniques seem difficult to innovate with, this means that drastic auditing increasingly appears as a success factor more critical than innovative technology.

Because of his Region's main activity, the person at the Head Office with whom Rio has the most frequent contacts is Jupien (deputy chief executive for private building in the country).

As far as career is concerned, a Regional Director's position is considered as a senior position in the hierarchy and, apart from being promoted to Deputy Chief Executive, no promotion is possible for Rio. However, some Regions are more interesting than others: sites are more numerous and involve considerable turnover and, accordingly, the related Directors' salaries are more substantial. Most of the Regional Directors would consider becoming the Director

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of Region A as a promotion. Obviously, such a promotion is of no interest to Rio !

1.4.2. The Accountant of Region A

Edouard Monceau, 42, has been working in Piranhas Corporation for 15 years. He is a self-made man, with no degree. In 1981, Monceau was appointed accountant for Region A. Given the importance of this Region, such an appointment can be seen as a promotion. Monceau reports to Rio and his function is to assist the Regional Director in administrative and control tasks. Accordingly, Monceau is responsible for supervising payrolling, the management of the clients' accounts and the invoicing. On top of this, each month, he must ensure that the financial data have been transmitted to the Head Office's Information Systems Department. However, Monceau's most crucial function is banking negotiation. In fact, the financial burden of the sites is such that Piranhas will not start any construction work until (at least) one bank stands surety for the clients. Here lies a critical aspect of building, since the launching of the construction works on site depends, in the last resort, on the financial institutions' decision.

1.4.3. The Sectoral Managers of Region A

Region A is divided into two sectors. The first one comprises three sites, and is placed under the responsibility of Dominique Metral, 54. Regis Leberger, 56, is responsible for the four remaining sites which constitute the second sector. Metral and Leberger hold engineering degrees and both started working for Piranhas as site agents. Sectoral managers are mainly in charge of liaison with the clients, but do not enjoy great latitude. In

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particular, they have no control over prices. Metral and Leberger report to the Director of Region A (Rio).

1.4.4. The Site Agents of Region A

Each site is placed under the responsibility of a site agent. Their average age is 30, and all the Region A's site agents hold engineering degrees from Lyon's Institut National des Sciences Appliquees (INSA, one of the top French engineering institutes). Their average seniority is five years. Their function is to lead and control the execution of building works.

The site agents stand at the interface between the field (foremen) and the regional operational structure. Each site agent reports to Rio, the Regional Director, on the progress of the site he is in charge of. Under the supervision of the sectoral managers, the site agents are responsible for the liaison between Piranhas and the clients (invoicing and billing). Besides, they must manage the allocation of energy, machinery and building materials, and the assignment of the teams on site.

Rio relies on the site agents to achieve his mission of coordinating the projects under the constraint of minimising the costs. Accordingly, a site agent is judged on his capacity to meet the construction deadlines as well as the initial costing attached to his site. The site agents may resort to the regional accountant's for help in these operations. As far as their careers are concerned, the usual evolution of a site agent is to become sectoral manager and, eventually, Regional Director. In Region A, a key criterion for such a promotion is a good assessment by Rio.

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1.4.5. The Foremen of Region A

The foremen are in charge of leading the teams in the execution of the building works. Their average age is 40. They are placed under the direct supervision of the site agents and, because of their age and low qualifications, no promotion can be expected for them. This situation is counterbalanced by relatively high wages.

2. The Innovation Systems: Principles and Implications

The Head Office of the company is equipped with a computer built by the French manufacturer Baleine. This computer is used for handling the payment of the salaries and computing each site's profitability on a monthly basis. The terminals which connect the regional headquarters to the Head Office's mainframe are also from Baleine.

Each month, the regional headquarters transmit (by mail or the Transpac network) to the Information Systems Department: (i) for each of the workers on site, the total of his or her hours; (ii) for each site, the data needed to compute its profitability (total of man-hours, total time by task, energy cost, cost and quantity of material used, etc.). Once all the data attached to each site is collected, the mainframe produces direct costing analyses showing the site's profitability and the deviations from the initial costing and budget.

The Director of the Information Systems Department examines these deviations and must inform the accountant of the corresponding Region. In turn, the accountant must inform the site agents. Then, the phase of analysis and interpretation of the deviations can start: each deviation must be ascribed to somebody or something. If the deviation is due to a deficient design, plan, or to inadequate estimates, the responsibility falls on the methods

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engineers; if the deviation is due to an unexpected cost rise (suppliers, salaries, energy, etc.), the responsibility cannot fall on any member of the company; if the deviation is due to a deficient management of the site, the related site agent is answerable to his Regional Director. In recapitulation, each deviation must be interpreted. The interpretation involves two aspects: analysis ("How much?") and attribution of responsibility ("Who?", "On whom should the blame fall?"). When possible, corrective actions are undertaken to limit or stop further deviation.

The major weakness of this procedure is that corrective strategies and actions are bound to start at least one month after the deviation originated.

On the occasion of a congress on new information technologies, Tarbes (the Director of the Information Systems Department) met an engineer of Baleine, and referred to the problem of the time necessary before corrective actions can be undertaken. Two months later, a sales engineer of Baleine phoned Tarbes and proposed a meeting. The purpose of this meeting would be to study the means to solve the problem of the deviation control by reducing the time that elapses between the beginning and the correction of the deviations. Tarbes accepted the principle of such a meeting and its date was agreed on. Knowing that the General Secretary's opinion is of paramount importance for any decision to be accepted, Tarbes asked him to attend the meeting. During this meeting, after listening to Tarbes and Saby (the General Secretary), the sales engineer set forward a solution which consists of installing minitels on each site.¹ Accordingly, after each day of work, the site agents could feed the minitels with the data needed for computing each site's profitability. These data would be transmitted to the Information Systems Department by the Transpac network. If equipped with a new Baleine software, the mainframe

would then enable each site's profitability to be controlled on a daily basis. The procedure of such an operation is extremely simple. This type of control would enable corrective actions to be undertaken more readily, and therefore prevent the deviations from developing. The overall cost of such a system amounts to the following: cost of purchasing the Baleine software plus cost of the communications via Transpac.

At this stage it must be noted that the micro-computer with which each regional headquarter is equipped could not be used for such control. This is due to two main reasons: (i) the micro-computers are over used; (ii) most of the sites are far from the headquarters, and the site agents would find it difficult to go there and transmit the data after their day's work.

For three months, the minitel project (MNL) was the subject of numerous meetings and discussions between various site agents, regional accountants, Regional Directors and the Deputy Chief Executive Jupien. Because of its importance, Region A would be the one in which the first installation should take place.

Four months after the initial meeting, a sales engineer of an American multinational corporation specialised in information business machines (COD) met two site agents at the headquarters of Region A. This sales engineer proposed to the site agents a micro-computer to assist them in their management and control of the sites. The sales engineer was well informed about the site agents' problems and he put emphasis on the following points:

- (i) The micro-computers enable the user to control the execution of building works on a regular and real-time basis (the control being made in relation to the site's budget);
- (ii) The micro-computers increase the site agents' autonomy and their speed of response, since the control of the execution of

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building works on site could be performed without having to wait, each month, for the Head Office mainframe's analyses.

In order to bolster his presentation, the sales engineer had brought a micro-computer and made a demonstration with the help of a simulation program. Two days after this demonstration, which was attended by the accountant of Region A, two of the site agents informed the Director of the ISD (Information Systems Department) of the proposal and expressed their wish to meet him to discuss COD's offer. He agreed but, as for the first meeting about MNL, the Director of the ISD asked the General Secretary to attend the presentation (the meeting took place four weeks later).

At this moment, one can consider that two propositions of innovation were in competition. They consist of:

- (i) A minitel of each site, all the minitels being connected to the computer of the Information Systems Department by the Transpac network, and the mainframe being equipped with a Baleine program enabling direct costing on a daily basis (MNL).
- (ii) A micro-computer on each site. Made by COD, the micro-computers are compatible with the computer of the Information Systems Department, and their maintenance is warranted (in the following lines this proposition is referred to as "MCO").

The overall cost of MCO amounts to the following: cost of the micro-computers plus cost of the processing software. There is no common measure between MNL and MCO's costs.

MNL and MCO have remained in competition for six months. Then, after this phase marked by numerous meetings and debates, MCO was accepted: Region A was chosen as test field, and two micro-computers were purchased and placed at the disposal of Region A's site agents. The following lines purport to shed some light on

this decision.

3. The Actors' Experience: Feelings and Actions

3.1. The Director of the ISD

Tarbes' main worry is "to reduce the fuzziness which surrounds most of Piranhas' administrative tasks". In particular, his opinion is that most of the sites generates some "fuzziness" (about execution, control, interpretation and attribution of the responsibility for the deviations) from which some agents draw benefit. He views information technology as:

"a tool which may contribute to clarify matters, things and procedures. But this is not always welcome by everybody."

As regards innovating, he confesses he feels "pushed by the young site agents' enthusiasm for new applications of information technology".

With respect to his day-to-day work, Tarbes regrets that, although his formal role is to dispatch to the Regions the monthly statements on profitability and deviations from construction budget and costing, the General Secretary wants to be informed first and presses him to get the deviations before dispatching them. Nevertheless, Tarbes tries to reach arrangement with the site agents: he says he will allow them some time to correct the deviations (when such a correction is possible) after informing them. But, when the deviation persists, he feels "compelled to inform the General Secretary". In this respect, Tarbes views his function as that of a filter. He confesses to have a "fellow feeling" towards the site agents, because of their "esprit Grande Ecole", and their attraction to computer science (which they learnt at INSA). According to the Director of the ISD, "this attraction

contrasts with the sectoral managers' somnolence". The site agents' dynamism seems all the more precious to Tarbes as the Regional Directors "do not look very sensitive to the advantages of information technology and seem solely interested in one thing: to be autonomous vis-a-vis the Head Office and have as few contacts with the Deputy Chief Executive Jupien as possible".

However, Tarbes reproaches the site agents with their "impatience for computerising everything ... their lack of distinction between needs and superfluous factors ... their short term appraisal of the company's evolution." On the other hands, Tarbes views the regional accountants as precious collaborators, because they are in charge of ensuring that the relevant and required data are sent to the ISD for the monthly profitability and deviation analyses.

His opinion about the two propositions is the following:

- (i) MNL: this system can reduce the fuzziness on site, since the organisation of the building works, the team posting and the use of machinery, energy and material can be known at the Head Office, enabling daily control of the sites to be performed.
- (ii) MCO: only this system is interesting from the viewpoint of computer science. MNL is not capable of development or evolution, and does not enable computations to be performed on site: MNL does not allow for an autonomous and flexible control by the site agents on the execution of building works. By contrast, MCO enables them to control and monitor their works both rationally and on a real-time basis.

Nevertheless, Tarbes thinks that a weakness of MCO lies in the fact that the site agents can keep the diskettes on which is stored the information related to their sites. This capacity to retain information does not seem compatible with the Head Office and

Tarbes' attempt to reduce "ambiguity" on site. But Tarbes remains optimistic and suggests a solution that would allow both for the Head Office's control and the sites' autonomy. This solution hinges upon the working out of a connection between the mainframe and the micro-computers on site. This is a somewhat complex interface to work out, and means a procedure of use less immediate and simple than that with the minitels. Yet, Tarbes views this solution as highly feasible and confesses he is already working on it. Such a connection would enable real-time control to be performed from the Head Office: each micro-computer could be addressed by means of the ISD's computer, which would enable the operator to be informed of the site's profitability and work organisation. According to Tarbes, it is this possibility of connection which convinced him of the superiority of MCO and enabled him to convince both the General Secretary and the managing board.

3.2. The General Secretary

Saby views his major mission as one of "ensuring that the algorithms laid down by the management board are applied". In this respect, he regrets that the Regions are not sensitised enough to auditing problems. However, he acknowledges that "achieving building works in accordance both with the deadlines and the clients' specific requirements must be a difficult problem for the site agents". His opinion is that MNL would have released the site agents from direct costing, control and auditing matters. According to the General Secretary, should MNL have been accepted, the site agents' sole "accounting commitment" would have boiled down to entering the data corresponding to the day's building work into the tables displayed on the minitel's screen. In brief, the General Secretary is surprised at Region A's refusal of a system that would have freed

the site agents from tasks they find it difficult to cope with.

In particular, the site agents' behaviour "baffles" his analysis:

"... first, when MNL was discussed, they were against computerisation, and now they swear by the computers. Even Tarbes find it difficult to restrain their new appetite..."

The General Secretary's view is also that MNL meant an advantage for the Director of the ISD:

"... the simplicity of the procedure would have released Tarbes from passing the monthly statements to me: another minitel could have been connected to the mainframe and installed in my office. Instead of this, Tarbes will have to work out a costly and complicated interface, and the company incurs a risk in purchasing software made by a different company from the one which installed the mainframe ... MCO is a waste of money: MNL would provide the same service as MCO, and is ten times as less expensive..."

By contrast, Saby is not surprised by the Deputy Chief Executive (Jupien) and the Director of Region A's favour towards MCO: he thinks that they do not know "what information technology is about" and that they consider "micro-computers as more valuable than minitels".

3.3. The Deputy Chief Executive for Building in the Country

Jupien declares that his fundamental function is to control the Regions' commercial performance, and that his most helpful collaborators are the Regional Directors. According to Jupien, the other person at Head Office (apart from him) who gets frequent information about the Regions' performance is the General Secretary.

Jupien stresses that the Director of the ISD should first communicate the monthly financial statements (on profitability and deviations, site by site) to the site agents before passing them to Saby. In fact, Jupien feels that "the General Secretary encroaches

on his functions" and that "he should restrain himself to his financial mission and try to optimise the relations between Piranhas and the financial institutions". Jupien's opinion is that this "encroaching" ruins the Regions' marketing dynamism and fosters their bureaucratisation. Besides, Jupien blames Saby for the shareholders' lack of enthusiasm and the weak amount of external investments in the company: "... Saby prefers overburdening the Regions with his control ..."

The Deputy Chief Executive explains the General Secretary's behaviour by suggesting that Saby no longer enjoys the network of relationships and the dynamism needed to achieve his mission of negotiation with Piranhas' financial environment. Accordingly, Jupien explains Saby's favour for MNL as follows: "... with MNL, he would have had a direct access to the sites' situation, without needing Tarbes' intervention, as easily as one calls the speaking clock ..."

When asked about the part he played in the decision-making process, the Deputy Chief Executive asserts that "the Regions' autonomy being the corner-stone of long-term sound development", he "pushed for the adoption of MCO, so that any Region could monitor its marketing and control ..."

3.4. The Director of Region A

Rio declares that his major mission is to prospect and search for substantial orders from the regional industrialists. This means frequent travelling and a presence at the Chamber of Commerce and Industry. But Rio regrets that he must spend most of his time writing reports about his prospecting activity for the Deputy Chief Executive (Jupien). Consequently, according to him, he must delegate an important part of his prospecting and marketing

activities to his sectoral managers. Rio is not pleased with this arrangement because he considers the sectoral managers to be "shortsighted, unaware of Region A and the company's real needs".

His Region being the one with the biggest turnover, Rio regrets his lack of autonomy. In particular, Rio blames "the highest management's preference for control and scorn for marketing ...". Rio is all the more dissatisfied by this tight control as he considers that, with the help of the accountant of Region A and his site agents, he achieves an efficient audit and control, since his Region "is the most developed one in the company".

Rio's opinion about information technology is that

"So far, the computers' sole influence was to increase the dependency of the Regions towards the Head Office: one had to wait until the Information Systems Manager and the General Secretary know the sites' situation before the site agents be informed ... with more than 45 days of delay, we were to correct mistakes which, most often, are due to the Methods Department's design rather than to the execution on site. On top of this, we must not forget that quick reactions help us to meet our clients' requirements better..."

As regards the choice of MCO, the Director of Region A confesses that computer science is not his strong point and that he relied on the preference of his site agents who, he says, "have nothing to learn from Tarbes on this matter".

3.5. The Accountant of Region A

Monceau views his mission as that of "dealing with the gist of the financial and audit problems facing Region A and its sites". In this respect, he considers management control as his main worry, and he thinks that construction does not lend itself to direct costing:

"... comparisons are difficult to draw, because each site is a particular one; works stations change over the day, the various operations do not lend themselves to standard interpretation of the deviations ..."

Accordingly, Monceau regrets that "hitherto, computers were only used, at Piranhas, to draw statements and attribute responsibility more than one month after the deviations originated, rather than to detect mistakes as soon as possible". But he hopes that MCO will enable a real-time management control of the various site to be performed.

By and large, Monceau views Piranhas as a bureaucratic organisation, within which the executive echelon - apart from Tarbes - is too old. To bolster his judgment, Monceau quotes the usual decision-making sequence in the company: "... when a proposition or a suggestion is set forward at the regional level, one must obtain the approval of the Regional Director, who then informs the relevant Deputy Chief Executive, who must then refer the matter to the General Secretary.

Besides, Monceau considers that the management board undergoes change brought by the site agents rather than encourages it. On top of this, he reproaches the General Secretary with his reluctance towards all possible development of regional autonomy. In fact, Monceau feels that Saby's action complicates and slackens the pace of management on site. To bolster his judgment, Monceau underscores the diversity of his experience (at Piranhas, he was successively accountant, auditor of the West Indies branch, manager in the Working Stock Department) which "makes him the sole manager to know all the aspects of life in the company". This enables him "to understand all the problems which confront any organisational level, including the difficulties met at the lowest levels".

