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**AN INVESTIGATION INTO THE IMPACT OF DECISION
SUPPORT SYSTEMS ON STRATEGIC MARKETING
PLANNING PRACTICE**

Volume 2 of 2: Appendices

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**This thesis is submitted in fulfilment of the requirements for
the degree of Doctor of Philosophy**



Appendices

The appendices are as follows:

A. Model of marketing planning process: extract from Analysis Report

The first two appendices complement the description of the EXMAR system in chapter 6. This appendix describes the first version of the marketing planning model developed as a basis for development of the EXMAR system. It is an extract from the Analysis Report which formed the first specification document for the first, demonstrator version of the system.

B. Sample EXMAR screen snapshots

This appendix contains sample pictures of four versions of the EXMAR system, to illustrate the discussion of the system contained in chapter 6.

C. Questionnaire

The text of the questionnaire used in the survey of EXMAR users.

D. Papers

This appendix contains double blind refereed academic papers on the research.

A. Model of marketing planning process: extract from Analysis Report

Introduction

This appendix describes the first version of the marketing planning model developed as a basis for development of the EXMAR system. It is an extract from the Analysis Report which formed the first specification document for the demonstrator system. The model is discussed in chapter 6. Aspects of the model are also discussed in the British Journal of Management paper in appendix D.

This appendix is structured as follows:

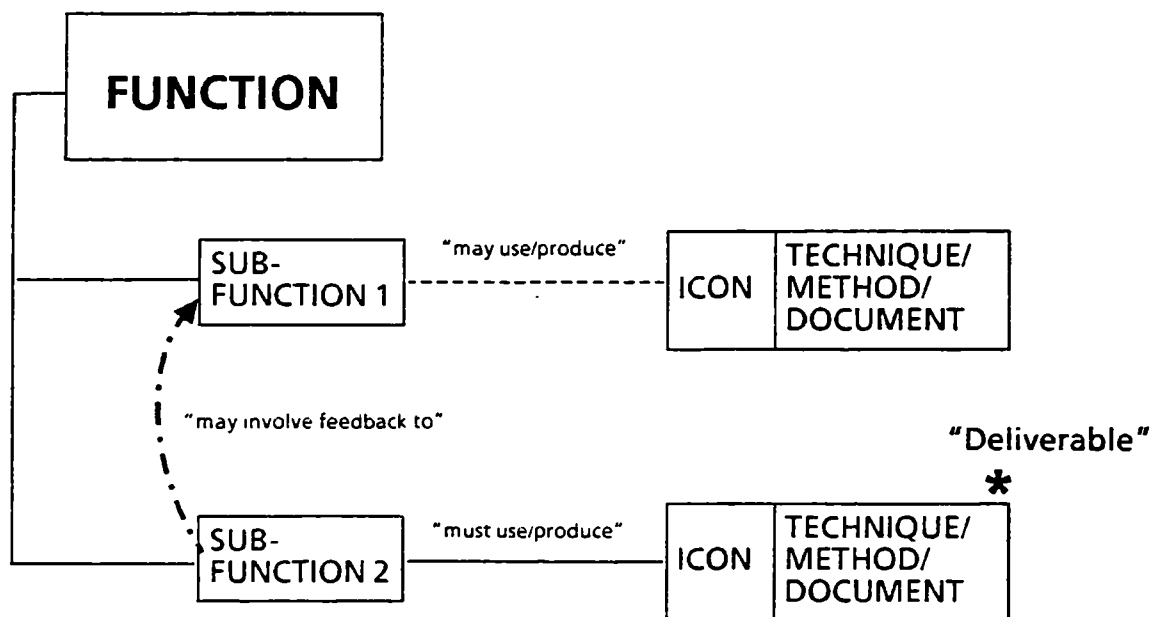
- Functional breakdown of the marketing planning process: sections 3.1 to 3.3 (p10-39)
- Data model: section 3.4 (p40-45)
- Technique interrelationships: section 3.5 (p46-48).

3. FUNCTIONAL BREAKDOWN, DATA MODEL, TECHNIQUE INTERRELATIONSHIPS

This section defines the functions performed during the relevant stages of the Marketing Planning process, and in some cases breaks down the functions into simpler functions. The functions are related to techniques and methods used in carrying out the function, and to deliverables that form part of the Marketing Plan, as defined by McDonald. The top level breakdown is used to refine further the scope beyond the definition contained in the preceding section.

