

Strategy Support Software: Enhancing Executive Dialogue & Debate

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ABSTRACT

Group decision making and discussion often leads to unanticipated ends. The use of strategic support software to improve such processes yields higher quality debate. Simulation technology provides for explicit mental models, the exploration of assumptions, and instantaneous analysis of "what-if" scenarios. This paper will look at how the design of executive support software is shaped by dialogue and debate, and how interactive strategic management tools shape such discussions.

Introduction

Management teams meet to discuss strategic issues, problems and opportunities. Into these meetings each manager will bring his or her own perceptions of important opportunities for or possible threats to, their business environments. Managers must sort through all the perceptions and decide upon the key issues, getting to the core underlying assumptions. It is paramount for managers to surface and test these underlying assumptions (Mason 1981, Wack 1985, Rockhart 1988). As Henderson et al. (1984) argue:

The management of assumptions...can not be delegated. The assumption set is the domain of executive management and the responsibility for ensuring the validity of assumptions rests clearly with executive management. We suggest that a major implicit reason for existing ESS is to support executives in the analysis of critical assumptions.

Morecroft (1987) stresses the importance of debate and dialogue ensuing from many opinions generated by the management team's different mental models. In his view mental models drive strategic change through recognition of problems and through debate which leads to action plans. Enhancing the quality of executive debate and dialogue is major concern.

The research challenge for strategic management is to create tools and techniques that can be used as an integral part of executive debate and dialogue to improve the quality of the mental models that a management team evolves. (Morecroft 1987)

In this paper I will discuss MicroWorld S**4™: Strategy Support Simulation System (Diehl 1991) in light of this research challenge. I will describe the use of MicroWorld S**4 to improve group decision making by enhancing the quality of discussions. Two questions are at the center of this paper: How does the nature of executive dialogue and debate shape the design considerations of executive support software. And equally important, how does the use of technology in meetings change the nature of dialogue and debate in turn?

MicroWorld S**4 attempts to combine the benefits of dynamic modeling and executive information systems and dynamic modeling (Diehl 1992b). While models are useful for exploring tacit assumptions and for making mental models explicit, they lack advanced data manipulation and retrieval capabilities of information systems. Executive information systems, on the other hand, provide efficient ways to access data, but they fall short in helping the decision-makers reexamine their thinking or reframe the problem in a new way.

Initially, managers tend to see MicroWorld S**4 applications as useful off-line analysis tools, the results of which might be used during presentations. With increasing familiarity of the tool, managers integrate the use of MicroWorld S**4 into the presentation itself by providing instantaneous what-if analysis in response to questions in the ensuing debate.

Design criteria for software supporting strategic debate

Strategic discussions can turn in any number of directions. Managers need a tool that is flexible enough to answer the "what-if" and "why" questions that lead business planning meetings. To better handle such discussions senior management requires a tool that will provide them with meaningful reports and data to make assumptions more explicit; a tool to test assumptions and "what-if" scenarios on the spot while allowing their model to remain flexible. MicroWorld S**4 has three key elements that provide the needed flexibility: (1) Flexible report generation (2) Dynamic data analysis and (3) Dynamic what-if analysis

1. Flexible report generation

To support instantaneous what-if analysis, data must be readily understandable and must require little or no transformation. Like the simulation training system MicroWorld Creator™ (Diehl 1990), the design of MicroWorld S**4 is guided by the belief that whatever reports the manager uses in her 'macroworld' should be made available to her in the emulated 'microworld' as well. This provides the user with ready identification with the information and increases the saliency of the output because familiar reports, such as income/loss statements and balance sheets, create a bridge between the analysis and the user's own decision-making environment (Diehl 1992a).

MicroWorld S**4 provides for a flexible report design. Reports are typically drawn in a drawing program, copied and pasted into the application. The symbol '@' followed by a variable name can be used in the report as a place holder for the actual variable in the simulation model. Once the report is imported, MicroWorld S**4 substitutes the actual value for each variable (Figure 1).