According to Monceau, it is this deep knowledge which drove him to reject MNL. His opinion is that the major weak point of MNL is that it would not have shortened the circuit between the foremen (who are in the field and must undertake the corrective actions

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under the responsibility of the site agent) and the site agents (who must be informed of the deviations as soon as possible). Monceau illustrates the circuit by the following figure:

Foremen (construction and possible deviations) ----> ISD (analysis)
----> Saby (interpretation of the deviations) ----> regional
accountant (interpretation of the deviations) ----> site agents
(corrective strategies)----> foremen (corrective actions)

On the other hand, Monceau views MCO as a system which will allow for efficient control of building works and which can help him in transmitting to the ISD the data he has to mail on a monthly basis (i.e. the number of hours per employee entered in the micro-computer by the site agents could be used for the computation of the salaries directly). However, Monceau does not forget that the site agents were not in favour of information technology when MNL was under examination. He reproaches them with "having taken a fancy to micro-computers" and with "making computerisation their major aim", now that MCO is in the process of being installed.

3.6. The Site Agents of Region A

The site agents' major concern hinges on the budget, costings (costs of labour, machinery, building material, energy, etc.) and deadlines related to the site they are in charge of. A general feature of their experience is that they feel overlooked by the Head Office. In particular, they regret that Tarbes (the Director of the ISD) slackens the pace of innovation in management methods, ignores their skills in computer science, and does not take into account their specific needs. Moreover, the site agents regret that Tarbes enables the General Secretary's "misuse" of the monthly financial statements related to their sites. They consider that the sites'

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profitability - which the General Secretary strives to control - would be better if they were informed sooner about the deviations. They think also that the General Secretary's tight control is ineffective, disturbs their work and upsets the foremen.

Accordingly, their opinion is that micro-computers on site will: (i) enable precious time to be saved (in order to meet the clients' requirements); (ii) let them check more quickly than before whether the execution is consistent with the initial costing and budget; (iii) allow for an easier and more flexible definition of the corrective strategies that the foremen will have to implement.

Besides, they declare they preferred MCO to MNL because the micro-computers allow for sharper analyses which will enable them to get a better understanding of some bad results which appear on the monthly statements. The site agents' opinion is that the accuracy and the depth of these analyses will prove that the responsibility for most of these bad results must fall on the Methods Department and not on them (minitels do not allow for such deep and accurate analyses, since they do not enable the data to be processed on site, and only transmit them to the mainframe).

The site agents view the foremen as their most precious collaborators, while they call the sectoral managers "incompetent persons". As regards Jupien (the Deputy Chief Executive for building in the country), they are sorry that he seems to overlook them, "being content with the reports from the Regional Director who is retrograde when it comes to computerisation".

Protocol analysis shows that the sectoral managers and the foremen did not play any direct or indirect part in the choice process. Accordingly, it is not worth mentioning their feelings and actions in this section.

4. Analysis of the Zones of Uncertainty: Organisational Stakes, Rationalities and Strategies

The preceding lines suggest a number of ambiguities at various levels (technology, missions, problems, opportunities, information, etc.). As regards the information related to the monthly analysis of the sites' financial performance, it is difficult to know who gets it first: according to Tarbes, the site agents are the first to be informed; according to the site agents, the Deputy Chief Executive and the Director of Region A, the Director of the ISD will inform the General Secretary first. As regards the organisational purport of information technologies in general, and of MCO and MNL in particular, opinions do not differ less: are they aimed at optimising control, are they means for saving time in correcting deviations, or tools meant to ease administrative tasks? In the same way, who really eases or hinders the development of information technology at Piranhas: is it Tarbes who hinders this development, as suggested by the site agents; or, on the contrary, are not the latter hindering Tarbes' efforts to implement new applications by formulating increasingly conflicting and contradictory requirements? Finally, what is the real part played by the Regions in the control and audit process? In particular, in Region A, are the accountant and the site agents really concerned with these tasks? A positive answer to this question would clearly contradict the General Secretary's judgments.

All these ambiguities arise from the discrepancies between formal roles, actions and the feelings of the actors. The strategic approach to these discrepancies should permit the evaluation of the extent to which the combination of the actors' strategies and rationalities drove Piranhas Corporation to reject MNL and adopt MCO.

Strategic analysis hinges on the study of organisational stakes.

Protocol analysis reveals a fundamental organisational stake affecting the actors: the control of the Regions in general, and that of Region A in particular. This does not mean that this control is an end in itself for any of the actors. This control can be seen, in fact, as the means for achieving more or less clear objectives.² This organisational stake enables the researcher to relate various zones of uncertainty which affect the actors in various ways. Moreover, the organisational stake of the control of Region A enables one to understand the actors' strategies and the rationalities underlying these strategies.

4.1. First Zone of Uncertainty

A first zone of uncertainty affects the evolution of the building works on site. In the first place, the very nature of this evolution is uncertain. This uncertainty is mainly controlled by the site agents and the foremen. In fact, this control is limited, since most of the costs affecting sites are not under these actors' control. However, they control the management and the allocation of the labour force, the machinery and the building material. In the second place, the information relating to the evolution of sites is uncertain, in its collection, and in its destination. This information must first be collected by the accountant who is to transmit it to the ISD. Once processed by the mainframe, the destination of this information is subject to "bargaining" between the Director of the ISD (Tarbes), the General Secretary (Saby) and the site agents. In this bargaining, Tarbes' assets are his hierarchical authority, his operational position, his technical knowledge, and the necessity of going through him to obtain the computer print outs.

Tarbes' strategy consists of satisfying the General Secretary

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most of the time in exchange for the latter's agreement on his projects for new systems, while demonstrating his control of this organisational sector (i.e. information and information technology) to the site agents. His capacity to choose the first or only destination (between Saby and the site agents) of the information enables him to maintain effective control over the computing initiatives and procedures which the site agents covet.

The General Secretary's assets are mainly based on his hierarchical position and his power of negotiating with the Chairman and Managing Director over investment decisions. In order to increase his control over the regional headquarters, he implements a management control strategy in which he controls the fundamental tool, i.e. direct costing. In this respect, the information from the various sites (e.g. the information about the work in progress, cost prices, allocation of machinery, and labour force, etc.) is more useful to him than the mainly commercial data he could get from the Regional Director.

In this overall negotiation, the site agents' assets are weak, since the regional accountant must ensure that the financial data relating to the progress on sites are transmitted to the ISD. In fact, the sole control of the site agents over this information is related to the precision and the level of aggregation of the data they transmit to their regional accountant. However, this point is important because the precision and the level of aggregation determine the reliability of the interpretation of the deviations when this data is analysed. Clearly, if the information related to all the technical operations is aggregated, it is impossible to spot the individual operation which caused a given deviation (and therefore it is impossible to attribute responsibility). The site agents' strategy consists of obtaining the computer analysis as soon as possible in order to begin corrective actions, or to show they

are not responsible for the deviations. Then, their main contact is the Director of the ISD.

4.2. Second Zone of Uncertainty

A second zone of uncertainty relates to the outcome of the negotiation between the Director of the ISD, the General Secretary and the site agents. This zone of uncertainty mainly affects the Deputy Chief Executive, Jupien. When this negotiation turns to the advantage of the General Secretary, the control the latter gains over Region A reduces the Deputy Chief Executive's room for manoeuvre in the negotiations about provisional budgets and investments for the Regions. In this type of discussion, the only assets of Jupien are the information he obtains by means of the frequent reports he asks the Regional Directors to write. However, the General Secretary's capacity to negotiate investments also affects the Director of the ISD, since many investment projects relate to new applications of information systems.

Accordingly, one can identify a cross-regulatory system of actions which can be described as follows:

Tarbes controls the destination of the monthly computer analysis of the data produced by Region A. A rapid and complete knowledge of this information increases the General Secretary's room for manoeuvre in investment negotiations. When related to the decisions about investments in information systems, of which the greatest part has effects at the regional level, this room for manoeuvre affects the Director of the ISD who needs the General Secretary's agreement for his application projects to be adopted. On the other hand, the acceptance of his project increases or maintains Tarbes' control over the information systems and procedures which are coveted by the site agents who wish to

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influence and benefit from new applications of information technology.

One notices that the Deputy Chief Executive, the Regional Director and the accountant do not take part in this regulatory process. However, the control over the zone of uncertainty relating to the links with the commercial and institutional environments could allow a second type of regulation to develop.³

4.3. Third Zone of Uncertainty

A third zone of uncertainty surrounds both the Regional Director's search for clients and his accountant's negotiations with banks. Their respective actions determine, firstly, the completion of the contract (stemming from the client's agreement with the Director's proposal), secondly the commencement of work on site (stemming from the banks' agreement to stand surety for the client). To achieve his supervisory mission over the various Regions, the Deputy Chief Executive uses the information transmitted to him by the Regional Directors. The strategy of the Deputy Chief Executive is, with the help of the frequent reports he demands of the Regional Director (Rio), to retain a portion of his control over Region A. This control proves very useful to Jupien during the budget discussions involving the General Secretary (the Deputy Chief Executive is mainly concerned with commercial arguments, while the General Secretary appears particularly concerned with budgetary matters). Protocol analysis shows that the Deputy Chief Executive (Jupien) does not try to use the zone of uncertainty under the control of the regional accountant (i.e. that relating to the negotiations with the banks).

4.4. Fourth Zone of Uncertainty

A fourth zone of uncertainty, relating to the choice between MNL and MCO, affects the three preceding zones of uncertainty and the position of the actors in their search for control over Region A.

4.4.1. The Site Agents of Region A

In the first place, this zone of uncertainty affects the end-users of the system, i.e. the site agents. The effect of MNL would have been to render the site absolutely transparent to the Head Office. MNL meant that, at the end of each working day, the completed operations would have to be recorded by means of the minitels. The software is designed in such a manner that this information would have been entered in the tables displayed on the minitels' screen. Such a procedure would have meant the standardisation of the manner in which the format of these data is collected. Then, the mainframe would have performed an analysis sufficiently precise so that the interpretation of the deviations would always have been possible. Therefore, the room for manoeuvre of the site agents would have been reduced: this procedure would have prevented them from transmitting data that would not have lent themselves to precise analysis and attribution of responsibility for the deviations. On top of this, day-to-day progress reports about the works on site would have enabled any analyst from the Head Office to detect mistakes in the management of the sites without enabling the site agents to hide these mistakes by aggregating the overall results of the building operations at the end of each month. Finally, the ease of use of MNL would have provided the General Secretary (or any of his assistants) with direct access to these data, without recourse to the Director of the ISD. Such a system would have eradicated all possibility of negotiating by the

site agents.

Protocol analysis indicates that the rationality of the site agents hinges more on the execution of building works in accordance with the clients' requirements, than on a respect for initial budgetary estimates.

The system of actions which comprises the control over Region A, and the rationality of the site agents allows for understanding their favourable attitude towards MCO. In the first place, micro-computers enable the site agents to maintain their present level of control over the information about the execution of building works, since the diskettes remain in their possession. Even if a connection between the micro-computers and the mainframe were to be established, they would control substantial portion of the information about the sites:

- (i) They could detect deviations in real time and take prompt remedial actions (when possible) or, should the case arise, refine their analysis (with the help of the micro-computer on site) in order to attribute the responsibility for the deviations either to the methods engineers, or to unexpected eventualities (e.g. an increase in the cost of building materials, a modification of the client's requirements, etc.).
- (ii) They remain in a position of negotiating both within the system of actions and the first regulatory mechanism (see 4.2.) since the access to the information about the sites by means of the connection (i.e. the connection between the mainframe and the micro-computers, which connection Tarbes is already trying to work out) needs a procedure more complicated than with the minitels. In other words, it is less easy for the General Secretary to have access to the information about the sites with MCO than with MNL. With MCO, the General

Secretary still needs the mediation of Tarbes in order to have information about the sites.

4.4.2. The Director of the ISD

The zone of uncertainty relating to the choice between MCO and MNL also affects the Director of the ISD. Tarbes' capacity to influence the organisational game is determined by his expertise in information technology. Although the site agents threaten, because of their education, the exclusivity of this expertise, Tarbes' position and his easy access to the central computer enable him to be a central piece in the first regulatory mechanism (see 4.2.). This seems to account for his opposition to MNL, the ease of use of which would have permitted the General Secretary to have direct access to site information.

The rationality of the Director of the ISD is oriented towards the substitution of computerised procedures for manual procedures, to the standardisation and the "clarification" of these procedures, within the limits of available investments. Tarbes' favourable attitude towards MCO can therefore be explained as follows:

- (i) With MCO, the General Secretary must still use Tarbes or his assistants to increase his control over Region A; this can help Tarbes to negotiate with the General Secretary, in discussions relating to new information systems investments. Usually, Tarbes tends to support investments which require his expertise (one instance of these investments is the future connection between the mainframe and the micro-computers on site).
- (ii) The preservation of this capacity to negotiate enables Tarbes to control the development of information technology at Piranhas Corporation, in the face of the site agents' desire

to increase their influence over such developments.

4.4.3. The Deputy Chief Executive for Building in the Country

The fourth zone of uncertainty also affects Jupien, but less directly. His rationality, which is mainly oriented towards the maximisation of commercial opportunities, and his desire to preserve a portion of his control over the Regions in the face of the General Secretary, seem to account for his unfavourable attitude towards a system (MNL) that would have provided the General Secretary with more immediate access to site information.

4.4.4. The Director of Region A

The fourth zone of uncertainty also affects Rio. His rationality is of the same type as that of the Deputy Chief Executive. On top of this, having no prospect of promotion, his strategy consists of preserving the autonomy of Region A in order to be able to "perform genuine autonomous management". Therefore, two different attitudes towards the proposals were conceivable. A favourable attitude towards MNL, since the control that the General Secretary would have obtained thereby would have enabled the Director of Region A to devote himself to the search for clients; or a favourable attitude towards MCO which preserves the autonomy of his Region. The fact that Rio has taken the latter view suggests that he was afraid that an increase in Saby's control over Region A would have pushed the Deputy Chief Executive to increase his demand for information (through frequent reports).

4.4.5. The Accountant of Region A

The "legitimacy" of the regional accountant is based on his capacity to handle the management control of Region A. His rationality is mainly oriented towards the optimisation of the financial methods and tools he uses in order to: (i) help the site agents in their control over the financial aspects of building works; (ii) supervise the interpretation of the deviations for each site. With MNL, both these operations can be achieved from the Head Office. The regional accountant's favour towards MCO can be explained by the fact that this project, on the contrary, enables Monceau to perform complete real-time financial control, in better conditions than at the time when "information technology was solely used to draw statements".

4.4.6. The General Secretary

The General Secretary, as mentioned above, is the only actor who is in favour of MNL. The Deputy Chief Executive's opinion, which is generally shared by the other actors, is that Saby no longer masters the environment necessary for his institutional role, and that he counterbalances this weak point by increasing his control over the Regions (see 3.3.). Such a strategy is based on a bureaucratic rationality of control over administrative (i.e. the procedure of interpretation of the deviations) and technological (i.e. the control over progress and organisation of construction works) issues. His favour towards MNL can therefore be explained as follows: (i) MNL would have enabled him to implement a day-to-day control over the construction on sites; (ii) this control could have been direct (from a minitel terminal installed in his office, for example), which would have left him free from Tarbes' mediation to get information about the sites. However, it is surprising that a

project to which Saby was opposed, has been accepted. This astonishment arises from the fact that Saby occupies a key position in the hierarchy and in the decision-making process related to investment selection. The following section deals with solving this paradox.

4.5. Solving the Paradox

In recapitulation, one can say that the opinions are clear-cut: only the General Secretary is in favour of MNL while, for various reasons, all the other actors are in favour of MCO. Although the coalition is numerous, it is surprising that the Chairman and Managing Director can have made a choice against the advice of his General Secretary.

In the resolution of this paradox, the information from our contact at Baleine furnishes interesting hints. According to this person, the Chairman and Managing Director of Piranhas did not have to go against his General Secretary's advice, since the latter eventually gave his agreement for MCO. Baleine's sales engineer withholds his information from the General Secretary himself, who phoned him to say that Baleine's offer was declined, "to his considerable regret, but with his agreement". According to the sales engineer, Saby only changed his mind (or at least his position) during the last discussion of the projects with the Chairman and Managing Director.

Strategic analysis can explain the final strategy of the General Secretary (whose change of position seems still unknown by the other actors) without, of course, enabling the researcher to assert that the foregoing reasoning was definitely his.