3.1 Notation of functional breakdown diagrams

The diagram below summarises the notation used in the Functional Breakdown diagrams. Function boxes represent tasks to be performed as a step towards production of a marketing plan. Technique/method boxes have icons that illustrate the style of representation used by the technique or method.



3.2 Top level breakdown

3.2.1 Scoping defined by previous section

The previous section defined the scope of Exmar Phase2 as being the marketing audit, SWOT analysis and objectives and strategies stages of McDonald's 9 stage breakdown of the Marketing Planning process. This is taken as the starting point for this section. The diagram below summarises this.

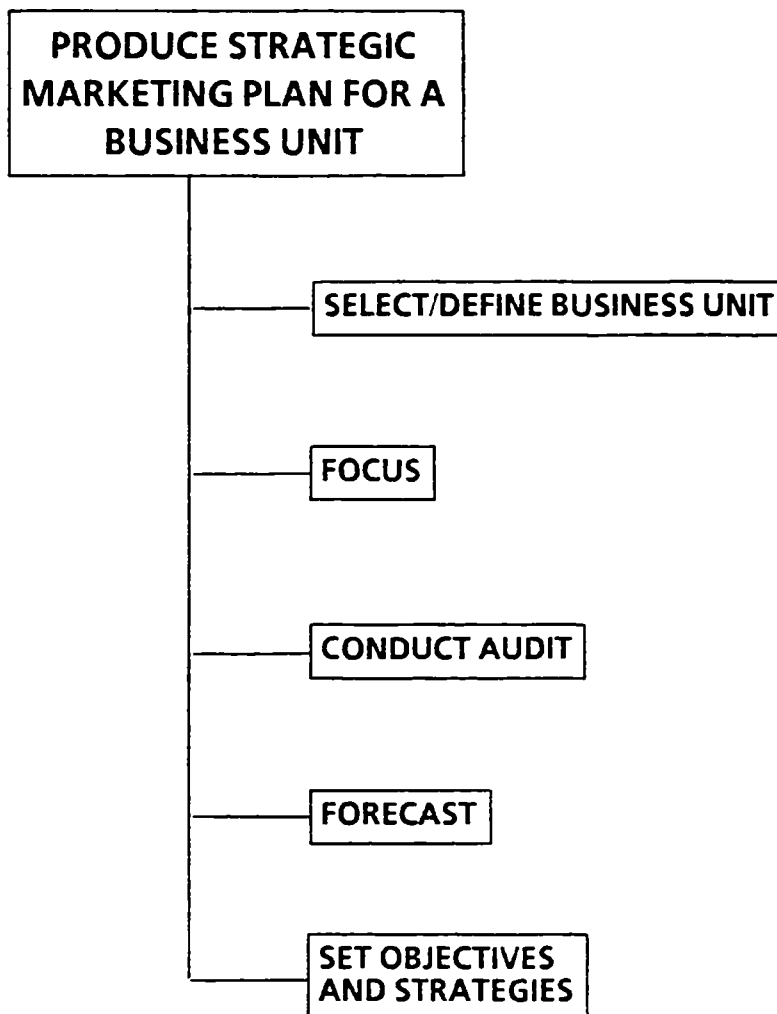


Objectives are set subject to certain assumptions: other than this, little formalism has yet emerged with regard to assumptions.

The setting of corporate objectives is outside Phase 2 scope. So any information from the corporate objectives required is regarded as an input to the model.

3.2.2 Top level functional breakdown

We have found it useful to produce a slightly differing top level breakdown than that contained in McDonald's 9-stage diagram. This is given below. Explanatory notes follow.



Produce Strategic Marketing Plan for a Business Unit

This describes the task being modelled. It is strategic because it deals with long term direction and context, and because this involves ignoring some details to aid clearer thinking about the important parts of a business. It is for a business unit because this process can be carried out at any level of an organisation, or for a subset of the business that crosses organisational boundaries.

Select/Define Business Unit

Identify which area of the business the marketing plan is for, and record the purpose of the business area.

Focus

Identify which of the unit's products and markets are of interest.

Conduct Audit

Assess the products and markets identified in Focus stage.

