

SIMULATION: A COMPLEMENTARY METHOD
FOR RESEARCH ON STRATEGIC
DECISION MAKING PROCESSES

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INTRODUCTION

Since 1965, social scientists like Coleman (1966) and Raser (1969) have taken an increased interest in the simulation experiment and have added it to their palette of research tools.

Simulation has also found successful applications in teaching and research on international relations (see, e.g., the Inter-Nation System of Gueztkow et al., 1963).

Surprisingly enough, researchers in management seem to have paid little attention to this approach. In reviewing more than 100 research studies in policy, Hofer (1976) pointed out that most of them are based on a small number of in-depth field studies and some on cross-sectional large sample. None of them made use of laboratory experiments.

A similar review made by Fromkin and Streufert (1976) of the organizational literature led them to report that "Weick's (1965) exhortation against the neglect of laboratory experimentation is still valid".

Yet, as will be shown in this article, simulation proved to be very useful to complement field research studies and historical case analysis in the particular instance where the research topic was the divestment decision process¹.

Indeed, this research was exploratory in nature. The state of knowledge, despite a copious literature, was still at its beginning. The research objective then

¹ For a complete description of the research and its findings, see Danielle Nees (1978-1979).

was first to gain some understanding, to try to portray the process as accurately as possible, to generate hypotheses that could eventually be tested in other ways. In addition to this, the process was assumed to be "messy", with several - not yet identified - actors, non linear, extended over time, with various perturbations and a heterogenous structure. These two factors called naturally for a limited number of preliminary field studies.

The outcome of these studies, when complemented by historical case analysis was twofold: First a descriptive formalization of the divestment decision making process which needed further validation and, second, a set of hypotheses which required additional treatment to be brought into sharper focus.

Three options were available: to accumulate field studies, to do a questionnaire survey or to undertake a simulation experiment.²

It is well-known that field studies are particularly time consuming and costly. If the aim is to observe longitudinally and document the process - rather than reconstruct it - it becomes prohibitively expensive. Moreover, additional case studies do not increase the validity of the findings, although they may increase the confidence in them. Each case is unique and entails its own situational complexity. Whatever the number of case studies made, nothing can be proved or even disproved.

Finally, as Campbell and Fiske (1959) emphasized (p.82), "When a hypothesis can survive the confrontation of a series of complementary methods, it contains a degree of validity unobtainable by one tested within the more constricted framework of a single method".

² This article is not intended to provide a comparative evaluation of these three groups of research methods. See, e.g., a) for laboratory experiments: The whole issue of Administrative Science Quarterly, Vol. 14, N° 2, June 1969 and Inbar, M. and Stoll, C.S., Simulation and Gaming in Social Science. The Free Press, New York, 1972; b) for field studies: Bauer, R.A. and Gergen, K.J., The Study of Policy Formation, Chapter 6. The Free Press, New York, 1968; * c) for questionnaire surveys: Philips, D.L., Knowledge from What? Theories and Methods in Social Research. Chicago: Rand McNally, 1971.

* and the whole issue of Administrative Science Quarterly, Vol.24, December 1979

A questionnaire survey applied on a large sample of cases was also of limited value.

Without dwelling on the well-known pro's and con's of this type of techniques, let us just pinpoint two matters of impracticability that reduced the interest of application in this case: the "what to ask?" and the "to whom to send?" issues. As for the first issue, it appeared to be very unpractical to device a questionnaire incorporating "how" questions. One can easily ask people "what they did". It is much more difficult to ask them "how they did it?". The resulting length and heaviness of such a questionnaire would have a great chance of discouraging the respondents. On the other hand, as most divestments were not publicized in Europe and as managers surrounded the process with much secrecy, it was not possible to locate a population from which a sample could have been drawn. The informative response rate most probably would have been low.

The simulation technique, though not dominant in all research projects offered, in this particular case, an avenue to economically complement field studies and deal with a non-forthcoming research context without reducing the essentials of the situation studied.

Simulation is defined by Abelson (1968) as "the exercise of a flexible imitation of processes and outcomes for the purpose of clarifying or explaining the underlying mechanisms involved".

It is important to recognize that the objective is not to duplicate reality in vitro but to create and observe a system that complies to the same behavioral pattern.