It has been seen that the adoption of MCO would have deprived the Director of the ISD (Tarbes) of any bargaining power over the

site agents (see, in particular, 4.4.2.). However, the site agents have an expertise in information technology. Therefore they master a field of activity of increasing importance in industry. Such a skill escapes the General Secretary who cannot, vis-a-vis the management board, prevent any development in information technology. By accepting MCO, Saby maintains Tarbes' exclusive power over the site agents. Therefore, by leaving to the site agents an autonomy controlled by Tarbes (the connection between the micro-computers on site and the mainframe will be monitored by Tarbes), the General Secretary keeps a possibility of triangular negotiation [General Secretary - Director of the ISD - site agents]. This possibility of negotiation is mainly useful to Saby in his control over the site agents. Had MNL been adopted, the mastery the General Secretary would have gained over the site agents would have been limited in relation to the problems which they could have posed to him. MCO has the effect of permitting the General Secretary to maintain an indirect power over the site agents. It appears that he preferred to have this indirect power to a direct control which was to be undoubtedly artificial and of short duration. The rationale of the General Secretary's behaviour can be summed up by the following propositions:

- (i) The Director of the ISD is more dependent on the General Secretary than are the site agents (as a head of department, Tarbes is concerned with budgets and must resort to Saby to have his investment projects accepted; the site agents have less to expect from the General Secretary).
- (ii) The site agents are more dependent on the Director of the ISD than on the General Secretary (the site agents are pushing to have more information technologies at their disposal, but they need Tarbes' support to have them accepted).

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(iii) Therefore the General Secretary keeps the Director of the ISD "within the game" so as to maintain his (indirect) control over the site agents and, consequently, over the Regions.

The paradox can also be solved by using Power Theory. The General Secretary used to enjoy both positional power and resource power (see note 1, Appendix I). His positional power used to result from : (i) his position in the interface between the company and the financial institutions and shareholders; (ii) his position in the decision-making process related to investment selection. It is said that the General Secretary is less and less able to achieve his institutional mission (see 3.3.). Whether this inability is real or not is not a relevant question. What is important is that influential actors believe (or express the view) that it is real. This means a decline of the positional power of the General Secretary. This drives him to counterbalance this decline by increasing his resource power.⁴ Resource power usually results from the ability to distribute the goods (remunerative power) or the bads (punitive power). The General Secretary's resource power is mainly punitive, since his control gives rise to the interpretation of the deviations and, therefore, to the attribution of responsibility. Accordingly, the General Secretary's situation may be summarised as follows:

- (i) His resource power is increasingly punitive, and exercised towards the site agents, via the procedure of interpretation of the deviations.
- (ii) His positional power is increasingly limited to his position in the decision-making process related to investment selection. Most of the investment proposals are related to information technology. Consequently, the General Secretary's positional power is increasingly exercised towards

the Director of the ISD. It has been seen that MCO has the effect of maintaining Tarbes "in the game" (i.e. in the regulatory mechanism exposed in 4.2.). In other words, MCO preserves the Director of the ISD's relevance. A power is a power only if it is exercised towards "relevant" actors. Therefore, the General Secretary's acceptance of MCO can be viewed as a strategy to preserve his positional power (over the Director of the ISD).

5. Conclusion

This case study allows for a comparison of the efficiency of two distinct commercial approaches. Baleine contacted first the Director of the Information Systems Department who was, then, to "sell" the system (i.e. MNL) to its potential users (i.e. the site agents). On the contrary, the American company COD contacted first the potential users, introduced the system (i.e. MCO) to them in the field and emphasised the interest of the micro-computers to them.

The outcome of the decision-making process, of which strategic analysis proposes an explanation, justifies the second approach. However, it is important to note that we could test our suspicion that the Director of the ISD suggested to the COD sales engineer to contact the site agents: the sales engineer from Baleine told us that the COD sales engineer was first contacted by Tarbes who advised him to contact the site agents of Region A.

Even if one can consider that the two approaches are similar insofar as the Director of the ISD was at the origin of both, COD's approach is different because it is centred on the potential users of the system. However, the importance of an approach directed towards the end-users must not be over-emphasised on the sole basis of one case study.

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NOTES AND REFERENCES

1- A minitel is a terminal of the French interactive system of videotex: it is a video terminal linked to a telephone. Minitels provide users with information similar to such well-known teletext systems as Britain's Prestel, but are provided free by the PTT rather than purchased as a television add-on. The Transpac network enables various minitels to be inter-related and/or connected to a private mainframe. In this case, the minitel owners must pay for the use of Transpac. The cost of a communication via Transpac is not significantly greater than that of a phone-call.

2- This view is consistent with Crozier and Friedberg's definition of organisational stakes: a stake is what is needed by an actor to pursue or achieve his strategy (see L'acteur et le systeme, op.cit.).

3- A "regulation" is the process by which an organisation of actors (and, therefore, a system of actions) maintains a dynamic equilibrium. Such an equilibrium is viewed as a balance of powers and countervailing powers (see L'acteur et le systeme, op.cit.).

4- The inference is based on Galtun's contention that an actor tries to optimise his power configuration. That is, a decline in positional power will be counterbalanced by an increase in resource-power (when possible), and vice-versa. (See: Galtun, op.cit., note 1, Appendix I).

BARRACUDA CORPORATION

0. Introduction

This case study is based on an extensive analysis of the "Big Ticket" system (BGT) within Barracuda Corporation, one of the largest French retailing companies.

0.1 Genesis of the Study

The genesis of the study can be summarised as follows: (i) a research assistant from Barracuda informed me about a problem concerning the adoption of a new business information system within her company; (ii) this person introduced me to the head of the Organisation Department of the chain and we then asked him whether it was possible to carry out interviews within the company in order to study the BGT project; the reasons which I gave to justify my proposal were mainly technical and emphasis was put on the technological problems faced by companies during the phase of introduction of new information technologies; (iii) some days later, the head of the Organisation Department informed me that it was impossible for anybody outside the company to undertake such interviews, but a solution was still possible: that of carrying out a study for Barracuda; as a researcher appointed by the company I could easily perform the interviews; (iv) I was appointed by Barracuda for a one-month period, and the mission was "to present a diagnosis of the situation and a set of recommendations for the optimisation of BGT". This month of research was mainly devoted to carrying out the technical mission for Barracuda (which technical mission enabled me to interview 30 people from the Head Office and

34 from the stores). However, at the end of the study, enough information was available to carry out a more strategic-oriented analysis for the purpose of the present research.

0.2. Purpose of the Study

This appendix presents the study of BGT, an automated and computerised stock management system for white goods (i.e. fridges, cookers, dish-washers, etc.). The key point of the case study is that the decision is neither one of adoption nor one of rejection of a new information system (i.e BGT). Rather, the situation seems more akin to that of a deferred final decision.

In fact, following a commercial proposal by the American manufacturer Computer Omnium Data (COD), Barracuda agreed to test the system. The test started three years ago, and its length may give the impression of an adoption, although no more than 10% of the test objectives are fulfilled and no formal decision has been made so far.

The objectives of this case study are therefore:

- (i) To demarcate the organisational factors which contributed to the "consistently weak" realisations of the test and, yet, to the continuation of the test.
- (ii) To try and assess the influence of the actors' rationalities and strategies on the decision-making process related to the potential innovation.
- (iii) Subsequently, to try and assess the extent to which COD's marketing could have benefited from strategic analysis for its commercial approach towards Barracuda. So far, COD has sold less than 10 terminals for the BGT project (the "potential market" amounts to 80 terminals) and Barracuda's decision-

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makers are still too worried about the weak indications of the test to pay attention to other commercial proposals from COD.

These objectives may be attained through the following steps:

- (i) Presentation of the company;
- (ii) The innovation system: principles and implications;
- (iii) Divisions, departments and actors: organisation, missions and objectives;
- (iv) The actors' experience: feelings and actions;
- (v) Analysis of the zones of uncertainty: organisational stakes, rationalities and strategies.

1. Presentation of the Company

This section is meant to characterise the main features of Barracuda Corporation with a view to highlighting the relevance of the innovation system to the company. In this respect, the following points will be addressed: company's general data, corporate situation, buying and supplying functions, logistics and re-stocking problems. This early examination should assist the understanding of the innovation system.

1.1. Company's General Data

Barracuda Corporation is a French public limited company. It runs 277 department stores, all located in France. The main activity of the chain is the commercialisation of an offer ("assortment") consisting of a food division and a non-food division. The chain possesses various types of stores, but the study will mainly focus on two categories: the high-street hypermarkets and the Home and

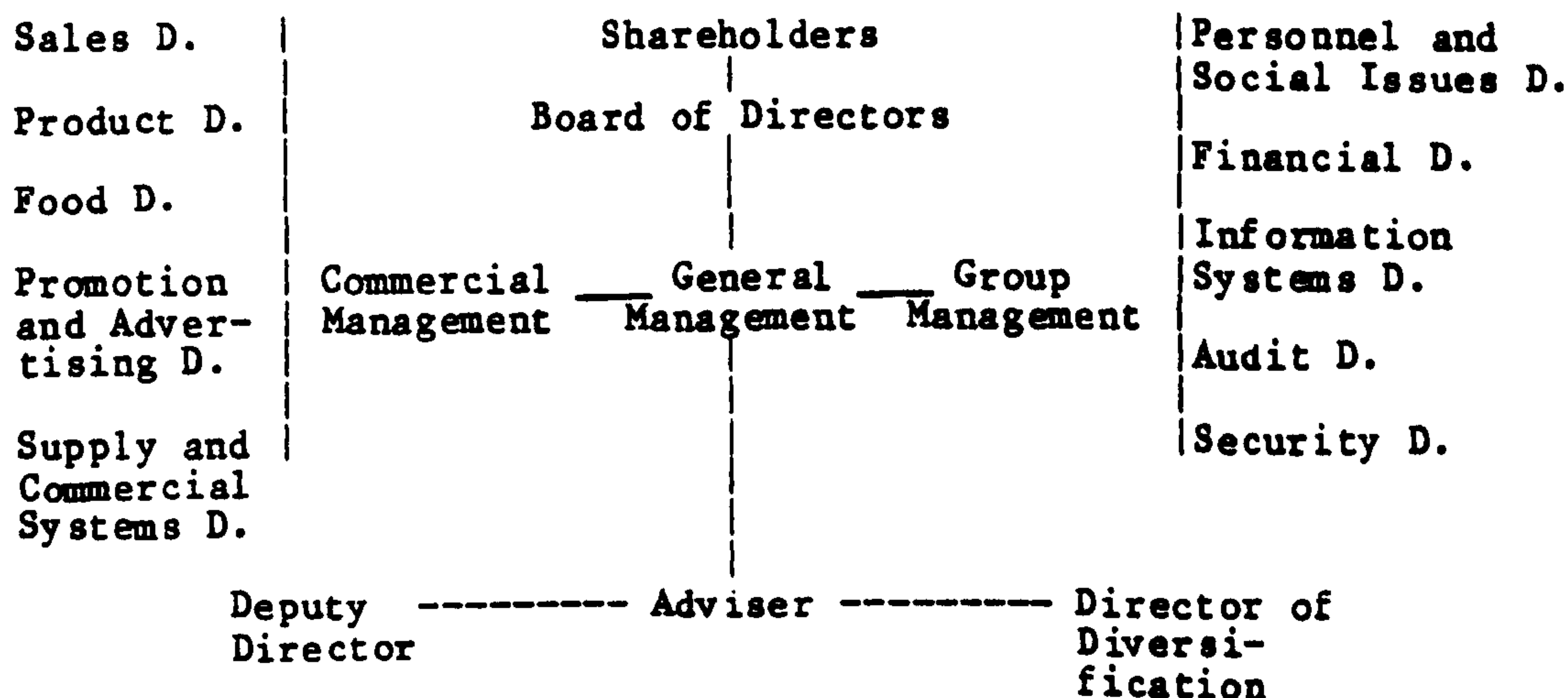
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Garden Centres (HGCs). HGCs are a mixture of DIY stores, garden centres, furniture shops and domestic appliances shops. HGCs are remarkable in terms of surface area and turnover: in some HGCs, the white goods department alone can give rise to a turnover of FF 26,000,000. Unless otherwise stated, the term "store" will denote both hypermarkets and HGCs, especially when referring to store managers.

The group employs about 15,000 people (60% are female) and the Paris Head Office employs 950 people. Besides its main retailing activity, the company enjoys a diversified portfolio of activities through various subsidiaries: credit, tourism, import-export, catering, continued education (through an institute specialising in teaching retailing techniques and management: "Institut des Techniques de la Distribution", or ITD).

The distribution of Barracuda's activity is thus: food (26.6% of turnover), clothing (39.7%), home equipment and leisure (33.7%). The total turnover of the group, including sales and provisions of services, amounted to FF 17,303,000,000 in 1984. In 1985, investment will amount to FF 180,000,000.

The organisation chart may be represented as follows ("D." stands for "Division"):



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1.2. Corporate Situation

Up until 1978, the company enjoyed a leader position in its market and was able to maintain a low level of investment, while productivity was far from being a major concern. Nevertheless, from this year on, the general economic depression combined with increasing competition of peripheral big stores such as But, Mobis or Darty, has resulted in resource allocation becoming the central problem of Barracuda. Reinvesting was necessary in order to maintain profitability which, in fact, had steadily declined. However, the weak level of cash-flow resulting from the low level of depreciation (resulting itself from the low level of investment) and the modesty of the net profits were limiting investment capabilities. The present efforts of the general management are aimed at breaking this "loop of decline" (Personnel Director).

In order to understand the set of problems posed by the innovation, two major functions of the company must first be examined.

1.3. The Buying Function

This activity is at the centre of the mission of the Product Division. The role of this division consists of defining the commercial policy of the group, selecting the assortment which will constitute the basis of the stores' offer and controlling the stores orders. The chain's Central Buying Department is controlled by the Product Division for the commercial aspects, and by the Supply and Commercial Systems Division for the administrative aspects. More precisely, the Central Buying Department is in charge of:

- (i) Selecting a set of articles within which each store will

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choose its own assortment, according to some financial constraints and market specificities.

- (ii) Managing the purchases of the merchandise. The Central Buying Department deals with 6,000 suppliers and handles more than 100,000 different types of articles.

These operations involve diverse negotiations, the follow-up of deliveries, the settlement of litigation, etc.

The selection of an article consists of entering its name and characteristics into a computerised article file. This file can be addressed by means of the stores' terminal, and displays, for each article, the purchase price without VAT for a minimum level of order along with a recommended selling price allowing for the stores' margin. Via the terminal, the stores can also order the articles (if they belong to the selection): the order instructions are transmitted through the packet switch network to the Head Office where they are automatically edited, printed and mailed to the suppliers.

1.4. The Supplying Function

This activity furnishes the core of the mission of the Supply and Commercial Systems Division (SCSD). More precisely, the role of the SCSD consists of managing and coordinating the following functions:

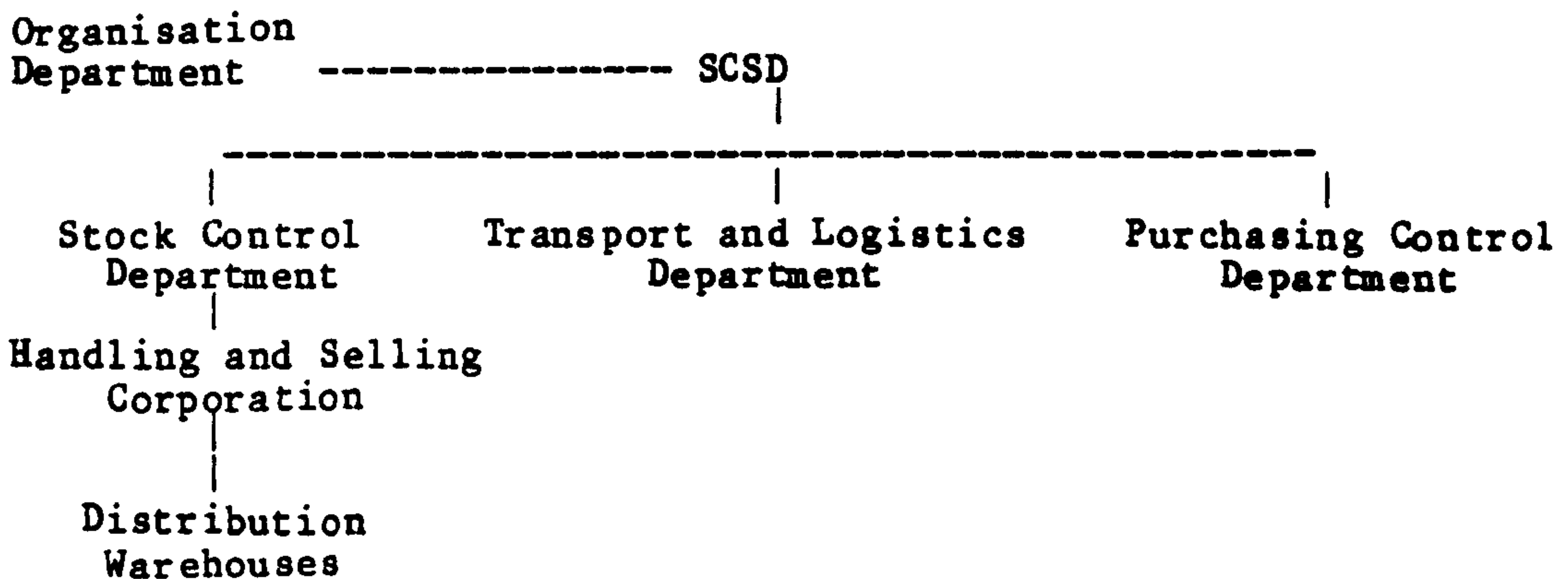
- (i) Logistics: to meet the short term needs of the stores and exercise functional control over the logistics divisions of the stores; to control the implementation of the transport policy and the development of the regional distribution warehouses.
- (ii) Purchasing: to monitor all the administrative operations of the Central Buying Department, in cooperation with the

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commercial departments of the Product Division.