Forecast

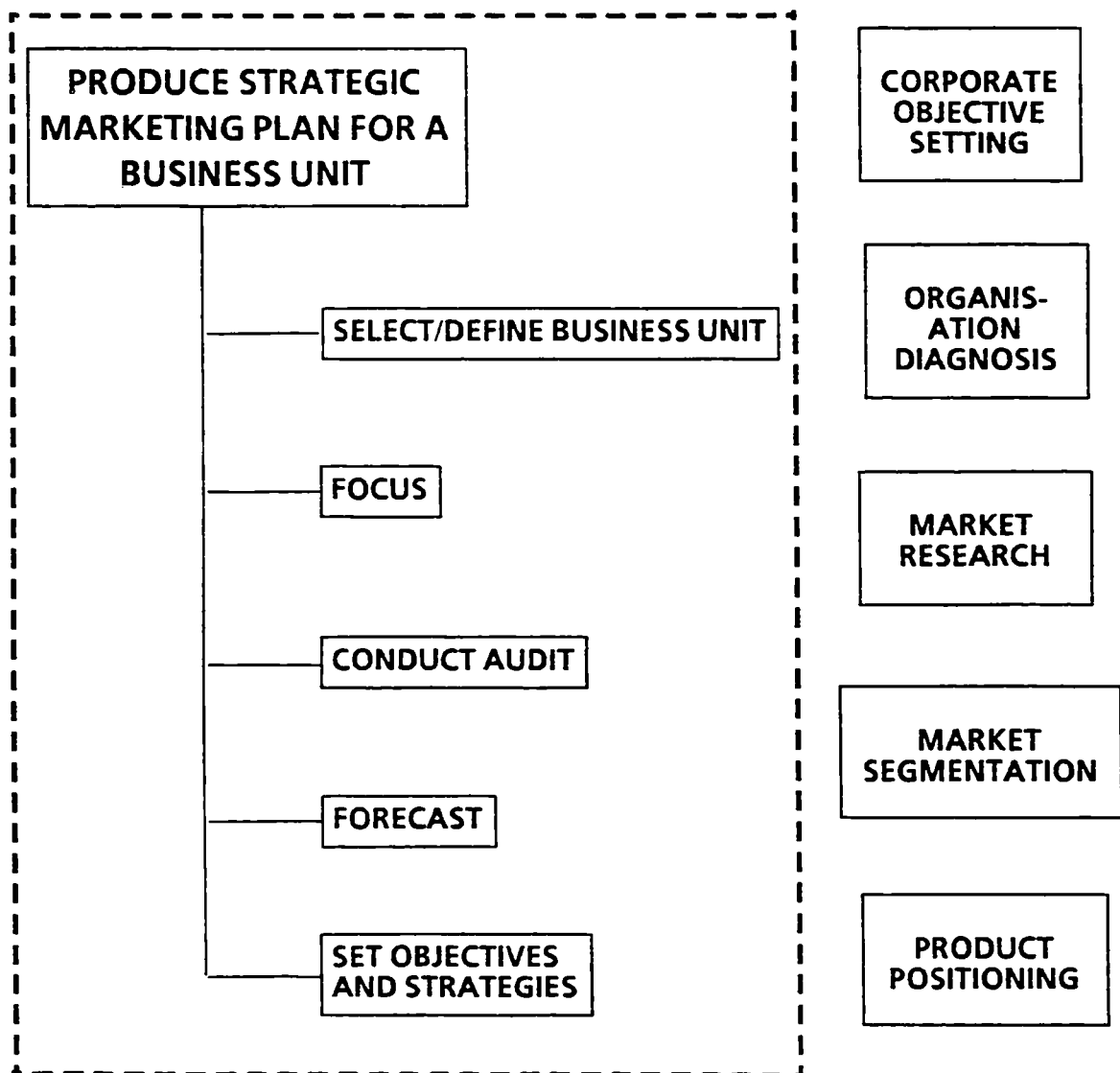
Predict the business unit's future relationship with the markets under consideration.

Set Objectives and Strategies

Set objectives for the business unit based on the information collected, analysed and summarised. Define strategies by which the objectives are to be met.

3.2.3 Further refinement of scope

Various related areas are therefore outside Exmar's scope, on the grounds that, though important, they are peripheral to the central concerns of Exmar, and should not be studied in detail in the interests of timely focus. These areas are summarised in the boxes on the diagram below outside the "scoping" dotted line. Brief notes on these follow.



Corporate Objective Setting

The means by which corporate objectives are arrived at is not within Exmar's scope. Where corporate objectives (or business unit objectives derived from them) are required by later parts of the marketing process, they are regarded as an input to the model.

Organisation Diagnosis

Such issues as diagnosis of the health of an organisation, Blake Mouton Matrix, etc.