The next section will describe in greater detail the simulation experiment that was carried out and partial results derived therefrom. This will be followed by a section suggesting possible improvements and extensions.

DESCRIPTION OF THE EXPERIMENT

The simulation experiment was part of an iterative research process, shown in Figure 1, which consisted of six steps, each step serving as an input to the next ones. The experiment was run after the field studies and the case analyses were completed, with the objective of re-observing, outside the field settings, some aspects of the divestment decision making process that were of particular concern.

The experiment took place in the context of a management development program (M.D.P.) with two separate groups of 25 European managers each, over one academic year.

These 50 managers were from about 30 to 45 years old (the average age of 38 was the same as in the field settings). Eighty five percent of them held top or middle positions in large companies. All managers had a university degree.

Figure 1

RESEARCH METHODOLOGY

1. Exploratory Interviews
 - with managers
 - with bankers
 - with consultants
 - with academics
2. Desk Research
 - on divestment
 - on decision making process
3. Clinical Studies
 - three European companies
 - one completed and two ongoing processes
 - one non-first and two first decisions
4. Analytical Studies
 - analysis of eleven American cases
5. Simulation
 - based on three cases
 - six runs in a management development program
6. Face Validity Test
 - model tested with practitioners and researchers

Based on material drawn from field studies and case analyses, three cases were prepared in written format for the experiment. Each case was designed to serve specific research objectives. Figure 2 provides a synopsis of the simulations. Each case described the environment, the business activities and the organization of a specific company.

Within each group, five working groups were formed in such a way as to ensure: a) that every group had managers from each functional area (finance, marketing, production, organizational behavior, control and/or Business Policy) and b) that the groups were heterogeneous with respect to the hierarchical and line vs. staff positions of the participants.

Each case was first prepared individually by all the 50 participants of the M.D.P. A week later, they met in working groups to discuss the case. The two hour discussions were video-taped and later examined in terms of the objective pursued.

Three days later, the two groups of 25 managers met separately under the supervision of a coordinator. Once again, the two hour discussions were videotaped to be later analyzed.

The participants were placed in the internal and external environments of the actual decision makers and were asked to play their roles. The research attention was focused on their behavior towards each other and the issue at hand.

There was no other rule, but to refer to the case for any information, or to call upon the coordinator for assistance. The players, being participants in the M.D.P., were not told that they were contributing