- (iii) Organisation: to assist all the other divisions in their organisational problems, be it at the Head Office or at the store level; to define working standards and train the employees.
- (iv) Supplying: to control the implementation of the new policy aimed at developing the distribution warehouses.

The organisation chart of this division is represented by the following diagram. The relevant elements of the diagram will be characterised in more detail in due course.



The Divisions and departments mentioned in the foregoing lines will be described in more detail in Section 2; similarly, the question of the Handling and Selling Corporation (in fact, this organisation is juridically a public limited company controlled by Barracuda, and functionally attached to a division of Barracuda) will be addressed in due course. However, the early functional presentation above should assist the understanding of the logistic and re-stocking problems of the company, which are directly related to the innovation system.

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1.5. Logistics and Re-stocking Functions

Two types of logistics already exist in the chain. They are briefly described below.

The Traditional Type

Each store sends orders to the suppliers, who deliver and invoice the store. Thus, the operation happens as many times as there are stores, suppliers and products. For each supplier, each store is a different client, and each transaction generates an order, a delivery, an invoice and a settlement. This type mostly concerns seasonal products.

The Distribution Warehouse Type

In this situation, a wholesaler intervenes between a certain number of stores and a certain number of suppliers. The wholesaler substitutes itself for the stores by placing the orders, controlling the stocks and settling the invoices. On the other hand, the wholesaler takes the place of the suppliers for delivering and invoicing the stores. This type of logistics has given rise to a new branch of Barracuda: the Handling and Selling Corporation (HSC). HSC plays the role of the wholesaler and is in charge of managing the Barracuda distribution warehouses. Most of the all-season products are concerned with this type of logistics. The turnover of HSC consists of the total of the internal prices (i.e. the price at which the distribution warehouses invoice the stores).

The internal price consists of the purchase price without VAT (as quoted in the article file) multiplied by a coefficient accounting for the operating expenses and margin of the HSC. HSC accounts, on average, for 5.5% of the price (without VAT) at which the stores purchase the goods from the HSC. The advantages of this

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type of logistics can be summarised as follows:

- (i) Simplified management;
- (ii) Simplified administrative and clerical tasks in stores;
- (iii) Better use of the stores' surface area ("optimisation" of the layout so as to gain more available selling space);
- (iv) Better purchasing conditions (the discount rate increases as the suppliers have to handle less and less individual invoices);
- (v) Stock shortages are less and less frequent.

Though juridically a public limited company (as well as a branch of Barracuda), HSC is functionally attached to the Supply and Commercial Systems Division (SCSD). This connection seems to result from the objective which the general management has assigned to the SCSD: that of enlarging the store offer (the subsequent rise in stock being passed on to HSC warehouses), improving the profitability of the product lines and gradual lowering of the stores' stocks (the physical stocks being gradually transferred to HSC warehouses).

The problem at issue in this case study is related to the second type of logistics. The connection results from the fact that the warehouse type of logistics allows for automatic and computerised re-stocking of the stores. This possibility is based on the "Big Ticket" system (BGT). The procedure can be summarised as follows: for the white goods only (e.g. fridges, cookers, dish-washers, etc.), the sales assistant may use a terminal in order to check the stock availability within the store or in the nearest HSC warehouse and also the terms of delivery, should the article desired by the client need to be ordered. Then, the sales assistant can use the terminal to order the goods from HSC, or record the sales if the

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desired articles are available within the stores. In the latter case, the goods sold are subtracted from the inventory.

This first section was chiefly devoted to a functional characterisation of the company. Having summarily described the chain's major activities and related these activities to the BGT problem, it is now possible to describe the innovation in more detail.

2. The Innovation System: Principles and Implications

In 1982, an American manufacturer of hardware and software (Computer Omnium Data, or COD) contacted the Information Systems Division (ISD) of Barracuda and offered to sell the BGT system (a software) to the company. The system is easy to define: a certain number of terminals are connected to a mainframe; from any terminal, the program enables the user to address all the other terminals and to have access to a number of files; some of these files can be modified (the stock file of the user's store and the stock file of its related HSC warehouse), some cannot (e.g. the stock file of other stores). The terminals are connected by means of the Transpac network (see Appendix II).

2.1. Domain of Application of the Innovation System

BGT is mainly relevant for "heavy" and expensive goods with a slow tempo of sales. With low administrative costs, BGT enables the user: (i) to know the availability of an article in the store's reserve or in the warehouse stocks; (ii) to take clients' orders when the good is not available in the store.

Two types of orders are possible: "order for collection", which

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refers to the sale of a good which the customer prefers to order and collect later on; "order for delivery", which refers to the sale of a good which the customer prefers to order and have delivered at home.

The management of an article on BGT can be achieved by means of the three following procedures:

BGT 1 This procedure is used in order to check the availability of an article, (in the store or in the warehouse), to book orders for one or various articles which are to be collected by the customers or delivered at home, to register a take-away purchase. A "take-away purchase" refers to a situation when the customer wants the good immediately. In this case, the good is taken either from the store minimum reserve stock or from the merchandise on display.

BGT 5 This procedure is used to retrieve or cancel an order.

BGT 7 This procedure allows the user to open a file for new articles, to modify the conditions of management of an article: e.g. to change the selling price, the type of re-stocking, the level of minimum stock beyond which automatic re-stocking is operated, etc.).

In fact, BGT allows for two types of restocking:

- (i) "Free re-stocking": the local store manager or his departmental managers order as many articles as they consider necessary;
- (ii) Automatic re-stocking: for each sale operation, the system automatically generates re-stocking orders for the corresponding number of units sold.

The user can choose the option on the terminal.

2.2. The Promises

The COD sales engineers were able to convince the managers of the Information Systems Division (ISD) of the value of the BGT system. Then, these managers informed the Supply and Commercial Systems Division (SCSD) of the existence of the system, and of COD's proposal. At this time, a department of the SCSD (the Stock Control Department) was studying various alternatives in order to optimise the warehouse type of logistics. During a meeting which was attended by executives from both the ISD and SCSD, a member of the ISD emphasised the following advantages of BGT:

- (i) Low total costs, both in terms of investment and variable costs;
- (ii) BGT allows for an optimisation of the warehouse type of distribution for three reasons:
 - (1) The "heavy" products, with a slow tempo of sales and a low stock turnrate, could be stored in the warehouses. This would contribute to lowering the stores' financial charges. Thanks to BGT, the stores could then order the goods from the warehouses and be delivered within 48 hrs.
 - (2) BGT allows for widening the stores' range of goods on offer. Since the stores would no longer have to keep a stock of the products in order to sell them, and could make do with only the merchandise on display, consumers could therefore be offered a wider assortment. The subsequent increase in reserve stock would be passed on to the HSC warehouses.
 - (3) BGT allows for a real-time control of the warehouses' stocks and of the stores' minimum reserve stocks. After each sale or order, the file is modified and the store or warehouse can be replenished.

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These arguments seemed consistent with the SCSD's concerns of the time, and with those of the Stock Control Department. Accordingly, the following decisions were made:

- (i) It was decided to test BGT in the Lyon area for the white goods only. At the time, Lyon's warehouse was catering for 20 stores.
- (ii) The Systems Department of the ISD was asked to adapt BGT to the particular needs and technical constraints of the company.
- (iii) In parallel, the Stock Control Department was asked to induce the stores to lower their reserve stock cover, from an average of four months down to 1.5 months (for the white goods only). Then, the stores will have to orient themselves towards a gradual but total absence of reserve stocks for white goods (it was computed that by saving 1.7 months of stock, it was possible to save 0.7 month of overheads, i.e. about 0.70% of the corresponding turnover). To do so, during the first months, the sales staff will have to use the free re-stocking option rather than the automatic one, so as to absorb the present excess of reserve stocks (if each time one sells an article, the system automatically generates an order, the stock cover will, at best, remain constant; by contrast, "sales assistants should be able to order only when necessary").
- (iv) BGT will have to be extended to other stores and products (e.g. furniture), while the policy of warehouse type of distribution will have to be developed by boosting HSC's activity and network.

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2.3. The Reality

About three years later, in late June 1985, the situation is the following:

- (i) The adaptation of the BGT software is viewed as "technically" satisfactory in general but also as "too sophisticated" by some actors.
- (ii) 350 types of white goods are run on BGT;
- (iii) The average reserve stock cover for these articles amounts to three months.
- (iv) Most of the stores have left their terminal switched on the automatic re-stocking option after the initialisation phase (The phase of initialisation of the system in a store refers to the installation and starting of the system in the store).

In brief, after three years of test, the situation can be summarised as follows: the actual results are far from meeting the objectives; the first decision to test the system did not give rise to a formal and final decision of adoption or rejection of the system.

Before proceeding any further, it is worth summarising the purely commercial implications of BGT.

2.4. Commercial Implications of the innovation

BGT implies change in terms of commercial mission and behaviour.

Firstly, stocking white goods in regional warehouses allows for widening the offer available to the consumer. However, as the available selling space in the stores cannot be expanded in the same proportions, it follows that some articles of the assortment cannot be displayed to the customers (there is not enough room) and that

the sales assistants must be able to sell them in spite of this.

Secondly, the conjunction of the widening of the assortment and lowering of the stock cover has the following effect: it is not uncommon to find that an article which a client has ordered will not be immediately available within the store. The article is stored in the warehouse, but not in the hypermarket. In such case a take-away purchase is impossible, and the client is told that he must either come back to collect the article or have it delivered at home (48 hrs later). Accordingly, the orders for deferred collection or delivery are expected to supersede the take-away purchases. However, up until very recently, the reputation of Barracuda was based on the easiness to realise the latter type of purchase in the chain's stores. This was not the case for Barracuda's major competitors.

To recapitulate, the status of the decision related to the innovation is that of a deferred final decision. Accordingly, strategic analysis will focus on the organisational possible causes of this situation. To do so, various divisions, departments and actors will have to be considered. The third section of the present appendix hinges on this point.

3. Divisions, Departments and Actors: Organisation, Missions and Objectives

3.1. The Information Systems Division

The ISD has undergone dramatic development, noticeable on various levels. Interestingly, the division occupies three out of the five floors of the Head Office's building, employs 200 people and enjoys the biggest share of the investment: in 1986, the ISD will take as much as 28% of the total budgeted investment. Another indication of

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the importance of the ISD is that, in this division, the heads of departments have the title of vice-director. In all the other divisions, the title is "Head of Department" (there is another exception, which will be introduced below).

The various departments of the ISD are: Credit, Finance, Operations, Installations, Systems and Outputs.

The Operations Department controls the stores' orders to the suppliers and the deliveries to the stores. BGT slightly alters the function of this department, since the white goods-related orders can now be placed to HSC directly.

The Systems Department designs or adapts the software and programs required by the new systems of the company. Most of these tasks are carried out in cooperation with the Organisation Department of the Supply and Commercial Systems Division.

The Outputs Department edits and prints all the informatic statements that may be asked for by the diverse divisions or departments of the chain.

The Installations Department controls and monitors the capture of the data emanating from the stores' electronic cash registers. This department employs 60 people and plays an important role as regards BGT. This importance is due to the fact that the department is also in charge of initialising the systems designed by the Systems Department. Accordingly, 15 employees of the Installations Department specialise in providing end-users with the skills (through training) and material (by initialising the operating programs in the stores) required for running the systems. The department has neither the time for, nor the mission of, following up the users after the installation. The staff from ITD ("Institut des Techniques de la Distribution", see 1.1.) is chiefly in charge of completing and widening the preparation of the users, within the framework of in-company training schemes.

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At this stage, there is one ambiguity worth highlighting: Who is accountable for training the sales staff on BGT? A sort of implicit division of the tasks seems to have materialised as follows: the Installations Departments of the ISD initialises the systems (i.e. the department installs the terminals, enters the initial data into the files and explains the operating commands to the future users); while ITD provides the staff with seminars and explains the systems in more detail. The educational background of the department's actors in charge of BGT is neither high nor specialised: "baccalaureat" level in general.

3.2. The Supply and Commercial Systems Department

This division, which employs 150 persons, has already been summarily described. Still, some points deserve further consideration. The division is headed by Paul Vigne, 57, who holds a degree from "Institut d'Etudes Politiques de Paris". His mission consists of coordinating the following functions of the company: logistics, purchase management, organisation and supplying. Only the three latter functions are crucially involved by BGT.

3.2.1. The Organisation Department

Five persons work in the department, headed by Jean-Claude Gali (35, "Ecole Supérieure des Sciences Economiques et Commerciales"). Gali's mission is rather vague and complex but can be summarised as follows: to study and simplify functional liaisons in the company, to spot possible improvements in present management systems and to detect possibilities of reducing operating costs. This mission leads him to conduct studies on, or deal with, as varied problems as the new electronic cash registers (Barracuda has undertaken to

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replace the present NCR machines with COD optical reader-equipped machines), stock control (with BGT), training the Head Office staff on the Visicalc and Lotus packages, equipping each department with at least one micro-computer. Gali is assisted by a project officer (28-year old, "Ecole Superieure de Commerce de Paris"), a research assistant (25, "Institut de Socio-Economie des Organisations"), a 40-year-old systems analyst and a secretary. Gali is generally described as a "high flyer", expecting a directorial position.

3.2.2. The Stock Control Department

Forty persons work in this department. The justification of the existence of the department is that "commerce and administration will never get on well". Accordingly, the department is in charge of handling the administrative implications of the sales activities. Such a mission chiefly impinges on two levels: the management of the stocks of the HSC distribution warehouses and the control of the stores' stock cover. In this respect, three persons in the department play an important role in relation to BGT. Their situation is examined below.

3.2.2.1. The Director of the Stock Control Department

From the outset, the title of the head of this department must be examined. Henri Chaler (61, "Ecole des Hautes Etudes Commerciales") is the only head of department with the title of Director. His position is all the more ambiguous as his other title is that of manager of HSC (which, as already mentioned, is in fact a branch of Barracuda Corporation).

Chaler's mission consists of "tidying up all the structures

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which interfere in the supplying of the stores" (Vigne) while developing the role of HSC in the overall distribution system of the group. A former company managing director and chief executive, Chaler entered Barracuda 10 years ago. Two years ago, he was sacked from Barracuda. The dismissal resulted from the pressure exerted by some store managers who were complaining about the "direct" methods Chaler was using to impose HSC and the warehouse type of distribution. Shortly after the dismissal, Chaler was reinstated in the company, after Vigne's direct intervention. According to Gali, Chaler accepted the offer only after negotiating and obtaining a very advantageous contract: as a matter of fact, a clause of this contract stipulates that a substantial amount of money should be offered to Chaler in the event of another dismissal. His wages were dramatically increased, while "carte blanche" was given to him for all actions capable of developing HSC. At present, Chaler is viewed as the actor with the largest degree of freedom in the organisation ("he has nothing left to win, or prove", according to Gali).

3.2.2.2. The BGT Project Officer

Gilles Petiot, 48, holds a degree from Rouen Business School. He is a former general inspector (see below, 3.4.1.), and his present mission consists of ensuring that the general management's new stock policy is followed in the chain. Accordingly, Petiot must control the stock covers (in both stores and distribution warehouses) and detect any infringement of the turnrate objectives. The turnrate objectives (i.e. how many times the stocks must "turn" in the year) are determined in relation to the nature of the articles, their seasonality and their tempo of sales. Presently, the average stock cover for white goods amounts to three months, which means an

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average turnrate of four. It is targeted to lower the monthly level of white goods to the following: display stock (i.e. quantity of merchandise on display) plus half the forecasted sales of the month.

Chaler has appointed Petiot as responsible for the developing of BGT and the achievement of the new stock policy. The objective the BGT Project Officer has been assigned, is thus: to ensure that stores abide by the new stock policy and that BGT be extended to all the white goods before the end of 1986. Petiot's possible partners for this mission are: ITD (inasmuch as this structure is in charge of training the future end-users of the system), Installations Department (inasmuch as this department is in charge of installing and initialising the system in the stores), HSC (since this organisation supplies the stores with white goods through the warehouses), the General Inspectors (since they can perform "surprise controls" in the stores and check the stock levels), the store management and staff (since the end-users of the system are meant to be the sales assistants), the Central Buying Department (since BGT can aid the Buyer in finding the products which sell well, by using a BGT terminal). However, the role of each of these actors or subunits is far from being clear, as will be shown below.

3.2.2.3. The HSC Distribution Manager of the Head Office

Simon Maucer, 35, is a former store accountant. His mission consists of coordinating the tasks of the HSC Distribution Managers for white goods. His objectives are the following: ensuring that the warehouses' stocks have optimum turnrates; obtaining the maximum logistics discounts from the suppliers; minimising white goods stock shortages both in stores and warehouses.

The logistics discounts refer to all the discounts granted by the suppliers as a result of the economies of scale enabled by the

warehouse type of logistics: deliveries are concentrated, administrative tasks are reduced accordingly, etc.

The Personnel and Social Issues Division is currently studying a bonus scheme for Maucer. So far, such an incentive scheme does not exist for his function. Maucer is directly under the authority of Chaler.

