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WORKING PAPER SERIES 3/93

Computer-supported Environmental

Scanning: A Case Study

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Computer-Supported Environmental Scanning: A Case Study [1]

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Abstract

The identification of strategic options, conducted on a periodic basis, is a critically important aspect of today's modern organisational life. Many business leaders are aware that the clarity with which they view these strategic issues can directly impact on the successful operation of their firms. The current turbulent business environment makes clarity and long range planning difficult. The use of periodic environmental scanning and analysis allows necessary adjustments to the overall strategic plan.

Researchers have explored the issues of how Computer-Supported Collaborative Work (CSCW) may aid the overall strategic planning process but there has been little attention paid to the processes actually used during environmental scanning and CSCW. This paper analyses the various tasks involved in environmental scanning. It also examines how the tools of CSCW may aid the identification of strategic issues in 'ill-structured' or 'wicked' environmental conditions.

A case example, taken from a New Zealand firm involved in a restructuring process, is provided to illustrate the computer-supported environmental scanning approach and to show how information technology can help sorting out strategic planning issues faced by organisations and subunits of organisations.

Key Words: Electronic Meeting Systems, Computer-Supported Collaborative Work, Group Support Systems, Environmental Scanning & Analysis, Group Techniques.

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[1] An earlier version of this paper was presented at the Twelfth International Symposium on Forecasting, Wellington, New Zealand; 7-10 August 1992.

Introduction

The ongoing restructuring of the New Zealand economy means that organisational environments are constantly changing. This poses an ongoing problem for many top-level managers. They are finding their strategic planning exercises to be only partially useful in such 'ill-structured' or 'wicked' conditions. To know what they are doing and why, they need to continually update and clarify their strategic plans (Bryson, 1988; Galvin, 1991; Thompson, 1992; Burns, 1992).

As a way of adding value to their current strategic plans, some managers are now resorting to continuous monitoring of the environment to detect any significant changes that may influence the performance of their firms (Milliken, 1990). Environmental scanning is essentially a method of identifying key trends, changes, and events in an organisation's environment that might affect the organisation's functioning. The results from these regular environmental scanning exercises can aid in formulating the current most important strategic options.

Continuous scanning of the environment is the first step involved in the process called Strategic Issues Management Systems (SIMS). Proponents of SIMS argue that it is flexible, sensitive and sufficiently action-oriented to be able to minimise the probability of encountering strategic surprises (Ansoff, 1980). In combination with the conventional Strategic Planning Systems, it is further argued that a synergistic relationship with SIMS will overcome the shortcomings inherent in each system (Camillus & Datt, 1991).

In addition, the use of groups during strategic planning sessions is wide spread and various group techniques can be used to facilitate planning under wicked conditions. The use of computers in supporting forecasting and strategic planning is also wide spread and computers are now being used to support group planning sessions. The purpose of this paper is to examine the application of Computer-Supported Collaborative Work (CSCW) in strategic environmental analysis under wicked conditions.

A Model of Environmental Analysis

For the purpose of this paper, a model of environmental analysis advocated by Bates (1985) is used. Its clearly defined sub-tasks make the links to computer-supported collaborative work easier to understand. According to this model, environmental analysis involves the three stages of (a) monitoring the environment, (b) analysing it and finally , (c) predicting it. The acronym MAP suggests these three steps used in generating a map or picture of the environment.

The first stage, monitoring the environment, involves: (1) a periodic review of the entire environment to identify trends or changes which may ultimately affect the firm, (2) sorting this information to generate a set of variables according to whether they affect the firm or not, (3) a further sorting of this set of variables into a set of Relevant Variables according to the significance of their influence on the firm and (4) a final sorting of the

Relevant Variables into a set of Critical Variables based on the firm's perception of their substantial influence on the firm. This sorting process is used to simplify the subsequent "planning process and focus attention" and to reduce all the "random bits and pieces of environmental information into a few crucially important factors" (Bates, 1985; pp. 98).

The second stage, analysing the environment, involves developing an understanding of how the environment works and identifying a set of relationships between the Critical Variables, the economy and the organisation. The questions often asked during this stage are: How do changes in the economy affect the Critical Variables, and vice versa?, To what degree does one Critical Variable influence another? and What impact do the Critical Variables have on the performance of the firm?

Finally, predicting the environment involves integrating the understanding gained from the previous two stages and generating a final set of Predictive Critical Variables and their Predicted Impact on the organisation.