FIGURE 2: SYNOPSIS OF THE SIMULATIONS

SIMULATIONS	CASE ISSUE	MAJOR POINTS OF OBSERVATION	MAJOR SIMULATION OUTCOMES																														
<p>1. <u>DUPAIN and its division SURPLATS</u> A French regional wholesale bakery operates, among others, a division which produces and sells frozen meals, as well as caters to institutions and corporations.</p>	<p>In 1972 the local market is attacked by national brands. The production costs suddenly increase leading to a substantial reduction of profit margins. The plant is at full capacity. The top management could choose between an aggressive strategy (building a new plant and increasing marketing efforts to enter other regional markets) or a defensive strategy, such as taking advantage of the newcomers on the market to sell at a good premium. (PART A OF THE CASE.) The management chose the first alternative (PART B). The division was eventually sold (in 1976) to a national competitor at a large discount price.</p>	<p>1. The pattern of the discussion process. 2. Allocation of time between the different activities of the discussion. 3. Comparison of the resistances between the field setting and the research setting.</p>	<p>1. Isomorphism with the field divestment process. 2. a) <u>Allocation of time</u></p> <table border="1"> <thead> <tr> <th></th> <th>Group 1</th> <th>Group 2</th> </tr> </thead> <tbody> <tr> <td>- Identification</td> <td>30%</td> <td>15%</td> </tr> <tr> <td>- Development of Solutions</td> <td>40%</td> <td>20%</td> </tr> <tr> <td>- Selection (argumentation and persuasion)</td> <td>25%</td> <td>6%</td> </tr> <tr> <td>- Implementation</td> <td>5%</td> <td>5%</td> </tr> </tbody> </table> <p>b) <u>Sequence of occurrence</u></p> <table border="1"> <thead> <tr> <th></th> <th>Group 1</th> <th>Group 2</th> </tr> </thead> <tbody> <tr> <td>- Identification</td> <td>1</td> <td>2</td> </tr> <tr> <td>- Development of Solutions</td> <td>2</td> <td>1</td> </tr> <tr> <td>- Selection (argumentation and persuasion)</td> <td>3</td> <td>3</td> </tr> <tr> <td>- Implementation</td> <td>4</td> <td>4</td> </tr> </tbody> </table> <p>3. Resurgence of cultural and psychological resistances (hope factor) to divestment.</p>		Group 1	Group 2	- Identification	30%	15%	- Development of Solutions	40%	20%	- Selection (argumentation and persuasion)	25%	6%	- Implementation	5%	5%		Group 1	Group 2	- Identification	1	2	- Development of Solutions	2	1	- Selection (argumentation and persuasion)	3	3	- Implementation	4	4
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- Implementation	4	4																															
<p>2. <u>FUQUA INDUSTRIES</u> (HBS 9-375-189) A,C A large diversified American Company considers two candidates for divestment: Troyan seed (agribusiness) is highly profitable but very capital intensive (case A); Scorpion (snow mobile manufacturers) is an ailing division (case C).</p>	<p>The question is explicitly labelled in the cases: should the divisions be divested? If, yes, how?</p>	<p>1. Are there any attitudinal differences towards divestment between favorable and unfavorable situations? 2. What is the attitude of the participants towards the relationship between the division manager and the top manager in a divestment situation?</p>	<p>1. There was no observed difference in the participants' attitude. In both cases, they rejected it and finally took it into consideration when forced by the coordinator after one hour of discussion. 2. Three standpoints about the participation of the division managers in the process were made: not necessary, dangerous and necessary. Nobody thought that it was important to take into consideration the future of the division manager.</p>																														
<p>3. <u>FAST FOOD INTERNATIONAL</u> and one of its European divisions In 1972, an American Company in the fast food business entered the European market by setting up national subsidiaries. As the franchising system is not well implemented yet on the continent, the retail shops are owned.</p>	<p>In one country, the division is very unprofitable after several years of operation. In 1976, the country manager faces a crisis situation, (the loss is horrendous). The cost of liquidation and closing down is unbearable. "En désespoir de causes", the country manager decided to try to sell the retail shops to their managers by proposing them a system of delayed payments due over time. Royalties were also due for operating with the brand name. This disposal solution not only avoided liquidation costs, but proved to be highly profitable.</p>	<p>This is the only case studied with a custom-made solution. The simulations were aimed at observing whether under conditions of non-personal involvement and lack of pressure, the solution would have been provided.</p>	<p>The solution was not proposed by any of the 50 managers - all of them agreed that the liquidation was unavoidable until the solution was disclosed to them.</p>																														

to a research experiment. Being used to the presence of video equipment in an educational context the managers lived an active "learning" situation without controlling their behavior as much as if they had been informed of the experiment. The large discretion the participants had in their behavior during the simulations favored their ego involvement (which was, in fact, increasing over time).

The discussion coordinator played a strategic role. The field studies and the case analyses clearly indicated two major phases in the process : before the divestment alternative was considered as a possible course of action and after. Typically, it was observed that initiating the divestment decision process required a considerable amount of time and pressure from different sources. The coordinator was, therefore, instructed to pressure the decision making process by frequently mentioning the passage of time, to recommend the divestment alternative if the groups had not reached it by themselves after an hour and to act as a professional consultant whose services could be sought (the participants were also informed of this).

Each of the three situations was run twice (two groups of managers). In no run were substantive differences identified. Even though additional runs would have been more convincing, the experiment seemed to be reliable.

Data elicited from direct observation, together with the videotape recordings, were observed by two researchers and the coordinator. The convergence between the different observations was taken to be also indicative of the reliability of the experiment.

As the players themselves found the simulation realistic (Raser, 1969). as no unexpected event occurred and given the isomorphism observed between the simulation structure and the referent case structure, the experiment is believed to be valid.

Finally, as the objective was to increase our confidence in the field work rather than to gain additional insights as such, the following rules were adopted at the outset and respected during the experiment:

- a) If some simulation outcomes appeared to be completely new or inconsistent with the field studies, they were to be analyzed separately;³
- b) If simulation outcomes were completely similar to or consistent with the field studies, they were accepted as supporting the field research findings;
- c) If some simulation results were more or less dissimilar to or inconsistent with the field studies, they were to be studied separately unless the discrepancy could be explained by a difference in the settings and thus generate potentially testable hypotheses.