3.2.3. Handling and Selling Corporation (HSC)

HSC, through its various warehouses, has two major implications for the stores: (i) a cost to pay; (ii) an opportunity for substantial economies. The cost includes a warehouse commission equal to 3.5% of the internal selling price (from HSC warehouses to stores) without VAT. To this must be added some transportation expenses accounting for 2% of the internal selling price of the products, without VAT. On the whole, when a hypermarket or HGC purchases a good from a HSC warehouse for FF 100, FF 5.5 go to HSC.

These costs are said to be at least counterbalanced by the economies the stores can realise. According to a note from the general management to the store managers, economies induced by BGT are the following:

- (i) Stocks: hypermarkets and HGCs should no longer have to maintain reserve stocks for white goods. However, at present, the hypermarkets and HGCs only save between 1.25 months and 1.5 months of stock cover for white goods, though they could already save up to two months, should they follow the Head Office's advice.
- (ii) Logistics personnel: it is possible to save as much as one-third of the working hours of the store logistics staffs.
- (iii) Available space: a substantial amount of space could be

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gained by "de-stocking". This space could be converted into display surface areas (i.e. selling space) and commercial layouts in the stores. In this respect, an important comment must be made. Each store pays a rent to the Head Office. The rent level takes into account the size of the store. However, all the surface area of the store is not subject to the same rent coefficient. In particular, the surface area devoted to merchandise on display and the surface area devoted to storage are subject to different terms: the level of rent corresponding to selling space is 50% higher than that corresponding to storage space. On the other hand, selling space plays a commercial role, while storage space plays a passive role and generates overheads only. This comment was not mentioned in the note from the general management.

- (iv) Buying department of the hypermarkets and HGCs: it is possible to save up to 20% of the working hours.

The situation of the Distribution Managers of the warehouses should now be examined. Each warehouse employs about four Distribution Managers whose activity consists of monitoring the sales of the stores of their area, so as to adjust their own orders to suppliers. In fact, these actors' main problem is to anticipate the stores' future needs and avoid stock shortages. Accordingly, the warehouse distribution managers are in constant contact with both the store personnel and suppliers. Their role is distinct from that of the Head Office Distribution Manager (Maucer) and that of the Buyer of the Central Buying Department (Poine). The Central Buying Department select an assortment, i.e. the basic Barracuda offer whose individual articles were selected by the Buyer, according to various criteria. So far, the warehouse Distribution

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Managers could order selected goods only (i.e. those selected by the Buyer). Therefore, the role of these Distribution Managers was limited to ordering such goods when necessary along with trying to maximise logistics discounts granted by the suppliers. It has already been mentioned that the logistics discounts benefit the warehouses only and are not passed on to the stores.

The warehouse Distribution Managers must also monitor the stock turnrate and turnover for the goods they are in charge of. The Distribution Managers' bonus is not only geared to the quantity of logistics discounts they obtain (in such a case there would be a risk of over-stockholding), but also to the level of turnrate of the stocks both in their warehouse and in the stores for which they cater.

3.3. The Product Division

This division employs 100 people and its central activity is to select the goods that will constitute the basic assortment of the Barracuda stores. This assortment results from the selection operated by the Buyers of the Central Buying Department. The Central Buying Department has already been presented, but the role of the White Goods Buyer (Poine) must be explained in more detail for two reasons: first, because of the role he could play in relation to BGT; second, because of the ambiguity of his function in relation to the Head Office Distribution Manager (Maucer).

David Poine, 42, is the Buyer in charge of white goods. He is responsible for the selection of the assortment intended to constitute the stores' white goods basic offer. He is also responsible for the determination of the commercial policy for white goods. This policy must take into account the objectives and general strategy decided upon by the general management.

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Consequently, his mission consists of researching new products, negotiating discounts - not logistics ones - from the suppliers and controlling the profitability of the articles he has selected. Poine must regularly issue notes about his contacts with the suppliers and write reports on the market trends. Besides this, Poine is responsible for negotiating production plans with the manufacturers. He is therefore responsible for the quality of his selection before the store managers and for ensuring a satisfactory supply to the stores and warehouses for the white goods.

Poine's bonus is computed at the end of each year, in relation to: the average margin of the white goods departments in the stores; the turnover of the articles of his selection; the average turnrate of the stocks of white goods in the stores.

3.4. The Sales Division

The mission of this division is to supervise the management and administration of the stores. This division is sub-divided into two large groups: the General Inspectors, and the store personnel.

3.4.1. The General Inspectors

There are 10 General Inspectors, in charge of controlling the implementation of the group's policy in the stores. The policy is decided upon by the general management in relation to the market share they want to secure, the target profits and economic trends such as inflation or interest rates. The implementation of this policy at the store level must take into account the specific circumstances inherent in each store (e.g. management of the human resources, power of the local unions, etc.) and its environment

(e.g. local competitors, economic conditions, level of unemployment in the area, political orientation of the city council, etc.).

In order to secure the execution of this policy and to control its implementation, the General Inspectors must keep in contact with the stores' management and staff.

The General Inspectors' average age is 50, and they are mainly former hypermarket managers. Their mission is currently oriented towards stock control.

3.4.2. The Stores

At present, BGT affects a fraction of the stores only. These stores may be divided into two categories: the "high street hypermarkets" and the HGCs ("Home and Garden Centres", see 1.1.). The former are located in city centre and offer all the Barracuda range in terms of food, clothes and accessories, plus some white goods. The latter will generally be located out of town, in the immediate suburbs and their range is limited to heavy home equipment: white goods, hi-fi, furniture, garden furnishing, etc.

Various categories of personnel work in the stores. Their respective situation is examined below.

3.4.2.1. The Store Managers

The mission of a manager is complex and may seem to involve contradictory and conflicting assignments. Above all, he must have a "business sense": he must be able to take advantage of all possible commercial opportunities, and be able to organise special promotions accordingly. Besides, he is responsible for motivating and managing his employees in a complex and competitive environment.

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However, he enjoys real autonomy: finally, he is free to choose the range of goods his store will offer, and to set prices. Nevertheless, he is accountable to the general management for his choices and decisions, and several managers still regret having put up this show of independence. There are various sanctions to punish would-be "free lancers": transfer to minor units, appointment to a vice-manager position, transfer to the Head Office for a project officer position, dismissal, etc. The incentive scheme of a store manager is complex, and hinges on two bases:

- (i) Commercial basis, which takes into consideration the commercial margin of his store (the related coefficient does not take into account the stock turnrates), and is a function of the store turnover minus the free-credit expenses and the promotional discounts).
- (ii) Financial basis, which takes into account the general financial performance of his unit (the related coefficient takes into account the stock turnrate of the store).

If the objectives in terms of financial performance (i.e. level of stock turnrate, level of profitability of the unit, etc.) fail to be met, the manager gets no bonus. The bonus, paid on a yearly basis, can amount to 2.5 times an average month salary, in the best situation.

In the biggest units, the store manager may be assisted by an assistant manager.

3.4.2.2. The Departmental Managers

The departmental managers report to the store manager. They must:

- (i) know the selection worked out by the Central Buying Department and, if necessary, complete the assortment with suitable articles

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(in this case, the agreement of their store manager is required, and the latter is then accountable to the general management for his decisions); (ii) keep their orders within the limits of the budget lines and objectives in terms of stock turnrates; (iii) organise ad hoc promotions for the department of which they are in charge; (iv) control the stock turnrate of the products of their department; (v) monitor the prices of the local competitors and adjust their pricing accordingly; (vi) manage the sales assistants of their department. The departmental managers have neither commission nor bonus.

3.4.2.3. The Demonstrators

The demonstrators, though working in Barracuda stores, are employed by manufacturers (e.g. Brandt, Zanussi, Miele, etc.). Accordingly, this type of personnel is paid by these companies and receives commission from the manufacturer employing them. The commission is paid on a monthly basis in relation to the turnover of the articles of the brand which the demonstrator represents.

The Sales Assistants

As far as white goods departments are concerned, sales assistants are in charge of selling the articles of the chain brand ("Barmatic") and the articles of the brands which are not represented by demonstrators in the store. Their function includes handling (the articles must be taken from the reserve to the display surface area), displaying (the articles must be well exposed and regularly dusted) and selling. At present, there is not a single standardised commission system for this type of personnel. Two methods co-exist:

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- (i) Commission calculated on the basis of the number of sales accomplished by the sales assistants. In this case, the sales assistants prefer to organise a sort of informal pooling: at the end of each year, the store manager indicates the total amount of commission which he must pay, and the sales assistants divide this sum by the number of sales assistants. The share of each employee is finally determined in function of his total number of work hours.
- (ii) Commission calculated according to the "profitability" of the sales assistants. For each article, the sales assistants know the corresponding level of margin and must orient the customers towards the articles giving rise to the highest margins. At the end of each month, each sales assistant's commission is computed and paid in relation to the quantity and the profitability of the articles he sold during the month. In the case of such an incentive scheme, the sales assistants do not pool the commissions.

The target turnover for each sales assistant is FF 3,000,000 per annum. The second type of commission (called "GODEL") is far less used than the first type, and sales assistants seem to be against it. Still, the Personnel and Social Issues Division is currently studying the possibility of extending the GODEL scheme to a greater number of stores.

3.5. ITD ("Institut des Techniques de la Distribution")

ITD is a branch of the company meant to provide training to the employees (sales assistants, store managers, executives, etc.). ITD organises seminars on retailing problems, the new policies of the

general management, and adapts the contents to the diverse categories of personnel the audience may consist of. At the time of the study, training the sales staff to operate BGT was on ITD's agenda.

4. The Actors' Experience: Feelings and Actions

This section is based on in-depth interviews of the actors who were or are still involved in the BGT test. In most cases, it would have been redundant to present, for each actor, the feelings and actions that transpired from the individual interviews. Accordingly, whenever it seemed that this would not impair analysis, it was decided not to present the data at the individual level: on the basis of the individual interviews, similar answers are presented in an aggregated, summarised and structured form. In methodological terms, the principle of sufficient information was applied: individual data were aggregated, summarised and structured whenever the marginal relevant information resulting from extensive individual presentation of the actors was judged negligible relative to the information resulting from aggregated, summarised and structured presentation. This type of operation must be distinguished from the aggregation and structuring inherent in questionnaire designs (see, Chapter VI, 2.2.1.2.). Here, the operation is made a posteriori, once the information has been given; in the case of questionnaires, the structuring and aggregation are operated a priori, on the basis of what is a priori viewed as relevant information and synonymous messages.

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4.1. The Installations Department of the ISD

Four people in this department were interviewed. These people were chiefly in charge of BGT. They consider that most of their problems were caused by the weak educational background of the potential end-users of BGT. Moreover, their opinion is that sales assistants, if not departmental managers, seem to be scared of information technology (in this respect, see the "Shrine-Screen Syndrome" in 4.9. below).

The interviewees consider that their mission is to provide staff and line employees with efficient and ready-to use systems. As regards BGT, their task consists of introducing the system to the manager of the store in which they must install the system, "initialising" the system and briefing the sales staff. The presentation of the system to the store manager usually takes between fifteen and thirty minutes. In order to initialise the system, the Installations Department's actors must feed into the computer files the statement of the white goods inventory usually taken the night before their visit. The briefing of the sales staff consists of presenting the system and carrying out a short simulation exercise on dummy inventories, stores and warehouses. The central point of the exercise is to show sales assistants that they must use the system in real time and record sales as soon as the client has given his agreement (so that the on-screen level of stock is the real one) and not record sales at the end of the work day, once the store is closed. The briefing and exercise will take between one and two hours. These operations take place during a working day, to the effect that some sales assistants may have to leave the presentation in order to serve clients.

Usually, the Installations Department's actors insist on the fact that BGT places all the Barracuda's white goods assortment at the disposal of the stores (the reserve stocks being located in the

warehouses). So far, the stores' offer was necessarily more limited, since the articles had to be stored in the reserve of the stores (whose storage capacity is clearly far less sizeable than that of the HSC warehouses).

The interviewees find it disadvantageous to be unable to follow up the users' progress. But, according to them, such a follow-up rests on the Stock Control Department, since "they are those in charge of developing BGT, as well as its instigators". More generally, the interviewees think that:

- (i) BGT is a system bought and adapted by the Systems Department of the ISD at the instigation of the Stock Control Department.
- (ii) The systems must be initialised in the stores by the Installations Department.
- (iii) It is Petiot who is presently in charge of promoting a wider and more effective usage of the system. In particular, Petiot is reproached with having failed to prepare the environment suitable to an efficient and effective usage of the system in the hypermarkets and HGCs. First, it is claimed that Petiot (the BGT Project Officer) never provided the sales assistants with catalogues presenting the articles stored in the warehouses but which are not on display (nor stored) within the stores. It is recalled that, because of the enlargement of the assortment, the stores can no longer display all the articles of the Barracuda offer; the articles are stored in the warehouses (which cannot sell to the public directly) as there is not enough room in the stores. Second, the interviewees admit that the stores are not equipped with a sufficient number of terminals: the sales assistants must leave the counters to use the terminal, sometimes they have to leave the clients for several minutes, or queue in order to use the

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terminal - especially on Saturdays when the rush is at its peak. According to the interviewees, this may explain why some sales assistants will record sales at the end of the work day only (which generates various mistakes: sales assistants will sell articles which are not available immediately, Head Office analysts and warehouse Distribution Managers will have a false idea of the real stock level, etc.). The interviewees' opinion is that Petiot should have pushed the Sales Division (to which the stores are hierarchically related) to buy more terminals for the stores. Eventually, it is generally held that Petiot has an insufficient knowledge of the stores' real needs and constraints.

Besides this, the interviewees feel that the Buyer for white goods (Poine) does not encourage the store sales staff to use BGT: "He does not understand anything but buying..."

Finally, the interviewees acknowledge that information technology is viewed as an octopus-like monster at Barracuda. But they consider that the other divisions are those to be blamed if the ISD sometimes encroaches on these divisions' role: "They criticise us but, in fact, they expect the ISD to substitute itself for them in managing the systems we have installed in their departments... they do not understand that our role is purely a technical one: to provide end-users with operational, bug-free and ready-to use systems... How the systems are then operated, their management, are the problems of the divisions which asked for the systems".

4.2. The Systems Department of the ISD

Two actors of this department were interviewed, as they were those who adapted the COD original software. According to these actors,

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this mission was demanding and rendered all the more difficult because of the future end-users' inexperience in data-processing. In fact, two versions of the adaptation have been worked out by the department. The first version was found to be excessively complicated and unnecessarily sophisticated, so another one had to be designed. Today, the interviewees consider that their "mission relating to BGT is accomplished and [that] all the present problems do not fall into [their] province".

4.3. The Head of the Organisation Department

Gali considers that his main mission is "to clarify the zones of fuzziness and to solve the organisational problems resulting from inertia and natural human opposition to change". He acknowledges that his crucial ally is Chaler, who he describes as follows: "Although our methods are frequently opposed, he is a priceless help to me... he is the free pawn of the game, fearless - even of the store managers... he can afford to walk into a hypermarket with muddied boots, while any other Head Office executive would put on slippers fearful lest they should mark the floor..."

A former consultant in an American consulting company specialising in industrial management, Gali stresses the fact that retailing does not lend itself to prompt organisational change: "In contrast with industry, retailing does not allow for sharp and precise analyses and planning of the means of new policies; more, there are no 'natural' indicators easy to set up and observe... everything is much more fuzzy and time-taking". As far as BGT is concerned, Gali's opinion can be summarised as follows:

- (i) In order to counter the increasing competition of the big out-of-town stores, the general management asked the Information

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Systems Division (ISD) to work out a system allowing both for enlarging the stores' white goods offer and lowering the stock overheads.

- (ii) The ISD bought the BGT software from COD, at a moderate price (FF 500,000).
- (iii) The ISD adapted the system to the company's needs and constraints, but has come out with something far too sophisticated relative to the chain's real needs and to the end-users' abilities ("... sales assistants are generally too old and unskilled").
- (iv) BGT is not accepted in the stores, for various reasons.

Gali sums up these reasons thus:

- (i) The Systems Department engineers adapted the software without leaving their ivory tower, regardless of the real abilities of the sales assistants.
- (ii) Nobody cared for highlighting the commercial dimension of BGT ("They have used engineers or administrative clerks to convince business-minded people"), the sales assistants have never been provided with any indication about how to sell with BGT (new sales techniques become increasingly required as the hitherto usual immediate purchase becomes less and less possible and as the sales assistants may have to leave clients for a while when using the terminal; so far, the sales assistants would never have left a client before the sale operation was either complete or the client changed his mind; the store managers have not been sensitised to the economies which BGT could mean for their store.
- (iii) Petiot is wrong when he prefers to "punish" (sic) store managers in case of excessive storage instead of trying to promote, in an intelligent way, the new stock policy.

Gali contends that he feels sorry that he has not enough time to devote himself to BGT. At present, his main concern is installing micro-computers in the Head Office's departments. This mission involves adapting the Lotus package to the departments' needs and functions. Gali's team is in charge of the operation. It seems that the fact that Gali was chosen instead of the ISD for this mission has a lot to do with Chaler's influence.