Balance Sheet
ACME, Inc.
As of December 31, 1995

Assets

Cash.....@Cash

A/R.....@Accts Receivable

Inventory.....@Inventory

Liabilities

A/P.....@Accts Payable

Loan Payable.....@Loans

Owner's Equity

Owner's Equity.....@Owners_Equity

Report in drawing program

Balance Sheet
ACME, Inc.
As of December 31, 1995

Assets

Cash.....\$1,000,000

A/R.....\$2,000,000

Inventory.....\$10,000,000

Liabilities

A/P.....\$1,000,000

Loan Payable.....\$5,000,000

Owner's Equity

Owner's Equity.....\$7,000,000

Report in MicroWorld S**4

Figure 1

2. Dynamic data analysis

However, there is an inherent limit in preformulated reports. While reports can be designed to support anticipated lines of inquiry, even the most experienced analyst can only anticipate part of the questions that might arise during the course of a strategic debate. MicroWorld S**4 provides a unique tool to increase the bandwidth of data analysis and to create dynamic reports. Clicking on any variable in a report will access an 'analytical lens' that is built into the program. (Figure 2).

Balance Sheet
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A/P.....\$1,000,000

Loan Payable.....\$5,000,000

Owner's Equity

Owner's Equity.....\$7,000,000

Report in MicroWorld S**4

Inventory

TIME	→ REGION	↓ PRODUCT
1995		
1996		
1997		

	East	North	South	West
Small	975	800	975	630
Medium	560	700	1500	770
Large	1200	200	380	200

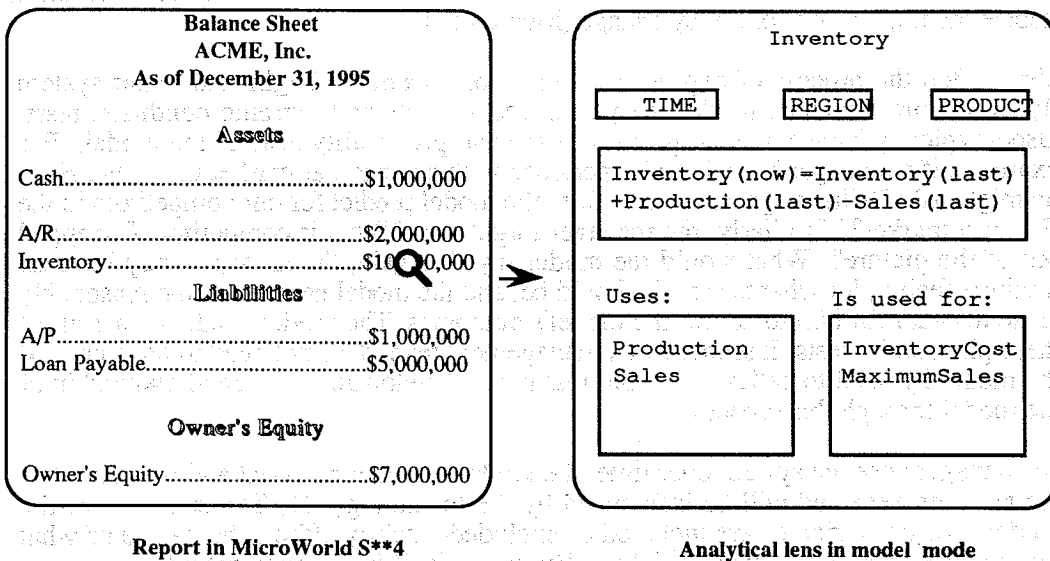
Analytical lens in data mode

Figure 2

The analytical lens extends the current analysis seamlessly across time and across dimensions such as competitors, product lines and regional markets. Any report thus can be a starting point for questions such as: "How did inventory behave in previous years? What are our inventory estimates for competitor X in Europe?"

3. Dynamic what-if analysis

The analytical lens does not only provide a framework for historical data analysis but perhaps more importantly a framework for what-if analysis. What-if analysis can only have an impact if its underlying assumptions have credibility within the management team and if it avoids any mysterious black-box assumptions. To truly support the testing of assumptions, the system needs to be open enough to allow in-depth exploration of the model, without requiring extensive technical expertise. MicroWorld S**4 is based on the principle that any assumption in the strategy system should be open for inspection and should easily be changed. Clicking on any variable brings up the underlying model assumption. (Figure 3)



The analytical lens can be used as a starting point for exploring the model assumptions and allows both causal backward drilling or causal forward drilling. For example, having inspected the equation for inventory the manager might want to explore what the underlying assumptions are for production or sales, the inputs used in the equation, and might drill further backward. Similarly the manager might want to inspect how inventory influences other parts of the model. Clicking on any variable name in the 'Uses' box or in the 'Is used for' box turns the focus of the lens on the particular variable.