Market Research, market segmentation, product positioning

Such techniques as research into the needs or wants of customers, positioning products within markets by finding criteria with which to map the market, and related market segmentation techniques are not covered. The results of market segmentation are important to the functions modelled, so this is essentially an input to the model, though some assistance may be offered.

3.2.4 Techniques considered

Porter matrix

Critical success factors table

Directional policy matrix

Ansoff matrix

Boston matrix

Product life cycle

Gap analysis

Objectives typology

Strategy typology

Impact/urgency matrix

Market attractiveness table

Cost experience curve

Porter 5-force model

Objectives priority matrix

Pareto curve

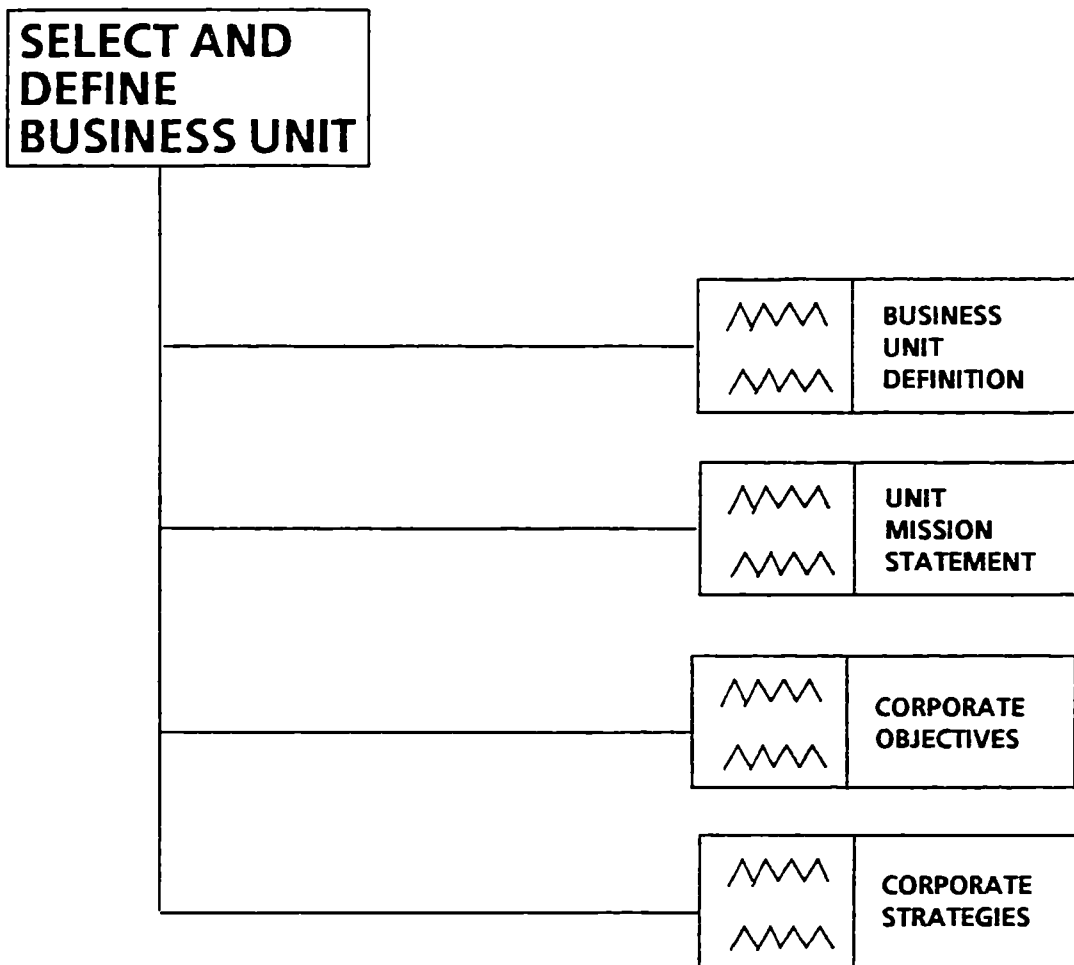
3.2.5 Techniques left out

Product positioning map
Customer preference map
Market segmentation map
Diffusion of innovation
Blake/Mouton matrix
Organisation diagnosis
McDonald productivity matrix
Size/Diversity graph, cost of variance
Downside risk assessment
Response elasticities

Downside risk assessment is on this list of techniques outside the scope because the consideration of risks and the development of contingency plans would normally form part of a shorter term tactical plan rather than a strategic marketing plan. The model developed does provide the basis for such consideration, however, in the form of documentation of significant assumptions and issues.