4.4. The Director of the Stock Control Department

Chaler describes his mission in a very direct way: "... to get rid of all the garbage that fills the company's drawers". In the light of subsequent information, it seems that this expression is meant to describe the endeavour to rule out irrelevant operations, useless tasks, and the re-orientation of the corresponding actors towards courses of action conceived as more productive. According to Chaler, this mission takes "clear ideas and a right mind... this is a prerequisite if you want to prevent things from deteriorating - at least to prevent the mess from growing". Chaler likes to say that the company produces two tons of paper a day (reports, notes, print-outs, etc.). This, he thinks, overwhelms managers and paralyzes any would-be decision-maker. Chaler views the Handling and Selling Corporation (HSC) as his major concern ("It is my baby") and considers that all the chain's members can only benefit from BGT. His reasoning runs as follows:

- (i) Implications for the White Goods Buyer (Poine): BGT could enable him to know, at any time, the volume of sales for each article of his selection. This could help him to know the white goods which sell well and, therefore, the articles with

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- a high stock turnrate. Such information could help Poine in his selection work, which would be doubly interesting for him:
- (i) because his bonus is geared to the white goods turnover;
 - (ii) because his bonus is also geared to the turnrate of the stocks of white goods. Hitherto, this type of information was not available to the Buyers. Accordingly, Chaler thinks that Poine should "logically" encourage the store staff to use BGT.
- (ii) Implications for the store managers: they should be the most interested in BGT, since they are supposed to realise high turnovers, margins and profitability. In order to secure a high turnover, one needs to have the relevant goods at the relevant time: BGT allows for ordering any desired article from the warehouse, and for selling it to the customer who can have the good delivered at home 48 hrs after his order. To secure commercial margins, one must not have articles which do not sell: BGT allows for selecting supplies according to the market trends. To secure profitability, one has to minimise storage costs and, therefore, stockholdings: BGT allows for a minimum (if not non-existent) reserve stock and for doing with the display stocks only (such stocks, from the accounting viewpoint, are not stockholdings, since the goods on display play a commercial role).
- (iii) Implications for the Distribution Manager of the Head Office: his mission is to secure a high level of profitability of the HSC warehouses and to maximise the profitability of the white goods department in the stores: BGT could help him to adapt his orders according to the stores' needs, in real time.

According to Chaler, the main inertia, if not opposition, emanates from the store managers "who have the old stocking reflex and nourish illusions about their customers' buying behaviour". If

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Chaler is to be believed:

- (i) The store managers "like big stockholdings", and do not realise that it is now impossible to maintain simultaneously the present levels of depth and width of the store offer: "something has to give".
- (ii) The store managers and sales assistants think that customers are too accustomed to the immediate ("take-away") type of purchase, and that they will never get used to the deferred type of purchase (collected or delivered). But as this opinion has no real basis, the store staff are wrong. And, even if they were right in their judgment, "it would be their job to educate customers, and to adapt their buying behaviour". According to Chaler, "the sales assistant's job must change; a good is no longer a physical product only, it is also its availability, its type of delivery, etc.; sales assistants must be able to sell these, as well as the physical product... they must create a new type of Barracuda customer...".

4.5. The BGT Project Officer

Petiot's main problem is "to force the store managers to abide by the new stock policy decided upon by the general management". In order to know the stock level for white goods in the hypermarkets or HGCs already equipped with a BGT terminal, Petiot relies on the Outputs Department of the ISD. Every month, this department provides Petiot with print-outs showing the stock level for the white goods run on BGT. These print-outs enable Petiot to spot various anomalies in the inventory management of the stores. The

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most frequent types of anomalies are:

- (i) One type of article appears in the reserve stock, but not in the set of merchandise on display. This means that these articles do not play a commercial role: they only generate overheads and take up space in the store reserve.
- (ii) There is an excess of stock for one type of article, yet the automatic re-stocking option has been maintained (see 2.1.). Consequently, each sale of this type of article triggers off a command to the warehouse, which makes it impossible to reduce the stock level.

Petiot can correct these situations in various ways:

- (i) He can send the print-out showing the anomalies to the related store manager. In this case, the print-out will be annotated and the anomalies underlined. Petiot will set a time-limit before which the anomaly must be corrected.
- (ii) Petiot can ask the General Inspectors to control the store and write a report. This is a very powerful means of pressure as the General Inspectors and the store managers belong to the same division. Moreover, all the General Inspectors' reports have a wide circulation and are brought to the general management's attention.
- (iii) Petiot can ask the Information Systems Division to suppress the automatic re-stocking option for a store which had ignored his first warnings.

According to the circumstances, Petiot resorts to one of these three alternative strategies. For the BGT Project Officer, everything is evident: BGT is an element of the new corporate

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policy and, as such, must be effectively and fully used in the stores. According to him, the present oppositions are a result of the "feudal and rebel spirit" of the store managers who are determined to maintain a total and exclusive control over their stores. Petiot thinks that the only possible response is firmness and that this is best exerted through the General Inspectors' control and reports: "BGT is a necessary evolution of store management... they will have to put up with it, willy-nilly".

4.6. The Distribution Manager of the Head Office

Maucer states that his main problem at present is to clarify his mission in relation to that of the White Goods Buyer (Poine). So far, Maucer's mission was to get in contact with the suppliers of the goods selected by Poine in order to negotiate logistical discounts and supervise a satisfactory supplying of the warehouses. However, Maucer stresses that his mission is undergoing development and that he increasingly has to buy products that Poine did not include in his selection. According to Maucer, Chaler's endeavour to develop HSC and his new role indicates that "before two years, Poine will have to find another job... the traditional buying function is on its last legs, at least as far as white goods and 'heavy' articles are concerned".

When asked about the general management's attitude in relation to the Buyer/Distribution Manager choice, Maucer's answer is: "Here, there are things which should be kept not said... facts talk by themselves: if Chaler called me here, to the Head Office, there must be a reason..."

As far as BGT is concerned, Maucer acknowledges that he knows very little about it, and that his sole contact with the system happens when the users (i.e. the stores' sales assistants) phone him

to have their problems solved: "When the HSC warehouses do not deliver to them on time, when error-messages appear on the terminal screen, when there are discrepancies between the real stock and that which appears on the screen, etc., they will call me... they do not know that, indeed, these questions should be asked of Petiot".

However, Maucer views that BGT is bound to have "dramatic implications" for his function: "This system will enable me to monitor consumers' response to a given product, which will help me adapt my purchases accordingly, almost in real time... but this is rather remote... First, I have to demarcate my job from Poine's".

4.7. The Distribution Managers of the Warehouses

Four Distribution Managers were interviewed: two from the Lyon warehouse and two from the Epone warehouse (in Normandy). These actors were in charge of white goods in their warehouses. Although warehouses also store furniture, these are not yet on BGT.

The interviewees consider that their main problems result from the store managers' constant complaining about the functioning of HSC. The Distribution Managers view themselves as being between the devil (the store managers) and the deep blue sea (the Buyer for white goods): "Poine widens the assortment by selecting new brands and asks the manufacturers to deliver the goods to the stores regardless of the latter's needs, individual requirements or available storage space; on the other hand, all the new articles selected cannot be displayed to the consumers (the stores' display surface areas are not large enough)... but if the store managers put them in the reserve then they get the General Inspectors; on top of this, the sales assistants keep complaining about Poine's selection because his increasingly numerous new selections do not sell".

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Because their mission involves frequent contacts with the stores (which is not the case for Poine, who visits the stores very rarely), the Distribution Managers have to cope with all the stores' complaints. However, the Distribution Managers have an answer to the "systematic criticism" from the stores: "Statistics show that stores which are not supplied by an HSC warehouse are four times more likely to run out of stock than stores connected to the HSC network: this means an indisputable commercial advantage for the latter units".

4.8. The White Goods Buyer

Poine considers that his main mission is to widen the range of white goods available in the stores: "This is geared to the new commercial policy of the chain, aimed at countering the development of the competitors' big units specialising in heavy home equipment".

Poine has recently selected eight brands and he regrets that store managers and sales assistants "show too great an attachment to the traditional white goods assortment, which was centred on the chain brand (Barmatic)". The Buyer acknowledges that the stores are facing a problem of scarcity of space to display the new articles: "... but it belongs to the stores to convert the now useless reserve space into display space... in any case, I am not in charge of the store managers' job, and it rests on Chaler (the Director of the Stock Control Department and HSC manager) to explain the new stock and supplying policy to the store managers". As far as BGT is concerned, the Buyer's opinion boils down to the following:

- (i) So far, BGT has not changed his work, because the system is far from being completely adopted by the company, let alone accepted by its members.

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(ii) It is Chaler and Petiot's mission to encourage the stores to use the system, and to sensitise them to its advantage. Chaler, because BGT is the key element of HSC; Petiot, because he is the "BGT Project Officer". BGT is primarily a "control device", and does not fall into his province. Moreover, the Distribution Manager of the Head Office should try to help the stores to solve the problems caused by BGT and HSC, instead of trying to buy articles he did not select, "which makes life even more difficult for the stores".

It is worth noting that Poine did not mention the relationship between the lowering of the stockholdings (enabled by BGT) and his bonus. This is why the researcher insisted and asked him whether such a relationship did exist. Poine's answer was that the relationship "exists in theory", but added that he did not know enough about the system to exploit the relationship.

4.9. The General Inspectors

Two General Inspectors were interviewed (Carrier and Dournot). They consider that their job consists of ensuring that all the chain's stores abide by the general management's policy. Presently, their major problem is to lower the average stock cover for white goods. They can recommend various operations to the store managers to reduce their stockholdings: "de-stocking" (the excess of stock is passed on to the warehouses), special promotions for the corresponding articles (with advertising in the local newspapers), ad hoc discounts (these discounts always mean a lowering of the margin for the stores). Each inspection is followed by a report on the store: "We can make errors, but not conceal..." (Dournot)

Presently, these two inspectors are chiefly in charge of BGT and

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most of their inspections are made under Petiot's request. They view the BGT Project Officer as an efficient coordinator of the various attempts to develop BGT: "He analyses and draw comparisons between the stores' stock cover, his conclusions are grounded on unquestionable computations". (Dournot)

The interviewees are less satisfied with the stores' personnel, whom they view as unaware of the real objectives of the group's global commercial policy: "For example, as for the promotions: the sales assistants cannot understand that the goal is not solely to sell the articles on sale, but also to drive consumers towards other articles, those generating substantial margins..." (Carrier).

As far as BGT is concerned, their opinion can be summarised as follows:

- (i) BGT is an excellent supply system (it is fast and allows for economies resulting from logistics discount.
- (ii) BGT means a change in habits: so far, each store was in charge of its own supplies, and orders had to be passed to the suppliers by the stores. The volume of orders was determined by the sales forecasts and present stock level. This system implied that the stores kept a high level of stock cover, as the stores' commercial policy was mainly geared to immediate sales (the "take-away" type of purchase still account for 80% of the turnover).

4.10. The Stores

Clearly, the chief end-users of the BGT system are meant to be the stores' sales assistants. Accordingly, the situation of this type of personnel was studied in depth. Interviews were carried out in seven stores. Three HGCs: one in Chalon-sur-Saone's suburbs; one

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in Echirolles (near Grenoble), and one in Godard (near Bordeaux). Four hypermarkets (of the "high-street" type): one in Lyon, one in Bordeaux, one in Chalon-sur-Saone, and one in Grenoble. The analysis is consigned in the following exhibits:

- Exhibit A : Interviewees and sample structure;
- Exhibit B1: Summary of the interviews of store management;
- Exhibit B2: Summary of the interviews of departmental management;
- Exhibit B3: Summary of the interviews of sales staffs;
- Exhibit C : Synthesis

The interviews suggest four major problems, or syndromes. Each of these is treated in an exhibit:

- Exhibit D1: the Shop-Keeper Syndrome;
- Exhibit D2: the Two-Way Mirror - Screen Syndrome;
- Exhibit D3: the Shrine-Screen Syndrome;
- Exhibit D4: the Murphy's Law Syndrome.

Exhibit E proposes a cross comparison of the interviews and suggests guidelines for analysing the actors' strategies and rationalities.

5. Analysis of the Zones of Uncertainty: Organisational Stakes, Rationalities and Strategies

Protocol analysis indicates that the present situation is characterised by various ambiguities. Most of these ambiguities may be related to the absence of a final decision on BGT. These ambiguities can be listed as follows:

- (i) What are the objectives of the white goods stock policy: "to eradicate" reserve stocks in the stores (as indicated by a

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note from the general management), or to lower the stock cover to 10 days (as indicated by the BGT Project Officer), or to lower the stock cover to 1.5 months (as indicated in the BGT manual) ?

- (ii) What are the real abilities, duties and missions of the Buyer and the HSC Distribution Manager of the Head Office ?
- (iii) What is the new line policy: is it intended to reduce the assortment width and depth, or to widen the range by selecting new brands ?
- (iv) Who is at the origin of the BGT project in the chain: COD, the Information Systems Division, the Stock Control Department, etc. ?
- (v) Is BGT widely and correctly used by the sales assistants; have all the sales assistants a clear idea of the relationship between BGT, the warehouse type of logistics and store management?
- (vi) What is BGT really meant for: is it meant for rationalising the supplies, reducing stockholdings, improving commercial adjustment of the assortment to consumers' wants, etc. ?
- (vi) Who is really in charge of BGT, who should be contacted by the end-users when they encounter a problem with the system ?

All these points are important inasmuch as they could explain the weak indications of the test and account for the status of the decision related to BGT. Protocol analysis suggests that the above ambiguities are not equally felt by all the actors: for some, everything is evident; for others, some points are highly ambiguous; finally, some actors seem completely confused. In fact, it is not really significant that a note from such or such division supposedly clarified everything about BGT, if either (i) a very limited number

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of actors have read, or heard of, the note, or (ii) another division's note was conflicting with the former. Only the actors' information, feelings and experience are significant, as these influence the organisational climate and enable the researcher to understand the organisational game which resulted in the deferred final decision for BGT.

Besides, these ambiguities are not neutral. Some actors use or maintain ambiguity, others try to reduce it while, conversely, some cannot but accept ambiguity as a given, an inherent puzzle with which they have to live in the organisation. This ability of some actors to "play on the ambiguities", to use them as strategic assets against others, enables one to view these ambiguities as zones of uncertainty in the sense of the Theory of Organised Action. The present section tackles the question of the extent to which the actors' rationalities and strategies in the front of these zones of uncertainty and related stakes can explain the present status of the decision related to BGT. The foregoing analysis and the above list of ambiguities have made allowance for understanding the zones of uncertainty affecting the actors. Accordingly, in the following lines, attention will be focused on the uncertainty monitored by the actors. That is, "zone of uncertainty" will mean "zone of uncertainty being monitored" rather than "zone of uncertainty affecting the actor under consideration".

5.1. The Information Systems Division

Strictly speaking, the development of HSC and the new commercial strategy of the company have no direct implications for the ISD. However, the key role of BGT in relation to HSC and in the development of the new commercial strategy, directly involves the Systems Department and the Installations Department of the division.

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The Systems Department is doubly involved by BGT. First, because a successful implementation of BGT would mean that the department is satisfactorily operational and that it deserves its considerable share of the budget. Second, because a prompt settlement of the problems due to the BGT test would enable the ISD to undertake new programmes, which would bring new projects to the Systems Department. The situation of this department can be summarised as follows:

What is at stake: the legitimacy of the present and future budget for the Systems Department.

Rationality: is oriented towards substituting automatic and standardised centralised procedures for varied and idiosyncratic behaviours.

Strategy: consists of detecting or developing new needs and requirements and trying to meet these by proposing solutions based on the department's informatic expertise.

Zone of uncertainty: the Systems Departments used to monitor the uncertainty relating to the nature and orientation of the new informatic systems. However, this asset is increasingly challenged by the development of Gali's Organisation Department.

The Installations Department of the ISD plays a part in the development of BGT through the initialisation and installation procedures. The situation of this department is thus:

What is at stake: the "operational value" of the department; i.e. the recognition of its ability to perform effective and successful

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installations, to the benefit of improved efficiency.

Rationality: is oriented towards the optimisation of the immediate environment of the systems developed by the Systems Department. This immediate environment consists of the following elements: technical skills required to operate BGT in the stores (the skills are meant to be transmitted through the briefing and simulation exercise); initial computer files required to handle the stocks on BGT (the inventory is entered into the files during the installation phase). In fact, the responsibility for this immediate environment is subject to a constant bargaining between the Installations Department and the other divisions which try to widen the duties of the department. For instance, several actors of the Products Division would like the department's responsibility to be extended to the follow-up of the system after the installation in the stores.

Strategy: consists of attributing the relative failure of the BGT test to the deficiencies of the broader environment of the system. The broader environment involves two dimensions: a commercial dimension and a technical dimension. The commercial dimension refers to the selling supports which should have been provided to the sales assistants in order to help them sell in the new conditions (e.g. catalogues displaying the articles which are not presented in the stores, but which are available via the warehouses). The technical dimension comprises the availability and accessibility of the BGT terminals in the stores; it is claimed by some actors that the average number of terminals in each store is insufficient, that the terminals are generally too far from the counters and that the response time of the terminals is too long: the overall result is that "sales assistants have to queue to use the terminals". The strategy of the actors of the Installations department consists of attributing the relative failure of the BGT

test to the absence of catalogues (responsibility of the Stock Control Department or of the Sales Division) and to the limited number of terminals available in the stores (responsibility of the Sales Division which should have provided the stores with more terminals, or responsibility of Petit who should have convinced this division to buy more terminals for the stores, or responsibility of Gali who should have carried out a study to determine the optimal number of terminals which should have been made available to the sales assistants).