CONTRIBUTIONS OF THE EXPERIMENT

As has been explained previously, this experiment was primarily designed to increase internal and external validity for the field research findings as well as the observations drawn from the case analyses.

The structure of the divestment decision process that emerged from the field studies consisted of four scenarios: identification (the awareness that something should be done, the development of information and set up of a team), development of solutions (decision to increase investment or to dispose of the unit as well as the search for divestment solutions), selection of a solution (choice based on the interplay between individual judgments and factual

³ This situation never arose.

analysis, interpersonal argumentation and persuasion, and coalition formation), implementation of divestment decision (external and internal negotiations, external and internal communications, materialization of the deal).

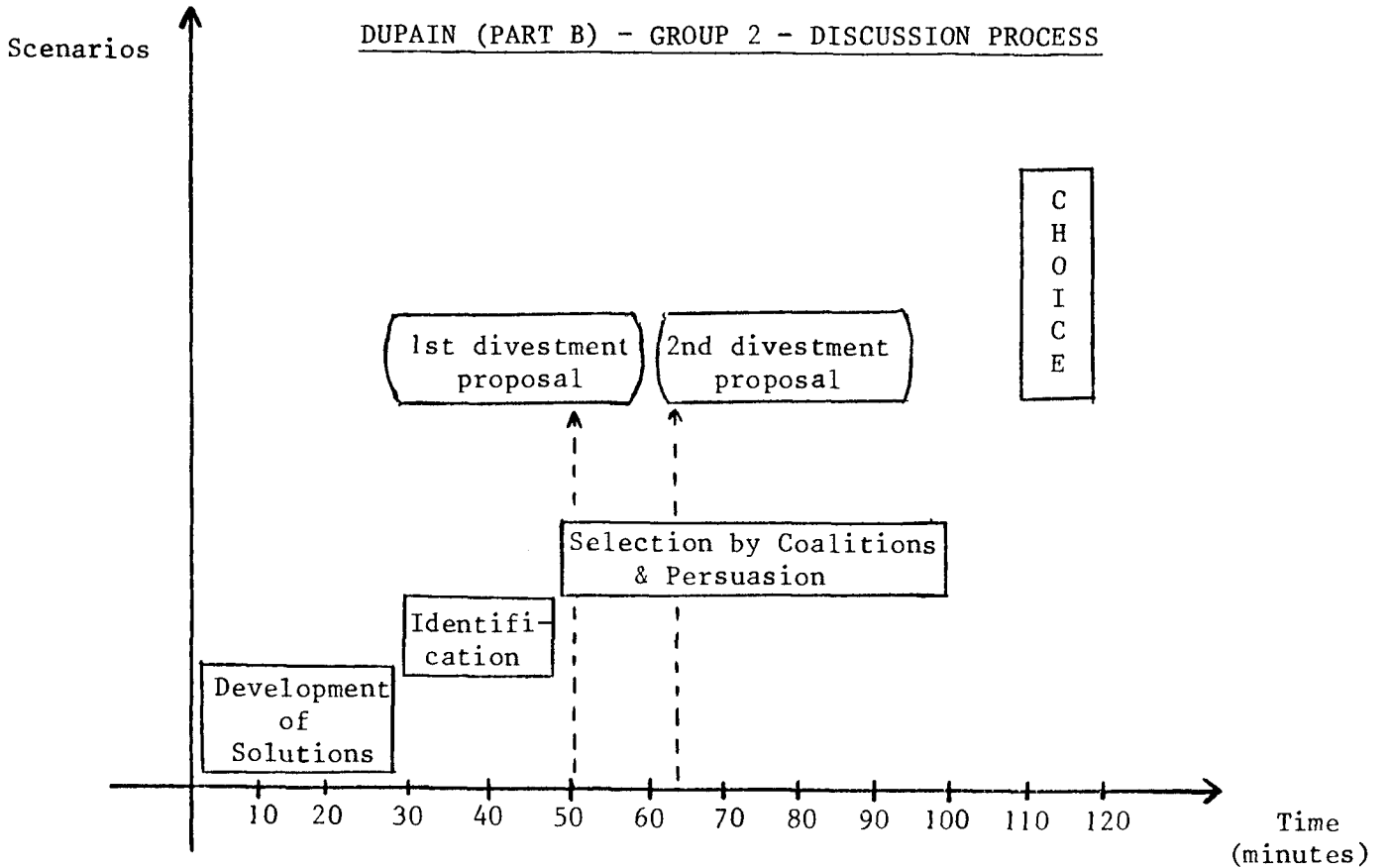
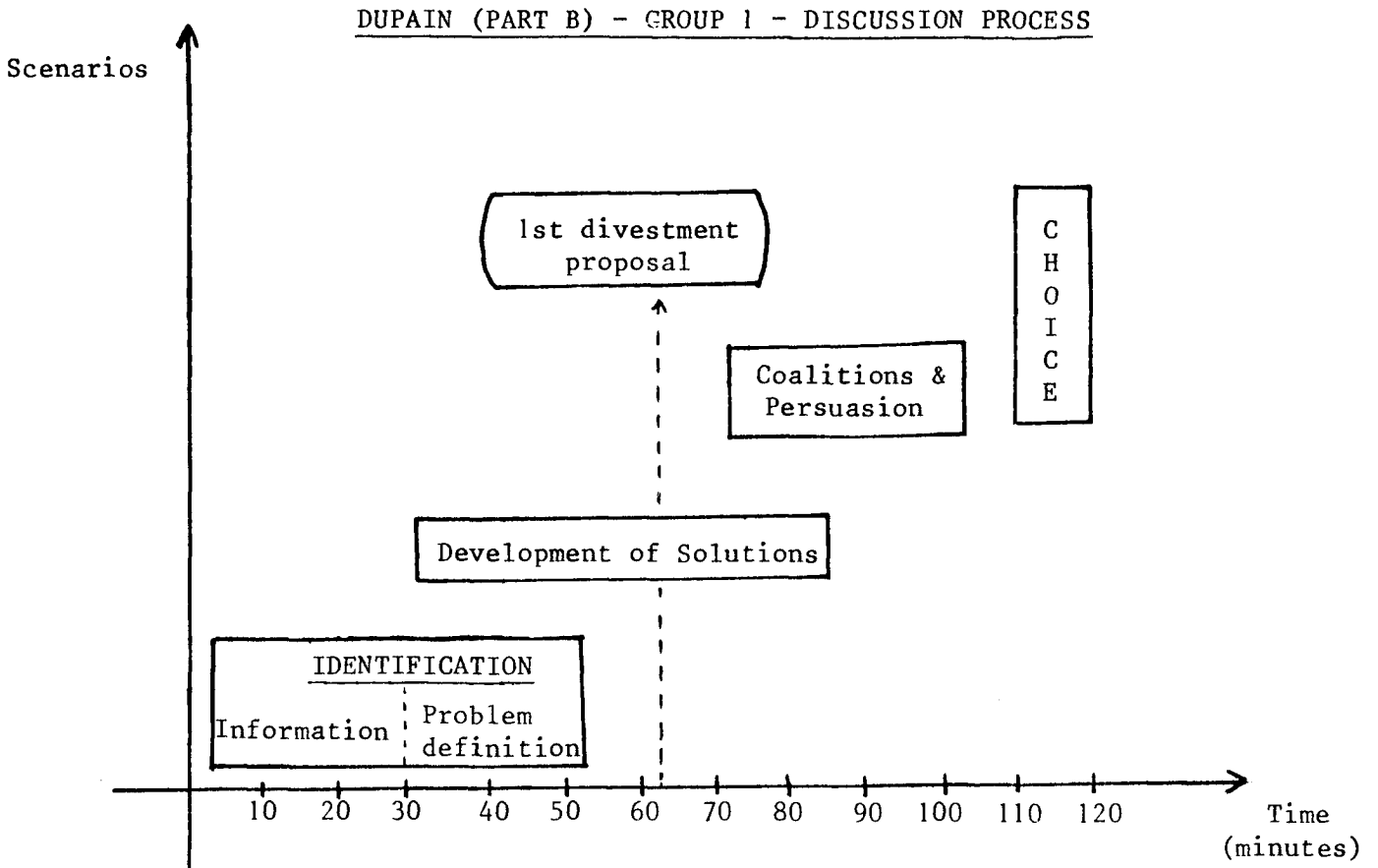
These four scenarios were linked by a number of loops (particularly failure loops between implementation and development of solutions), they were spread over time (the average duration estimated for the 14 divestment cases studied was 15 months not taking into account the period between the events eventually leading to the disposal and the process initiation). They were also scattered through the organization (five major roles were distributed mostly between the Board of Directors, the CEO's level, the group management level, and the divisional level). Moreover, the sequence of occurrence seemed to be variable (some processes started by the development of solutions, others by the identification scenario, others by implementation). Finally, the scenarios did not have the same weight in all cases.