The Use of Group Techniques in Environmental Analysis

The use of groups during the various stages of strategic planning is well documented (Gilad & Gilad, 1986; Hambrick & Mason, 1984; Van de Ven, 1980). Usually groups of managers with diverse backgrounds and perspectives are brought together to address strategic issues. Discussions and other forms of group interaction among senior executives are frequent methods used to elicit and evaluate information and assumptions. In particular, Milliken and Vollrath (1991) identified the nature of group tasks involved during the various stages of strategic planning. They suggested group activities such as The Nominal Group Technique (Delbecq, Van de Ven, & Gustafson, 1975), Devil's Advocacy (Schweiger *et al*, 1986) and Dialectical Inquiry (Mason & Mitroff, 1981) are useful in generating, debating and prioritising issues and assumptions that may emerge during the analysis of wicked environments.

The notion that the "consensus which emerges in a group using the dialectical inquiry (DI) technique, for example, may yield greater long-run acceptance and better performance than agreement which is reached by a majority vote procedure, provided that participants understand the purpose of the DI technique" (Milliken & Vollrath, 1991, pp. 1248) is worth further investigation. As their study was based on the results of research studies that used 'ad hoc leaderless' groups, the impact of a group facilitator on group performances is another interesting area for investigation.

Group processes reflective of differences in status and authority, the domination by one or two individuals, for example, and the fear about expressing ideas that may be ridiculed by supervisors can become obstacles to the generation of strategic options. Groups also often attempt to avoid uncertainty and smooth over conflicts. Thus,

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effective handling of conflicting views and the gaining of commitment to an exploratory process by group members becomes important. In strategic environmental analysis and where a group is involved, the nature of the processes and interactions between members may well be critical factors that determine whether relevant information and assumptions are adequately shared and evaluated.

Computer-Supported Collaborative Work at the Victoria University of Wellington

The use of information technology to support forecasting and strategic decision making has been around for a long time. It is only recently that these technologies have been used to support group processes in strategic decision making (Dennis *et al*, 1990). In particular, the technology has been found to be useful in supporting "idea generation, identification of key problems, communication of line managers concerns, organizational learning, integration of diverse functions and operations, and anticipation of surprises and crises". (Dennis *et al*, 1990; pp. 48).

The Group Decision Center (GDC) at the Victoria University of Wellington, New Zealand, uses GroupSystems (a software developed at the University of Arizona, USA) to support collaborative work by groups who are engaged in, among other tasks, environmental analysis and strategic planning. The GDC provides a CSCW system comprising fifteen computer workstations arranged in an U-shaped seating format linked together by a local area network (see Figure 1).

Figure 1: The Group Decision Center, Victoria University of Wellington
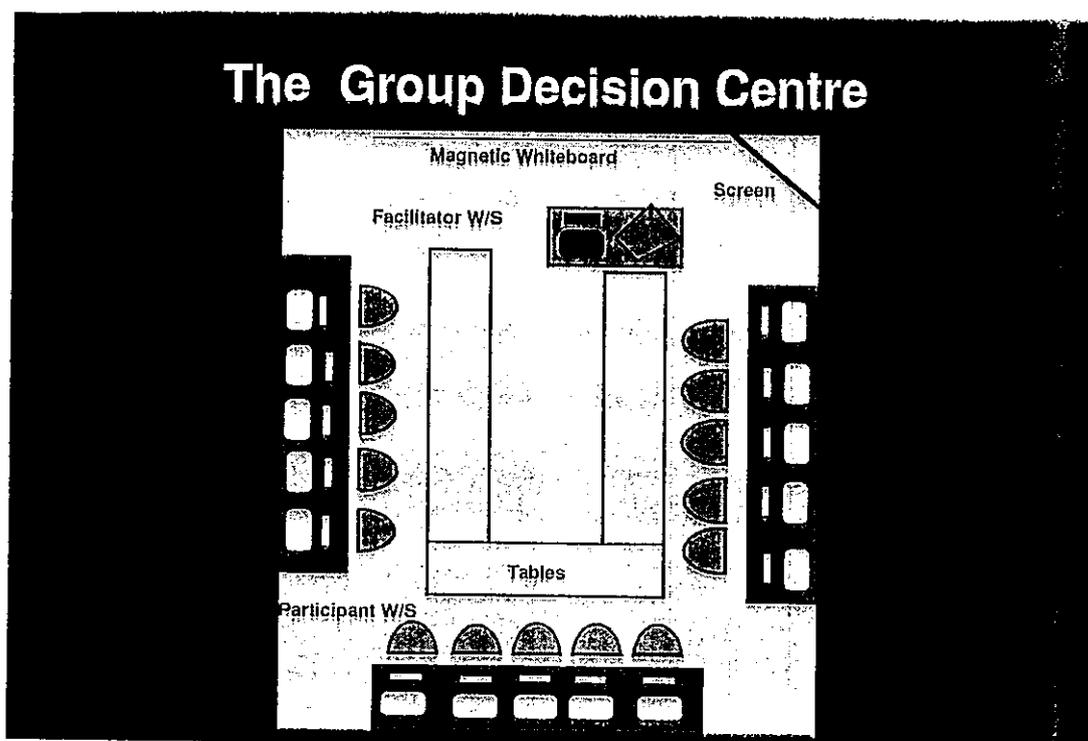
The system software helps group brainstorming activity by organising ideas into categories, allowing voting to elicit options and to prioritise ideas, evaluate alternatives and to analyse assumptions. A combination of the above tools can be used to facilitate the 'electronic' management of group activities to achieve certain group outcomes. The following is a short description of the available software tools which will be illustrated later.