Zone of Uncertainty: the Installations Department monitors the zone of uncertainty relating to the initialisation of the system in the store and to the level of pressure this department can exercise for an optimisation of the broader environment (commercial and technical) of the system.

5.2. The Head of the Organisation Department

As head of the Organisation Department, Gali's mission is similar to that of a consultant. That is, he enjoys no hierarchical authority capable of bolstering his recommendations. His sole authority is of the "rational-legal" type (i.e. based on knowledge, expertise, skills, and his position in the structure) and is exerted by means of the studies and researches he carries out. The fact that the various division directors always take heed of him and that he enjoys a good relationship with Chaler is one of Gali's major assets. The situation of the head of the Organisation Department can be summarised as follows:

What is at stake: Gali's title and the reputation of his department are the major issues. If his department's studies maintain their present standards in terms of pertinence and quality, Gali may

aspire to become "Director" of the Organisation Department. According to Gali, this change of title (from "head" to "director") would have more than purely formal implications: "A title of director would imply a hierarchical authority over the implementation of my recommendations and would prevent me from having to rely on the other directors for this control".

Rationality: is oriented towards consultation, negotiation and, in some cases, "seduction" as opposed to exercise of hierarchical authority.

Strategy: consists of posing problems that can only be resolved by means of studies carried out by his department. In general, the recommendations of these studies and researches involve a reinforcement of his department and a widening of the department's activities. In this respect, it is worth noting that the development of micro-informatics at the Head Office (i.e. the installation of micro-computers in each department) is carried out by Gali's department, over which the ISD will complain. When the recommendations and solutions to some corporate problems are not brought about by his department, Gali will question their feasibility, validity, or practicality. An example is his criticism of the BGT Project Officer and of the ISD for their strategy in relation to BGT.

Zone of uncertainty: Gali monitors the uncertainty related to the nature (i.e. what problem will be treated by the study) and destination (i.e. who will be informed of the results of the study) of his department's studies. Although, in theory, Gali has not an infinite degree of discretion in choosing the topic and destination of his studies, his "alliance" with Chaler enables him to attribute to the Director of the Stock Control Department the request of

studies whose orientation or theme are questioned by other actors.

5.3. The Director of the Stock Control Department

Chaler is involved in a threefold way in the decision-making process relating to BGT: (i) he is the manager of HSC, (ii) he is the main decision-maker for stock policy, (iii) he is superior to the BGT Project Officer. Chaler's main asset hinges on his remarkable "degree of freedom" within the company: he has already reached the highest peak of his career, and his contract seems to bind Barracuda to him rather than him to Barracuda. His situation can be summarised as follows:

What is at stake: it is difficult to speak of stake for a free actor. Nevertheless, the immense efforts by Chaler (and his impressive level of activity) within the company indicate that some things are still of importance to him in Barracuda. These things can be summed up thus: the warehouse-type of distribution (which hinges on HSC) must develop itself in the face of the "feudal power" enjoyed by the store managers ("... store managers still consider themselves as Middle-Ages type of landowners..."). Such a development would enable the administrative power to counterbalance the commercial power (that of the Sales Division in particular) in the company.

Rationality: is oriented towards the simplification and clarification of functional, operational and hierarchical liaisons in the company.

Strategy: consists of maximising opportunities to promote HSC at the expense of disputes with store managers. His main assets are charisma and an usual degree of freedom.

Zone of uncertainty: nothing, apparently, nothing can hinder the development of HSC and BGT if such is Chaler's will. Similarly, the distribution of function between Maucer and Poine is completely dependent upon Chaler. Finally, Chaler remains, in the last resort, the decision-maker and prescriber for stock policy. However, in spite of Chaler's apparent power, one fact remains: BGT is far from being correctly used in the stores.

5.4. The BGT Project Officer

Petiot plays a central role in the BGT test. To assist understanding of this key position, it is necessary to recall that three structures intervene in the management of any white goods department:

- (i) The operational structure, consisting of the store managers, departmental managers and their sales assistants.
- (ii) The product structure, consisting of the Buyer, the HSC Distribution Managers (from both the Head Office and warehouses).
- (iii) The functional structure, consisting of the head of the Organisation Department, the Director of the Stock Control Department and the BGT Project Officer.

Between these three structures there lies relationship problems and confusions of duties. However, an important distinction exists between these three structures: as already mentioned, some actors of the operational and functional structures enjoy financial incentive schemes (i.e. bonuses or commissions), while nothing similar exists for the functional structure. Accordingly, three strategies are available to Petiot in order to promote the use of BGT:

Product Strategy

This strategy consists of relying on the product structure. This could be achieved via the White Goods Buyer (Poine) who is interested, in theory, in lowering the reserve stock cover (since the level of white goods stock affects his bonus). Moreover, Poine could fruitfully resort to BGT to identify the articles which sell well. This would enable him to adapt his selection. However, this supposes that the system is correctly and effectively used in the stores to record the sales in real time.

The "product strategy" could also be pursued via the HSC Distribution Managers who are interested in knowing the stock level in the stores in order to prevent stock shortages. Again, such an optimal real-time management of supplying supposes an effective and correct use of the BGT system by the store sales assistants. However, the Shrine-Screen Syndrome (see Exhibit D3) indicates that the sales assistants are still far from using BGT in a correct and effective way.

Therefore, the "product strategy" could be summarised as follows: to sensitise the Buyer or/and the Distribution Managers (by stressing the importance of BGT to them) so that they encourage and help the stores to use BGT in a more effective and correct way.

Operational Strategy

This alternative strategy consists of relying on the operational structure and could be implemented via the store managers. The cross comparison of the interviews shows that these actors exert a determinant influence over their sales assistants (see exhibit E). Moreover, the bonus of these actors is affected by the stock turnrate in their unit. The "operational strategy" could be summarised thus: to sensitise the store managers to the importance of BGT both for their store and bonus, so that they encourage their

staff to use BGT in a more effective and correct way.

Perverted Functional Strategy

This alternative strategy involves substituting one's self to the operational structure for the exercise of coercive authority. This is a "perverted" (which must not be mistaken for "perverse") strategy inasmuch as the functional structure has no hierarchical liaison with the store personnel (managers and staff).

The interviews indicate that Petiot resorts to the third alternative. However, due to the absence of direct hierarchical liaison between his department and the stores, he must resort to the authority of the General Inspectors (who belong to the same division as the store staff and managers) in order to "impose" BGT in the stores.

Accordingly, Petiot's situation can be summarised thus:

What is at stake: Petiot's position, since the BGT Project Officer will be judged by Chaler on the basis of his success in promoting the use of the system.

Rationality: is oriented towards the optimisation of his network of relationships in the company. As a matter of fact, Petiot's major assets spring from his being a former General Inspector. He knows the General Inspectors personally, and has kept their working methods. Thanks to the General Inspectors, Petiot can - to some extent - control the downstream environment of the Head Office. Petiot's strategy can only be explained by such a rationality of optimisation of the sole asset available to this actor.

Strategy: as mentioned above, Petiot develops a "perverted" functional strategy. That is, he "unduly" (if one views chart flows

as the "organisational law") installs himself as a coercive authority by: (i) drawing the General Inspectors' attention to "negligent" store management in the stores; (ii) closing down the automatic re-stocking option for the "negligent" stores (those which have an excess of stockholding and do not appear to try to do anything about it); (iii) "reprimanding the 'negligent' store managers" by sending them annotated print-outs (on which anomalies are underlined, and deadlines for correction are given). He "punishes" without highlighting the lost economic opportunities for each of the structures liable to benefit from BGT and thus amenable to incite the sales staff to use the system in an effective and correct way.

Using the categories of power theory (see Appendices I and II, notes), one can conclude that Petiot's strategy consists of distributing the "bads", rather than the "goods". The type of his assets (the General Inspectors network) bounds his strategy to be punitive- rather than remunerative- oriented.

Zone of uncertainty: it is Petiot who decides on the General Inspectors' visits to the stores. These decisions, before they are made, stand as zones of uncertainty for the store managers: they do not know which store will be visited, and when.

5.5. The HSC Distribution Manager of the Head Office

Maucer could play an active part in developing the usage of BGT. As already mentioned, BGT could prove useful to him in his work. However, the system could be helpful to Maucer only if it were correctly used in the stores: the sales would need to be recorded immediately, which would allow for a real-time follow-up of the white goods stocks. So far, sales are usually entered into the

terminal at the end of the working day. However, Maucer could only promote BGT use in stores if he were convinced of the advantages of the system to himself. Yet, the analysis of the interviews indicates that Maucer is not sensitive to these advantages.

This situation seems to result from two phenomena. Firstly, Petiot did not try to sensitise Maucer to BGT's advantages (this would have corresponded to a "product strategy"). Secondly, the ambiguous role of Maucer in relation to Poine induces the former to develop a commercial strategy (i.e. negotiation with the suppliers) rather than an administrative strategy (i.e. making stores aware of stock problems). Maucer's situation can be summarised thus:

What is at stake: the commercial dimension of the Distribution Manager's function, in front of the buyer who wants to confine Maucer's mission to administrative matters (i.e. the management of HSC's supplies).

Rationality: is commercial and oriented towards maximising logistics discounts and penetrating the upstream environment of the company by negotiating with the suppliers.

Strategy: consists of optimising logistics flows while trying to extend the Distribution Manager's function to buying and selecting goods.

Zone of uncertainty: if one views the future distribution of roles between Poine and Maucer as an uncertainty (affecting mainly the stores) it is clear that the Distribution Manager monitors this uncertainty more than Poine does. This results from Maucer's belonging to HSC, which is managed by Chaler. Finally, for the stores supplied by a warehouse, Maucer monitors a fraction of the uncertainty related to their satisfactory supplies of white goods.

5.6. The White Goods Buyer

Poine could also play an active role in developing the usage of BGT in the stores. Indeed, if the system were optimally used by the sale assistants, Poine could follow up the commercial performance of his selection in real time. However, the exhibits show that the usage of the system in the stores is far from optimal. Such a follow-up would enable Poine to adapt his selection by: (i) ruling out the articles which do not sell or do not turn rapidly enough; and (ii) selecting articles similar to those giving rise to satisfactory turnover and stock turnrate.

Such an adjustment possibility would be doubly interesting for Poine, whose bonus is a function of both turnover and stock turnrate of the articles he selects. However, protocol analysis indicates that the Buyer is not sensitive to this opportunity offered by BGT. This seems to result from the conjunction of two phenomena. Firstly, Poine has not been informed of all the possibilities and features of the innovation system, and Petiot did not try to sensitise him to all the opportunities the system had to offer him. Secondly, Poine views BGT as essentially related to HSC. But, as already mentioned, this structure, under the impulsion of Chaler, and via Maucer, increasingly competes with Poine. This competition started with supply control and extends to selection activity itself, since Maucer supplies the warehouses with articles which Poine has not selected. It is therefore possible to understand Poine's passive role as a means to limit Maucer's role to resolving strictly administrative problems (HSC- or BGT- related). Poine's situation can be summarised as follows:

What is at stake: the exclusivity of selection activity. The major implication is the control over the interface between the company

and its upstream environment (suppliers and manufacturers).

Rationality: is mainly commercial, and oriented towards maximising the discounts from the suppliers.

Strategy: consists of trying "to find as good as and less expensive articles than the competitors do" (Poine) while doing nothing to ease Maucer's mission. The widening of the assortment provides Poine with a means to specialise his activity and hinder the development of HSC in order to counter Maucer's competition. By selecting new suppliers, Poine expands his mastery of the upstream environment: for all the new suppliers, Poine is now their interlocutor and contact in Barracuda. The widening of the assortment hinders compliance with the objectives in terms of stockholding limitations, which slackens the development of HSC. The stores cannot refuse the deliveries of the new selected articles, which generate problems in terms of available display space. Such new articles are therefore often stored in the reserve, which conflicts with the new stock policy and keeps Maucer busy by diverting him from purely commercial activity.

Zone of uncertainty: so far, Poine used to monitor the uncertainty relating to the relationships between Barracuda and its upstream environment. This exclusive control is more and more challenged by Maucer, but is still felt in the stores where most actors do not understand Poine's new selection policy and the fact that they receive white goods they did not order, for which they have no display space left, but which they must accept since they correspond to Poine's policy to widen the assortment.

5.7. The General Inspectors

Petiot's strategy places the General Inspectors at the centre of the process to improve control over white goods stocks and BGT's use. Coercion is the distinctive characteristic of the General Inspectors' intervention, and their activity is alien to sensitising, educating or motivating potential end-users. The General Inspectors' situation can be summarised as follows:

What is at stake: control over stores tends to become more and more computer-based, to the effect that the physical discontinuous presence of the General Inspectors is gradually superseded by the discrete continuous presence of the terminals enabling Head Office analysts to control the stores and exercise pressures. A "bad" bonus for a store manager, the closing down of the automatic re-stocking option, etc. are examples of the numerous "punishments" which can be inflicted directly and impersonally from the Head Office. What is at stake for the General Inspectors is therefore the maintenance of personal inspections in the stores, viewed as efficient means of control over the implementation of the general management's decisions.

Rationality: is oriented towards the use of punitive power and the exercise of a purely coercive authority as sole means to justify personal control in the stores. If the General Inspectors are said to have such rationality, it does not follow that coercion or authority are psychological characteristics inherent in their personality. Such a proposition would be more along the line of psychological analysis. In contrast, the point made by strategic analysis is that the General Inspectors' assets, the rules of the game and a gradual change in internal control/regulation processes orient them towards strategies whose rationale is the exercise of "punitive power", in the sense of power theory (in fact, the

organisation rules do not provide them with any "goods" to distribute, should they want to exercise a remunerative power; as they have it: "we have no right to conceal").

Strategy: consists of giving favourable answers to Petiot in order to evidence the necessity of personal and physical inspections in the stores, as opposed to functional and impersonal computer-based control operated from the Head Office.

Zone of uncertainty: although the General Inspectors cannot "conceal", they still enjoy discretion in their choice of the destination of their reports. A circulation at the highest level is a major threat for store managers.

5.8. ITD

It was only possible to interview one actor of this structure. The interview and the participation in one seminar furnished the following indications about the actor (who was specifically in charge of the BGT seminars):

What is at stake: the point is to position ITD as an essential structure for any change attempted in the organisation, the implication being a relative mastery (through training) of the downstream environment of the Head Office (i.e. the stores).

Rationality: is oriented towards training, sensitising and motivating the personnel. However, it seems that one tries to reduce fears (about the possible implications of organisational change in terms of redundancy) rather than to highlight and make explicit the meaning of the organisational innovations (in terms of new needs, market constraints, opportunities, competition, etc.).

Strategy: consists of detecting new training needs in the company and proposing adapted programmes.

Zone of uncertainty: in the last resort, it is the ITD training officers who transmit the general management's messages (technical, economic, administrative, if not political) to the very operational levels of the group, that is, to the sales assistants. These actors thus monitor an important fraction of the uncertainty attached to the morale and motivation of the employees whom the general management find the most difficult to "reach" and communicate to. However, the training officer seemed to be affected by the ambiguity resulting from the multiplicity of the parties involved in the BGT project.

5.9. The Store Managers

In the light of the interviews and analyses summarised in the exhibits, the situation of these actors can be described as follows:

What is at stake: the commercial and administrative autonomy of the stores. Indeed, the BGT terminals are viewed as a sort of challenge of the exclusivity of their authority on the management of their store.

Rationality: up until two or three years ago, the major concern of a store manager was to maximise the flow of merchandise from within the reserve to the car park, i.e. to the customer's automobile. This meant a mastery of the environment and frequent contacts with the suppliers to respond to market changes and a (mainly intuitive) knowledge of the Barracuda consumer's buying behaviour. This seems to account for the pregnancy of the immediate-sale oriented rationality (see the Shop-keeper Syndrome in Exhibit D1). Clearly,

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this type of rationality is hardly compatible with the new commercial policy more oriented towards deferred sales (since the target is to limit reserve stocks as much as possible). Some exceptions to this rationality can be observed; in such case, BGT is effectively and correctly used in the store (see the Lyon's hypermarket).

Strategy: consists of questioning the validity of the commercial and sometimes of the administrative policies by pointing out alleged inconsistencies within these policies (see the Murphy's Law Syndrome in Exhibit D4). There are various examples:

" (i) What is the point in converting reserve space into display space if the relating rent is 50% higher?; (ii) What is the point of saying that BGT allows for reducing logistical tasks if we cannot get rid of the employees who are made redundant?; (iii) On the one hand we are told to get rid of the stocks, on the other, Poine persists in sending new articles which we have to put in the reserve since we have not enough display space".

Clearly, a number of these objections and arguments may seem "objectively" invalid and contradictory (the first and the third for example).