The four scenarios identified in the field were also observed in the research setting. Figure 3 illustrates them for the two runs of simulation 1. It can be noticed that the sequence of the scenarios is not the same in the two runs (as in real-life cases).

On the other hand, the relative duration of these scenarios was not identical in the field and in the simulations. The decision makers of the focal organizations spent, on average, less time on the development and selection of solutions (12%) than did the players (65% and 80% respectively), but on the contrary, more time on the implementation process (25% in long processes and 70% in medium and short ones vs. 5% in the simulations).⁴

⁴ For further details, see Danielle Nees (1978).

FIGURE 3



Thus , the major contribution of this simulation technique was the observation as to whether the field studies findings were modified when other methods were used. The permanent presence in all the simulations of the four scenarios described above increased their representative value.

The second contribution of the simulation was to reobserve a number of phenomena (the way people were using information, the relationships between middle and top managers in a divesting situation, the formation of coalitions and persuasion chains, etc...). It is beyond the scope of this article to provide an exhaustive description of all the issues of interest treated by the simulation. However, by way of an example, we have selected one important issue, the resistance to divestment, to show how the simulations have complemented the field work.

It had been observed⁵ that the longer the divestment process, the more it tended to damage the morale of the candidate to divestment its productivity and performance, weaken the investor's confidence and affect the divested unit's value. Therefore, an in depth understanding of the sources of the resistance to divesting was very crucial to our research.

The time lag between the changes that trigger the process and the process initiation (called the pre-process) took the same time as the process itself. The duration of the pre-process appeared to be the major discriminating factor between long, medium and short divestment processes.⁶

⁵ See Danielle Nees

⁶ *ibid*

Some sources of resistance had already been identified elsewhere, R. Hayes (1972) underlined the "potential admission for failure", R. Hammermesch (1977) recognized the drag effect of multiple levels in large diversified companies, M. Porter (1976) pointed out the barriers to exit due to the degree of specialization, of capital intensity and/or of diversification.

These sources of resistance, although present in our field studies, did not seem sufficient to explain the observed delay. Two other factors needed to be added: First, the lack of understanding and knowledge by European managers of what the divestment entailed⁷ second, the "Hope" factor. By "Hope" factor, we refer to the degree of faith management has in the business. This factor needed to be overcome before any disposal alternative could be taken into account. Perceived as a measure of last resort, the divestment alternative was not taken into consideration among other alternatives. It was only after the decision makers had "mentally" disengaged themselves from the business that the divestment was considered.

The simulations strongly supported these observations. During the simulation on PART A of DUPAIN, for example, none of the groups proposed the divestment as an alternative solution. In the simulation on PART B, in each group, the divestment alternative was suggested shortly before the first hour ended by one individual and was summarily rejected by the groups.

In the first group, the divestment solution had to be eventually imposed by the coordinator.

⁷ In 1974, divestment was still rather new in Belgium and in France. It has probably changed since then.

The second group, however, arrived at the solution on its own, but only after exhausting the alternative of additional investment in productive capacity and marketing efforts (very much like the real situation on which the case was based).

The major factor that could account for this difference in behavior is that the first group, with two exceptions, had nobody who had experience in divestment. The second group, on the other hand, had more accumulated experience with actual divestment. The second group's reluctance towards the disposal was due, by their admission, to the lingering hope that the business could be turned around.

The field studies also showed that reactive and forced disposals were found to be frequent while opportunistic divestments were scant. Is it then psychologically impossible for managers to disengage from one of their businesses when it is profitable? Would profits cloud any other strategic rationale for divestment? Would managers find it easier to divest a money loser than a profitable one? Simulation 2 was very useful in testing whether the "Hope" factor and the cultural blockage were correlated with the profitability of the division.