- An **electronic brainstorming** (EBS) tool that supports simultaneous and anonymous idea generation by group members.

- An **idea organiser** (IO) tool supports group members as they identify and consolidate key items associated with previously generated text (e.g. ideas from EBS).

- A **topic commentor** tool supports idea generation related to a selected set of topics. Group members can enter and view ideas contained in each topic. It is a more focussed form of EBS, as topics are pre-determined.

- A **voting** tool provides a range of priority-setting methods, including rank ordering, multiple-choice questions and Likert type scales. The summary results of group members' private ballots can be publicly displayed.

- A **stakeholder identification** tool identifies stakeholders and their respective assumptions so that they can be scaled and graphically displayed for discussion and/or debate. This is essentially an assumption surfacing tool.

During each session, a trained facilitator is usually present to support the work of the group. The role of this facilitator is essentially to assist "the group in developing an agenda and ensuring that the group maintains it during the meeting..." (Dennis *et al* ,1990; pp. 39). In environmental scanning sessions, as prescribed by Bates, the facilitator also ensures that each stage of the process is completed, promoting verbal group discussion and if appropriate, chairing a dialectical debate between opposing sub-groups. The presence and skills of the facilitator are often critical in order to ensure a successful session because of the need for a balance between the effective use of the technology and meaningful human interactions.

The remainder of this paper will describe the experience of a business unit from a large NZ organisation which used CSCW tools to help its environmental scanning and a discussion of the issues that arose from this case example.

A CASE STUDY

The following case study illustrates the general approach adopted in computer-supported environmental scanning. The facilitator is the author. Pseudonyms are used for the organisation and participants' names and other details have been disguised.

Background of the organisation

This case example involved Big Kiwi Inc., a large NZ organisation with branches situated throughout the country. The organisation has recently been restructured and is now comprised of a number of autonomous business units. As part of the restructuring process, a completely new information system was installed to facilitate and enhance the work of this new organisational structure. Staff have been told that the restructuring process is still incomplete and that on-going changes are to be expected.

The case example focuses on a section of one of Big Kiwi's business units. The Business Support Centre, which is responsible to the General Manager (Information Technology), comprises a Manager (Business Support) and a number of Business Support Analysts. Their main role is to support users of the newly installed information system as well as other information systems used in the organisation. Because of the recent organisational restructuring, the role of the Business Support Centre became confused and required clarification. The author was contacted and an initial meeting was arranged to explore what could be done in what was initially thought of as a simple role clarification exercise.

Preparation for the workshop

During the first meeting with the Business Support Manager it was acknowledged that the role clarification exercise was, in fact, a re-assessment of the earlier strategic plan and how current organisational issues impacted on that plan. The current strategic plan was then discussed, along with a broad outline of current organisational issues. The goals and agenda of the session were then identified and mutually agreed upon. The background of the participants was also discussed so that the facilitator had an appreciation of the variety and seniority of the group of people who would be taking part in the planning workshop.

The facilitator then outlined the role that the Group Decision Centre could play and some of its previous strategic planning projects. The procedures and CSCW tools that could be used for the workshop were explained so that expectations concerning what could be achieved during the workshop were understood.

With the knowledge gained from the pre-planning meeting, the facilitator then proceeded to prepare the Group Decision Centre. The GroupSystems tools were used to map the intended workshop process. Figure 2 illustrates the parallel relationship between the activities involved in Stage 1 of Bate's Environmental Analysis model

(Monitoring the Environment) and the GroupSystems tools that are used in the Group Decision Center. The advantage of the GDC, in this situation, is that participants are offered anonymity, simultaneous processing that speeds up the meeting and an immediate printout of proceedings (Gallupe & DeSanctis 1988; Dennis *et al*, 1990).