3.3 Lower levels of functional breakdown

3.3.1 Select and Define Business Unit



Business Unit Definition

This states which business unit the plan is for. Where a plan is being produced for an organisational unit, this simply identifies the unit. But it may be more complex: one may wish to carry out the plan just for a subset of an organisational unit's business of particular interest, or for an area of the business that crosses organisational boundaries. For example, a plan for tinned foods within a foods company may cross department boundaries of design, production, finance, etc.

The business unit definition includes a title that can be used to head all documents associated with the plan.

It may be possible to produce a checklist to assist in this function.

Unit Mission Statement

This defines what the unit is, or will be, in existence to achieve. This will be a corporate mission statement if the whole organisation is being considered. Otherwise it will identify the specific role of the unit within the organisation.

Its form is a statement in words to cover aspects of the mission not covered by the corporate objectives and strategies. Brief statements should be made which cover the following points:

i) Role or Contribution of the Unit

- e.g.
- profit generator,
 - service department,
 - opportunity seeker

ii) Definition of the Business

- the needs satisfied or the benefits provided. Should not be too specific (e.g. "we sell milking machinery") or too general (e.g. "we're in the engineering business").

iii) Distinctive Competence

- this should be a brief statement that applies only to the specific Unit. A statement that could equally apply to any competitor is unsatisfactory.

iv) Indications for Future Direction

- a brief statement of the principal things that serious consideration would be given to (e.g. move into a new segment).