The case Fuqua (simulation 2) asks the participants to take a decision first on a very profitable, but capital intensive division, then on an ailing one.

In the introduction of case (A), it is worth reading that "As Mr. Fuqua prepared for the meeting where a final decision would be reached, he reflected on Fuqua's previous experience with divestitures. Divestitures were nothing new to Fuqua Industries" and just after, quoting Mr. Fuqua "selling a company takes more courage than buying one" ("Hope" factor?).

The result of the two runs of that simulation is the following : there was no observed difference in the participants' attitude vis à vis the divestment. In both cases, they ignored the divestment alternative and considered it only when asked by the coordinator. They did not have as much experience as Mr. Fuqua (nor his courage!). In conclusion, the major contribution of this experiment was twofold. First, it outlined the critical importance of experience in strategic decision-making. Exposure to a first divestment proved to be the most effective way to develop early warning signals, to shorten the duration of the process and to overcome intrinsic resistances. This observation led the supervisor of the M.D.P. to include the divestment issue into the Business Policy course, the objective being to expose the participants to divestment situations rather than to provide them with normative recipes. The second contribution of this simulation was to highlight the inherent psychological boundaries of strategic decision-making processes such as the divestment one. They are hard to eliminate and should then be acknowledged and taken into account in any normative development effort.

IMPROVEMENT AND EXTENSIONS OF THE EXPERIMENT

This experiment described above was undertaken in 1975. In hindsight, some improvements and extensions of this method as applied to strategic decision making processes can be foreseen.

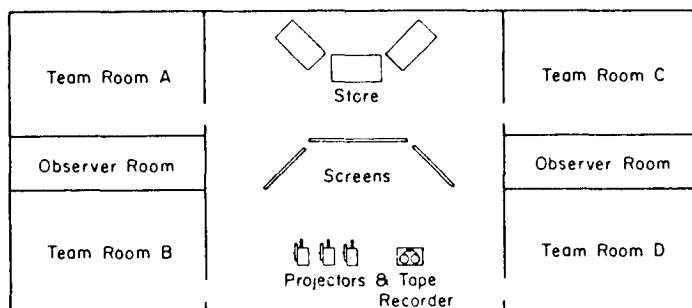
1. INCREASING THE REALISM OF THE SITUATION

The major criticism addressed to simulations in general, is their artificiality due to a lack of resemblance to the real organizations and the awareness of the subjects that they are participating in a research experiment.

Although these criticisms are sometimes overblown⁸, there is room for improvement.

First, McCaskey (1976) in his studies of the relationship between individual tolerance for ambiguity and the perceived environmental uncertainty devised a physical layout for his simulations in which the observer was not obtrusive (separated from the subjects by a one-way mirror) and space allocated to meet the simulation needs (see figure 4).

Figure 4



Physical layout of organizational simulation.

⁸ For an extended discussion on this matter, see Fromkin and Streufert (1976, pp. 433-422)

The physical setting of our experiment was not only more rudimentary, but also less neutral. It consisted of a seminar room where the participants were coming for learning purposes. It is difficult to assess the influence of the physical layout on the simulations. However, the "teaching" surrounding might have impinged on the discussion process and add unnecessary artificiality to the experiment

Second, the informational input was supplied in written, self-contained cases. Cases, in contrast to computerized simulations, provide qualitative data along with quantitative information. On the other hand, this is most probably the major artifact. The amount and the type of information was never evenly distributed among the actual decision makers nor was it channeled exclusively in written forms. In one of the clinical cases, for instance, a personal telephone call actually triggered the divestment decision process whereas the last income statement, known by everyone in the company, had not provoked anything. Using multiple media, dispersing information over time and among people would have certainly brought the experiment nearer the real-life situations. As usual, money and time are the only constraints on such sophistication.

Third, the participants of the simulation did not bear the consequences of their decision. They were neither penalized for failure, nor did they have to live with their undertakings after the simulation was over. They were not placed in a win-lose situation. The main implication has been observed in simulation 3 (see synopsis of simulations). A custom-made divestment solution⁹ was observed in one out of the 14 field

⁹ A custom-made solution is a solution which is not found in the immediate environment of the decision makers and which is specifically designed after the depletion of ready made solutions.

cases. It was designed, and defended by one individual, the others having lost confidence in finding a suitable solution and wanting to liquidate the business despite the very high cost of liquidation.