Figure 2: Environmental Analysis Activities and GroupSystems Tools

ENVIRONMENTAL ANALYSIS MODEL (Bates, 1985)	GROUP PROCESS STEPS	GROUPSYSTEMS TOOLS
STAGE 1: MONITORING THE ENVIRONMENT Identify the trends and events which may have an impact on the performance of your organisation	Idea Generation	Electronic Brainstorming
From the information generated so far, select a set of variables according to whether they affect the organisation or not.	Issue Identification	Idea Organiser
From the previous set of variables, select a set of Relevant Variables according to its significant influence on the organisation.	Issue Identification & Issue Ranking	Idea Organiser & Electronic Voting
A group discussion is now conducted to clarify and check common understanding of the process used up to now.	Issue Discussion	No computer tool is used here. The group facilitator conducts a face-to-face discussion
From the set of Relevant Variables, select a set of Critical Variables based on the participants' perception of its substantial influence on the firm.	Issue Discussion, Ranking & Assumptions Surfacing	Face-to-face group discussion, Electronic Voting & Stakeholder Identification

Facilitating the workshop

The following is a partial outline of the workshop. It is presented here to illustrate the relationship between the environmental scanning activities and GroupSystems tools used within the context of the Business Support Unit in Big Kiwi Inc.

Introductions

> Welcome and introductions
> Why are we here? - Manager (Business Support)
> Goals for this workshop: To clarify the role of (a) a Business Support Analyst and (b) the Business Support Unit relevant to the needs of users in the current Big Kiwi Inc. environment.
> Overview of workshop agenda
> Introduction to the Group Decision Centre (GroupSystems) tools by facilitator

Part 1 (Monitoring the Environment)

Initial Idea Generation

> Electronic Brainstorming starts - "What are the recent events and trends in Big Kiwi Inc. that may have an impact on the role of the Business Support Analyst?"
>
> A brief discussion on what they have experienced so far

Issue Identification - Round 1

> Idea Organiser starts - "From the information generated so far, select your two most important events or trends according to whether they have an impact on the role of the Business Support Analyst"

Issue Identification - Round 2

> Idea Organiser starts - "From the set generated in the previous section, select your two events or trends according to whether they have a significant impact on the role of the Business Support Analyst" (A brief discussion is held to clarify the meaning of the term 'significant')

Issue Ranking

> The set of significant trends or events (Relevant Variables) generated from the previous section is now arranged in a random order for participants to complete a 'rank order' vote according to its significant impact on their role
>
> Electronic Voting starts
>
> The result from the rank order vote is now discuss (a second vote is possible if required)

Group Discussion

> The facilitator conducts a group discussion to clarify and check common understanding of the process used up to this point

Assumption Surfacing

The rank order results are now used as a basis for a group discussion on the assumptions underlying the most significant trends or events. If the ranking list contains over 10 items, select the top 5 for the initial discussion. The rest of the items can be discussed if required.

At the end of this discussion, a list of assumptions will be identified.

Stakeholder Identification starts - the participants are asked to rate each assumption first, with regard to their relative importance and second, with regard to their certainty. The result of the two ratings for each assumption can be shown graphically on the public screen. The same procedure is used for the other assumptions.

Those assumptions which are rated as (a) important and certain and (b) important and uncertain are now used to determine the final list of significant trends or events (Critical Variables)

Issues from the Workshop

1. The facilitator and the manager agreed that the workshop should be held over two days with a week in between so that further information gathering was possible. This also allowed time for participants to reflect on the information and results generated from the 1st day.

2. The facilitator also re-phrased the questions asked during each stage of the workshop so that they were compatible with the context of the organisation and its participants. For example, the relevant external environment for the Business Support Centre comprised the other business units and staff of Big Kiwi Inc. Other environmental factors, such as changes in economic forecasts, had less immediate impact for this role clarification exercise.

3. The last step in the 'Monitoring the Environment' stage involved selecting a set of Critical Variables from an earlier set of Relevant Variables based on the participants' perception of its substantial influence on the unit. The Stakeholder Identification (an assumption surfacing mechanism) tool was utilised during this part of this workshop to "uncover and to analyse the critical key assumptions" (Mitroff *et al*, 1979; pp. 586) which have an influence on this perception and subsequently the selection.