Finally, the store managers explain their sales assistants lack of enthusiasm for BGT by stressing that it is not in the "nature" of salesmen to pay attention to profitability and storage costs.

zone of uncertainty: is related to the store staff's response to, and attitude in front of, the new management orientations of the Head Office. Indeed, protocol analysis and cross-comparisons of the interviews indicate that the behaviour and feelings of this type of

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personnel is highly dependent upon their store manager's behaviour and expressed feelings (see Exhibit E).

5.10. The Departmental Managers

As far as the departmental managers are concerned, the situation can be summarised as follows:

What is at stake: the department autonomy, especially at the commercial level.

Rationality: is mainly oriented towards maximising the commercial performance of the department of which they are in charge.

Strategy: consists of letting the sales assistants devote themselves to strictly selling activities, even if this means that the departmental managers are the only actors who will have the time to use BGT. In this case, after closing time, departmental managers will go to the BGT terminal and record all the operations that should have been recorded by the sales assistants during the day. This deferred use type of procedure generates various errors, since the system was designed for real-time use. Exceptions to such practices are usually associated with encouragement of the store management to use BGT.

Zone of uncertainty: related to the sales assistants' morale and sensitiveness to profitability concerns (as opposed to purely commercial matters) since the departmental managers have an important influence on the opinions of the sales assistants.

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5.11. The Sales Assistants

In the light of the interviews and analyses presented in the exhibits, it is possible to summarise the situation of this type of personnel as follows:

What is at stake: protocol analysis indicates that this type of personnel generally feels that BGT and HSC, via information technology, jeopardise (or, at least, challenge) the specificity of their function. Exceptions to these feelings are observed in stores where management encourage assistants to use BGT and try to promote concerns about profitability (e.g. by means of the GODEL incentive scheme).

Rationality: is oriented towards maximising commercial opportunities. Which supposes, for the sales assistants, that goods must be both available within the store, and visible on the salesfloor.

Strategy: consists of devoting themselves to selling activities and trying to sell as much as possible while attributing the incorrect or low usage of BGT to the demonstrators who "show very little concern for the particular problem of the chain".

Zone of uncertainty: is related to the way in which BGT is actually used in the stores. However, the mastery of this uncertainty is limited by the control exerted by the BGT Project Officer and the General Inspectors.

6. Conclusion

The weak realisations of the BGT test as compared to objectives, and

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the status of the decision related to the innovation system (i.e. "deferred final decision") can thus be explained by the conjunction of phenomena derivable in the terms of strategic analysis. Therefore, the present "explanation" of the organisational phenomena (and of their consequences) must be viewed as a "model" rather than as a description of "reality in itself". These phenomena can be summarily characterised as follows:

- (i) Ambiguities in the assignment of duties (Buyer/Distribution Manager) delay and hinder an optimal usage of the system, since the actors are more concerned with securing their position than with optimising the implementation of the BGT project.
- (ii) The features of the mission and incentive scheme of some actors seem to predispose them to playing an active role in the promotion of BGT's usage (e.g. the Buyer, Distribution Managers of the warehouses, store managers, etc.). However, the analysis of their rationalities and strategies indicates that what is at stake for them tends to deter them from playing such a role.
- (iii) The BGT Project Officer's strategy involuntarily fosters the opposition (to the system) of the actors (store managers) who have the strongest influence over the potential end-users of the system (the sales assistants).
- (iv) None of the efforts to convince store managers of the advantages of the system takes into consideration their rationality and what is at stake for them. All the efforts to promote BGT stress the administrative dimension of the system, without highlighting the commercial aspects. This seems to account for the strategy of opposition developed by the store management.

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These phenomena constitute the framework in the perspective of which strategic analysis is able to explain the status of the decision related to BGT. The framework is only interesting because it enables one to raise marketing questions such as:

- (i) To what extent would it not have been fruitful for the COD sales engineers to approach the store managers themselves in a specific and adapted way? In the light of strategic analysis, it appears that it would have been interesting for COD to emphasise the following points in their approach to the store managers:
 - (1) BGT is also able to play a commercial role;
 - (2) BGT confers a new type of autonomy to the stores, by enabling orders to be directly passed to the warehouses, by allowing for real-time follow-up of sales, etc.
 - (3) BGT is not as much a new control device for the Head Office as a new commercial support for the stores.
- (ii) Instead of trying to sell BGT to the Information Systems Division and only to it, would it not have been more advantageous to take into account Barracuda's strategic idiosyncracies and try to sell the system to the Buyer and the Distribution Managers as well (by adapting arguments) ?

Such a commercial approach could have allowed for a prompter decision (of adoption) and enabled COD to sell more terminals. Moreover, in such a case, Barracuda decision-makers would now be able and prepared to discuss new information technology projects of which COD would be all the more likely to furnish the basis as the BGT proposal would have proved a success.

This conclusion poses a problem in terms of marketing strategy.

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That is, if COD's target was to sell BGT (the software only, and not the entire system, including the terminals) one can consider that the strategy was successful. But, even in such a case, COD's strategy can be criticised from a marketing standpoint, since marketing is about developing and maintaining mutually satisfying exchange relationships between organisations (at a profit). In fact, the real question turns upon the actual corporate strategy of COD. It is likely that this strategy, because of COD's tremendous power, is to sell the software, knowing that customers will then be bound to buy the corresponding hardware from COD, "anyway".

The methodological conclusion is that a deferred final decision seems to be much more difficult to analyse than an adoption or rejection (it suffices to compare the length of this case study to Appendix I and II to realise this). However, the fact that, both in Shark and Piranhas the decision was already made before the study, may account for the difficulty (at least the relative length) of the present analysis.

INTERVIEWEES AND SAMPLE STRUCTURE

Thirty-four people were interviewed. Among these, twenty-four gave rise to in-depth interviews and discussions.

Type and Number of Stores Which Were Visited

Hypermarkets		Home and Garden Centres (HGCs)	
Lyon	1	Chalon	1
Bordeaux	1	Echirolles	1
Chalon	1	Godard	1
	3		3

Category and Number of Interviewees

Store Management		Departmental Management		Sales Staff		Demonstrators	
Lyon	1	Lyon	2	Lyon	4		
Godard	1	Godard	2	Godard	5	Godard	2
Bordeaux	2			Bordeaux	2		
Chalon	2	Chalon	2	Chalon	2		
		Grenoble	2	Grenoble	3	Grenoble	2
	6		8		16		4

SUMMARY OF THE INTERVIEWS OF STORE MANAGEMENT

Opinions and Origin

What Is the Purpose of BGT

BGT is a tool for stock management.

Godard

It is a system allowing for keeping a minimum stock.

Chalon (HGCs)

To allow for automatic orders.

Grenoble

To widen the offer available to consumers.

Lyon

Implications of BGT + HSC

We incur more risks of missing sales because of insufficient reserve stocks.

Godard
Bordeaux

Life is more and more difficult for demonstrators because we have more and more brands but less and less articles by brand. If we have to replace this personnel with Barracuda personnel the cost of labour will pass from 1.7% of turnover up to 4.5%

Godard
Grenoble

The advantages of these structures for the profitability of the stores is far from obvious.

Godard
Bordeaux

Some people are made redundant.

Godard
Chalon

Implications for Your Work

None

Godard

BGT is bad for the morale of the sales staff, it is difficult to tell them that information technology is good for the company while they may lose their job because of it. Personnel management is much more tricky now.

Chalon

We are less worried about stock management, since the computer does it for us. It saves time.

Lyon

Contacts for BGT Problems

There are too many people, we do not know who we should contact.

None

The Distribution Manager of the warehouse of Lyon.

The Distribution Manager of the Head Office.

Godard

Bordeaux

Grenoble
Chalon (HGC)

Lyon

Relationships With the Group

The Buyer: he does not do his job properly and ignores our opinion about his new selections.

From the Head office, we only see the General Inspectors when they "visit" us.

HSC: they ignore us.

The BGT Project Officer: he does not try to try to understand the problems we are facing in the stores.

Godard
Chalon (HGC)

Godard
Chalon (HGC)

Chalon (HGC)

Bordeaux

Bonus

We'd better not rely on it to make a living.

Godard
Grenoble

SUMMARY OF THE INTERVIEWS OF THE DEPARTMENTAL MANAGEMENT

Opinions and Origin

What Is the Purpose of BGT

It is a system to manage re-stocking.

Chalon
Echirolles
Godard
Lyon

In theory, it should reduce the risk of running out of stock, but we no longer have any stock.

Chalon
Godard

To know the price of article readily by using the terminal.

Lyon

To ease the work of sales staff.

Lyon

Implications of BGT + HSC

There are more risks of inventory mistakes, as some sales assistants may forget to record a sale on the terminal, especially when there are lots of clients at the same time.

Chalon

In case of stock-out, it is impossible to tell the client when the article will be available.

Echirolles

Costs are increased, as we still have to pay logistics people, while we pay for the warehouse.

Echirolles

The future of the demonstrators is at stake, because administrative concerns are taking over the commercial spirit: with whom are we going to replace them when they leave?

Godard

Implications for Your Work

On top of having to sell, we have to make the client come back to collect his purchase; we are not used to this problem.

Chalon

We have more work because of the difficulty to understand the BGT system, the codes on the screen, the commands are not clear at all.

Godard

More work: because of the lack of education

of the sales assistants, I have to use BGT myself and record the sales after closing time.

Echirolles

Contacts For BGT Problems

The Distribution Manager of the Head Office.

Lyon

The Distribution Managers of the warehouse of Lyon.

Grenoble
Chalon
Echirolles

Our store's administrative assistant: she understands the system very well.

Godard

Relationships With the Group

The Head Office Distribution Manager: he is too far from our problems. We never see him.

Chalon
Echirolles
Godard

The Buyer: what is his role in relation with the Distribution Manager? His latest selections do not sell well, and we do not know where we must store them.

Godard
Echirolles

The General Inspectors: we see them sometimes when we are controlled.

Chalon

The Stock Control Department: never heard of.

Chalon

SUMMARY OF THE INTERVIEWS OF THE SALES PERSONNEL

Opinions and Origin

What Is the Purpose of BGT

To manage re-stocking

Godard
Echirolles

To allow us to know the real level of the stock when we sell articles.

Lyon

To reduce stockholding in the stores.

Chalon
Bordeaux
Grenoble
Chalon (HGC)

To lower overheads.

Lyon

Implications of BGT + HSC

Lots of errors in inventory.

Godard
Bordeaux
Chalon

Problems for the clients.

Godard
Echirolles
Chalon
Bordeaux

Delivery terms from the warehouses are too long.

Echirolles

Implications for Your Work

We miss lots of sale opportunities.

Godard
Echirolles
Chalon (HGC)

We must adopt another style for selling; now we have to sell delivery terms along with the article.

Lyon

Relationships With the Group

Not enough contacts with the Buyer, HSC, the Head Office: we do not really know what they are up to with BGT.

Godard
Echirolles
Chalon

SYNTHESIS

Usage of BGT

- Godard** Sales assistants record the sale on the terminal once the client has left the store (in fact, the sale should be recorded during the transaction itself) and the terminal is not used to determine the level of stock before the sale is made. Sales assistants go to the reserve frequently to make sure the articles they sell are available.
- Echirolles** Sales assistants have been told to use the terminal to determine the level of stock only, and the department manager records the sales after closing time. Which means that sales assistants use a note-book to determine the level of stock during the day.
- Chalon (HGC)** The BGT terminal is used more often to record sales in real time, but sales assistants do not trust the system and prefer to go to the reserve to check the availability of the articles.
- Lyon** Optimal utilisation of the system: sales are recorded in real-time on the terminal, and the terminal is systematically used to check availability both in the store reserve and in the warehouse.
- Bordeaux** During the observation, the system was nearly correctly used; however, indications from the BGT Project Officer suggest that the average usage of the terminal is low.
- Grenoble** The terminal is only used to determine whether the article wanted by a client (when the article in

question is not available in the hypermarket) is available in the HGC of Echirolles (very close to Grenoble).

Chalon Utilisation nearly nil

Problems

In the light of the interviews, it seems that four major problems hinder the development of the usage of BGT (which usage would enable a clear decision to be made). As these problems may not appear very clearly from the summaries above, they are listed and defined below, in Exhibits D1, D2, D3 and D4.

THE SHOP-KEEPER SYNDROME

The fear of missing an immediate, unexpected and substantial sale because of insufficient reserve.

The reduction of reserve stockholding is viewed as synonymous with increase in the risk of lost opportunities. Sales assistants seem to have a "discrete" rationality. That is, they distinguish a sequence of independent events and will remember a "famous" story about a lost opportunity. Each store has its missed sale which suffices to definitely rule out the entire commercial policy of the Head Office. Financial aggregates have little meaning, and sales assistants show little concern for flows of continuous "small purchases" that constitute 80% of the turnover. For them, the turnover comes in discrete quanta, and missing one quantum (one sale) is to lose a client and damage the reputation of the chain. Somebody who says "To lose one client is to spoil a day" would be hardly impressed by scale economies. According to the sales assistants, the image of Barracuda is linked to immediate purchase. To betray the image is to jeopardise the whole business.

This reasoning was found to be absent in Lyon's hypermarket where sales assistants emphasised the fact that a good salesman is one who is able to sell what he has. If the article desired by the client is not available, the point is to sell another one, or to make the client order for that particular article. In this case, the article will be delivered to his home, or the client will have

to come back and collect it. The sales assistants of Lyon were younger, had a "baccalaureat", and some held a commercial degree from university (two years after the baccalaureat). On top of this, the Lyon's store manager appeared to be very concerned about profitability.

THE SHRINE-SCREEN SYNDROME

The BGR terminal is a magnificent black box, whose destination and ultimate beneficiary are unknown, which one fears to approach, and that should only be touched by initiated people.

Three types of reasoning will illustrate the phenomena.

Echirolles Due to their low educational background, my sales assistants cannot operate the terminal properly. They will order too much, make mistakes and disrupt the whole accounting system of the store. I prefer to have them sell, which they do well. Which means that I use the terminal myself, at the end of the work day, to record the sales. I do not want to let them play with the computer [sic] during the day. They have no idea about how to use it, and their job is to sell.

(Departmental manager)

Godard We do not dare to touch the computer at rush time. If we make a mistake, it is a real disaster. We do not know how to correct it, the clients become nervous and the demonstrators try to pick up our clients while we are stuck with the machine. Most of the time, in case of error, we do not understand what appears on the screen. I do not know who designed the programme, but I think he could have designed something easier to operate; we have never learnt computing before, and the presentation by the Installations Department took less than one hour.

(Sales assistant)

Chalon

We do not even know where they go, the orders we enter in the terminal. To the Head Office, HSC, a warehouse? The Distribution Manager told me the orders were transmitted by the computer to his warehouse. But then, how can one explain that Petiot always knows the stock level?

(Departmental manager)

THE MURPHY'S LAW SYNDROME

The fear that the best hopes and plans will only give rise to outcomes opposed to the expectations. The motto is that 'From the Head Office, the worst is always certain'.

The general argument is that the combination of BGT, HSC and the new commercial policy may produce results disadvantageous for the profitability of the stores. This argument is generally developed by store managers, and its main feature is to point out alleged contradictions in the general management's new policy. The following quotations by store managers illustrate the phenomenon.

Bordeaux To convert reserve space into display space: are they sure [the Head Office] that such modification (cost of the works plus 50% increase in the rent) is really likely to be counterbalanced by the expected increase in turnover? The question is all the more worrying as the new selections do not sell.

(Store manager)

Godard The new commercial policy poses problems for the demonstrators. They have less and less articles by brand (reduction of the depth of the assortment). Should we have to replace this personnel with Barracuda people (to whom we pay a commission, on top of their salary), the costs [in labour] for the store would increase by 170%.

(Assistant store manager)

Echirolles

What is the use of economising logistical tasks if we still have to pay the logistics people? All the economies they mention are unrealistic because they do not take into consideration the fact that it has become impossible to get rid of redundant employees. So, we have to pay for BGT, and we do not make any economy.

(Store manager)

CROSS ANALYSIS OF THE INTERVIEWS

In the light of the research, it is possible to compare the feelings and actions of the management and staff from the stores. Some lines seem to emerge, which furnish the platform for the presentation of the actors rationalities and strategies. The major conclusions that can be derived from the cross analysis of the interviews are summarised below.

- (i) There seems to be an association between the understanding of the role of BGT (along with HSC) and the level and "quality" of usage of BGT. (Cf. Lyon's hypermarket)
- (ii) There seems to be an association between the perception of a commercial role of BGT and the quality of its usage. (Cf. the Lyon hypermarket in which the widening of the offer is mentioned by the sales assistants, along with the idea that BGT is a support for salesmen).
- (iii) There seems to be an association between an absence of understanding of the new commercial policy of the Head Office and the low and incorrect usage of BGT. (Cf. Godard's HGC, for example)
- (iv) There seems to be a tight association between the attitude of the store management towards BGT, HSC and the new general or commercial policy of the Head Office, the attitude of the departmental management, and the attitude of the sales staff.

Moreover, it seems that, between the three following structures:

- (1) Hierarchical structure (store managers, departmental managers, sales assistants);
- (2) Product structure (Buyer, Distribution Managers, ...)
- (3) Functional structure (BGT Project Officer, Head of the Organisation Department, ...),

the hierarchical structure is more likely to influence the sales assistants than the other structures (given the poor relationships between the stores and the group, as revealed by the interviews).