Two factors can explain why he was the only one to find such a solution: his own cognitive ability and his specific motivation to solve the problem. He was the person chiefly responsible for the division and his proposed solution fitted his political status within the firm. He took a high risk position since he was not supported by anyone. But as he explained, "I had nothing more to lose, on the contrary, in case of success, I would have become the man of the situation".

The influence of his personal cognitive style and personal motivation were tested by simulation. The case was discussed by fifty managers who did not suggest a similar solution (although it appeared simple when disclosed) either by themselves or after a two hour group discussion.

In the field studies, the risks are present in the decision making context and condition the actor's behavior. One way to introduce a pay-off factor into the simulations would be to set up a competitive win-lose situation between two groups. Another way would be to design a reward system based on information of the field studies.

2. IMPROVEMENTS IN USE OF DATA

A retrospective assessment of this research experience reveals that the information output has been underutilized. For instance, questionnaires or in depth interviews with the subjects after the simulations would have permitted the collection of additional data such as personal feelings (resentment, frustrations, emotions), beliefs and internal reactions.

However important the ego involvement of the subjects, there is always unexpressed, but nonetheless important information that can be collected in this way.

Techniques such as content analysis could fruitfully be used to complement the videotaped material. It had been noticed, for instance, in several field settings that the word "divestment" was replaced by euphemisms such as "disposal" or "strategic reallocation". The analysis of the attitudes and reactions surrounding the first call for a divestment, and of the terms used before and after the first mention of disengagement would presumably have led to very interesting observations.

3. METHODOLOGICAL EXTENSIONS

From simulation to experimentation

As we have seen, simulation together with field research produces hypothetical propositions that link identified variables into possible causal relationships.

Once developed into testable format, these hypotheses can be subjected to a "laboratory" experiment where the independent and dependent variables are closely controlled and then manipulated.

In the "Tactical and Negotiations Simulation" of Streufert et al. (1965), the subjects participated over a long period of time (six to twelve hours) in an experiment during which in-group variables were manipulated by experimental variation, randomization, counterbalancing of stimuli as controls, or employing control groups exposed to constant stimulation.

In a similar fashion, various contextual variables in the cases such as ours, could be manipulated to observe their influence on the decision making process.

For example, various trigger mechanisms of the divestment process have been identified in the field research. By manipulating these mechanisms across different groups, one could have accumulated data on their impact on different variables of interest (time allocation between the scenarios, resistance to divestment, development of solutions, etc...).

From simulation to quasi-experimentation

Social scientists like Campbell(1969) have preferred the field experiment to the artificial confinement of the laboratory setting.

The major advantage of the quasi-experiment field studies over any other laboratory experiment is that it is applied in situ.

It is impossible to apply a quasi-experiment as such on a divestment decision process. As, by definition, it evolves over time, one cannot re-produce it by changing some variables and observe the resulting differences. It is also doubtful that the decision makers would allow such an interference or accept any sort of systematic manipulation while the process is under way.

On the other hand, their cooperation could be requested - when the process is over - to participate in the simulation of their own divestment decision process. This would enable the researchers, for instance, to observe the difference in behavior when the decision makers are placed in a non-stressful, less time constraining situation.

The passage from simulation to experimentation is the passage from empirical to theoretical generalizations. Therefore, it is more

than an alternative way of doing research, it is indeed a necessary bridge between chasing phenomena and theory building.

CONCLUSION

This article was aimed at showing the benefit of a simulation through cases when the research topic was difficult to tackle, the state of knowledge at its beginning, and the field context hostile to further empirical investigations.

The recent study of Berry et al (1979) provides evidence for the contention that simulation is also applicable to processes other than strategic decision making. They simulated with students the distribution process of Renault cars between the plants and the dealers. They showed how "different people facing the same situation reacted in the same way - non optimal - way".

From his literature survey, Hofer concluded that "new approaches to research design and method will be needed to support further research in the area (strategic planning and processes)" (p.281). Recently, Jauch, Osborn and Martin (1980) demonstrated that structured content analysis of cases is one alternative. Simulation has proved to be another valid alternative that deserves more attention from researchers in management.

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