Initially, a set of assumptions about the Relevant Variables were uncovered during a face-to-face group discussion. The participants were asked to electronically rate each assumption first, with regard to their relative importance and second, with regard to their certainty. This procedure allowed the participants to determine which assumptions fall into which quadrant of Figure 3. For example, those falling in the upper right-hand quadrant are important (e.g. approx. 150 users will be made redundant within 12 months) and those in the lower right-hand quadrant are the most critical (e.g. the Manager is looking for

another job). The results of this exercise enabled the participants to complete the subsequent selection of Critical Variables on a more informed basis.

Figure 3: Assumptions Importance and Certainty Grid
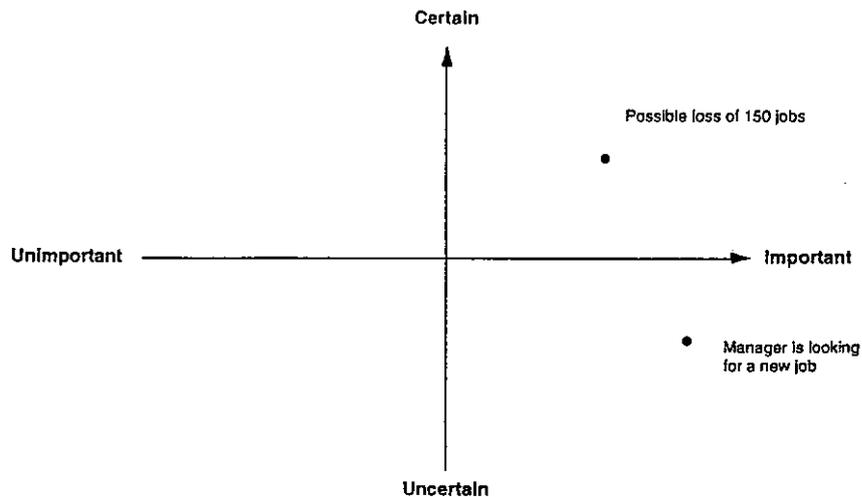
4.   The earlier assumption surfacing exercise also resulted in a polarisation of views about the impact of some Relevant Variables on the unit. The facilitator took this opportunity to prepare the group for a 'dialectical inquiry' during the next workshop day. As Mitroff, Emshoff & Kilmann (1979, pp. 583-584) note:

> *Essentially the Dialectic is an adversarial problem forming methodology which is especially suited to treating intensely ill-structured, i.e. difficult-to-define, issues. It does this by attempting to set up at least two very different (antithetical) and maximally challenging views (definitions, policies) of a problem situation so that everything the one view takes for granted as a basic and reasonable assumption, the other challenges as intensely as it can. The intent is not to confuse a decision or policy-maker who is witness to this dialectic interplay or debate between opposing views, but rather to assist him in understanding the critical role that the postulation of very different assumptions about the nature of a problem plays in its basic definition, and hence, its ultimate disposition. The intent is thus to allow the manager to take advantage of a turbulent environment and thereby to convert a problematic situation in to an opportunity.*

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Two groups were formed according to the views they had in common and were told to prepare for a debate during which they would argue why their point of view was more relevant and important than the other group. At various intervals during this debate, the 'stakeholder identification' tool was used to gauge whether there were any shifts in positions by either group.

Discussion

The GroupSystems tools provide an electronic communications channel where participants, via computer workstations and a network, are able to complement face-to-face communications during their group environmental scanning activities. The computer-based tools offer participants anonymity, parallel communication and ready printout of the workshop proceedings. Anonymity is important as it separates ideas and issues from personalities. This is especially critical in political, polarised situation like the one described in the case example. Parallel communication, which enables members to contribute ideas, opinion and information simultaneously; may increase the amount of information to be processed and the danger of information overload. This may be overcome by asking participants to focus and refine their ideas before typing. There is also a need to give people time to assimilate, adjust their thoughts, check and find out where others are. The presence of a group facilitator gives an "aura" of objectivity and can ensure that an organisational rather than an individual perspective is maintained. The facilitator can also increase the level of group interactions and maintain a balance between the use of technology and human interactions. This will ensure a more effective and 'humane' approach to computer-supported collaborative work.

Summary

This paper has dealt with the various tasks involved in environmental scanning and how information technology can aid the planning process. It began by examining a model of environmental analysis advocated by Bates and how the tools of CSCW may aid the identification of strategic issues in 'wicked' environmental conditions. A case example, taken from a firm involved in a restructuring process, was provided to illustrate the computer-supported environmental scanning approach. Issues from this case example were used to examine some consequences of using CSCW and how they can be overcome. Clearly, more research is needed in this area to explain how the computer-supported environmental scanning process works.

Acknowledgement

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