The analytical lens allows a manager to probe deeper into any variable in a report that he feels uneasy about. The underlying assumptions are there to be explored in a way that's not intellectually overpowering—one equation at a time. In this way, the lens allows managers to interact directly with the model. With the use of MicroWorld S**4's lens,

managers can understand assumptions when they are ready to rather than being overwhelmed by large listings of equations. Exploring the equations one at a time will allow managers the opportunity to fully understand assumptions about the connections between the different variables.

How technology shapes dialogue and debate

New technology to support executive dialogue and debate will in all likelihood change the nature of the interactions taking place. In this section I will list some of the changes I have noticed in several companies that have introduced the technology. Some of these changes are intentional. Other are subtle and unintentional.

One of the traditional advantages of using dynamic models is that assumptions are made explicit and can more easily be shared. Discussions using a model as a starting point are structured and probing. Unexpected outcomes are observed, analyzed and can serve as the starting point for changing assumptions and ultimately mental models. Simulations can be used to form a mental link between structural assumptions and behavior and to debate the implications of policy change (Morecroft 1987).

Very often the process of exploring assumptions seems to begin with what system dynamics practitioner's might call partial model tests and extreme condition tests. Users typically have a need to perform first-hand plausibility tests of the model. For example, if a manager has a lot of experience with a particular market in the Far East, he might ask: "What target shipments does the model predict for our competitors in the Far East market?" Similarly, the manager might ask, "What if competitor X dropped out of the picture? What would the model say?" Again, the manager may have an intuitive feeling for what the result should be, and the model needs to come reasonably close in order for him to accept the model's outcomes. The model needs to pass all of these plausibility tests. It seems that a management team does not need to have created the model by itself to believe in it, but that it can develop an intellectual ownership of the model through this process.

As managers use the system over time, the kinds of questions asked and the format of the answers expected will be influenced by the technology. (1) The structure of the model—which variables are included or excluded—subtly affects the nature of what the manager focuses on during a debate. For example, if it is easy to get information on capacity and inventory (since these variables happen to be included in the model) questions that concern competitor Y's capacity in Europe or a company's inventory of product Z tend to increase. (2) All the data in a MicroWorld S**4 is easily displayed in time series format and this will shape the thinking of managers. When reviewing competitor sales, it is no longer acceptable to receive data for only the last quarter or year. It is now expected that analyses focuses on data from the last several years, showing behavior over time. See Diehl (1992b) for a more detailed description of the changes introduced by the use of the software.

Limitations

While the use of MicroWorld S**4 varies (Bean 1992 provides a cross-industry example), typically an internal promoter supported by one or more analysts will introduce the strategy support system into a group session as part of a presentation that

provides on-the-spot what-if analysis. The use of MicroWorld S**4 in such a session is characterized by substantial differences in the degree of participants' familiarity with the system as a whole and with the underlying dynamic model in particular. In such a setting, a particular point of view is offered, underlying assumptions are discussed and an invitation is extended to the rest of the group to substitute one or more of these assumptions to explore the consequences of different courses of actions and business environments.

MicroWorld S**4 is a step towards Morecroft's prediction that

"...strategic management tools of the future will become increasingly interactive and take the form of graphic 'playthings' for sharpening executive mental models and for stimulating debate and discussion." (Morecroft 1987)

Still, much is missing from fully realizing this vision. While it is easily possible to change individual assumptions on the spot, much of the work going into a model-based system is still done off-line by a group of analysts. The embedded model can only enlighten discussions that stay within the boundary of the system. Major work lays ahead to deliver strategy support software that is truly flexible and provides structure for discussions without limiting them. While the steps towards this end are not entirely clear and leave much challenge for future research, we will know that we have arrived once managers start to frown: "How can you have a meaningful strategic discussion without strategy support software?" similar to the puzzled questions one might hear today "How can you do financial analysis without a spreadsheet?"

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