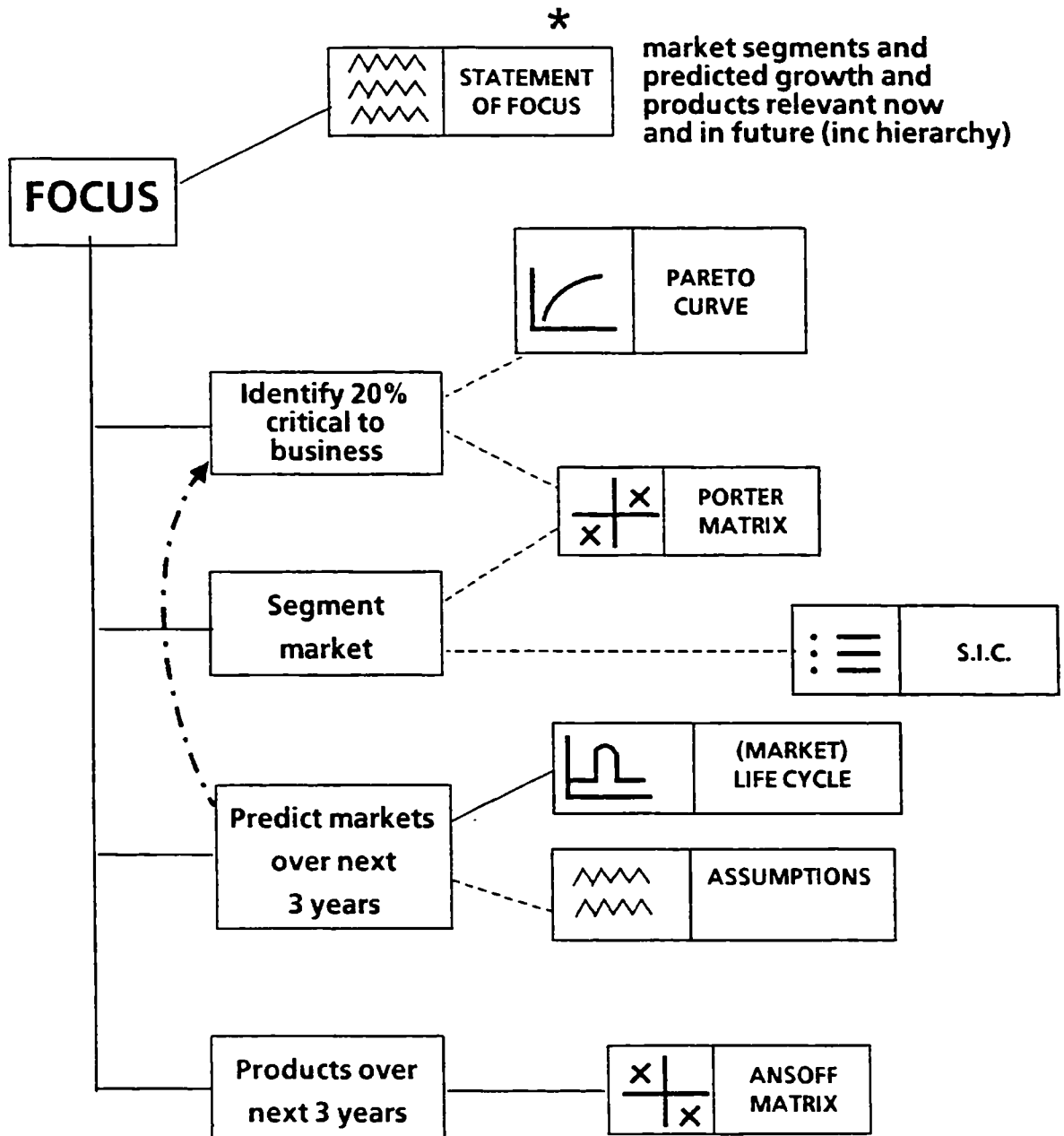
Reference: Tremco Marketing plan, vol 1

Corporate Objectives and Strategies

Corporate objectives document any financial targets set for the unit, particularly for revenue or profit. This also involves specification of the planning period to the end of which the targets relate (typically 3 years). They may have been defined by a higher level unit (that subsumes the unit under consideration) as part of that higher level unit's planning. As the higher level unit may not be at the corporate level, these objectives are not necessarily strictly corporate.

Corporate strategies give statements of direction as to how the objectives are to be achieved. They may again form part of a higher level unit's planning. An example from the case study discussed in section 7.2.2 is to reduce the unit's dependency on undifferentiated products to a lower quantified level.

3.3.2 Focus



Focus

The object is to identify which market segments and products are to be considered in production of the marketing plan. This involves ignoring some detail for the sake of aiding understanding about the critical issues involved. For example, an audit of tinned foods may decide to focus on baked beans and pet foods, and ignore the small market for anchovies.

Identify 20% critical to business

The basic rule of thumb is that the 20% of the business' markets and products most critical to its success are those that should be included in a strategic marketing plan. This is a guideline only: the planner may wish to conduct a more or less exhaustive plan. Plotting the Pareto curve will give a first indication. The Porter Matrix may assist by showing the relative strength of the products in their markets in terms of differentiation and cost leadership, as an indication of the possible future importance of the products.

Segment the market

The relevant markets should be identified and, where appropriate, segmented. This is in general a creative and important step. Limited guidance only is incorporated in this model. The Porter matrix may be of assistance in market segmentation in cases where cost and differentiation can effectively model the market, as clusters of products in similar positions might reasonably be placed in a segment. The Standard Industrial Classification (SIC) used as a basis of statistics collection by the Government can form a useful starting point for market definition, as a checklist from which to select, though its utility may be limited to where segmentation can sensibly be based on vertical markets.

Predict markets over next 3 years

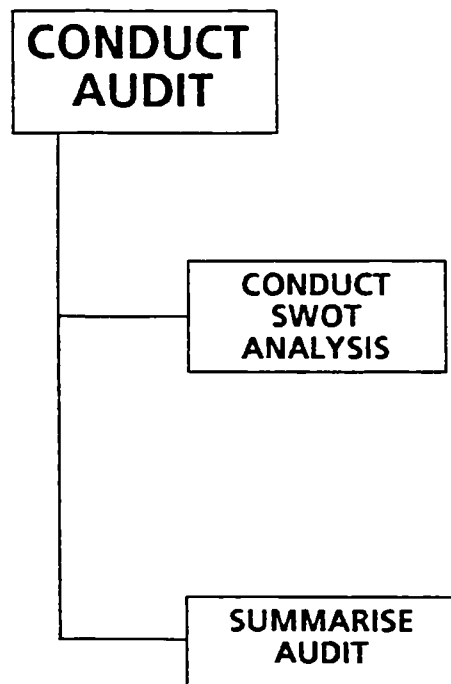
Prediction of the future market life cycle is important as an input into the audit of the current position. It is also may affect which 20% of the products and markets is deemed to be critical. For example, if it is assumed that the demand for anchovies is expected to rise steeply in the next three years, it may be decided to include them in the tinned foods audit after all.

Products over next 3 years

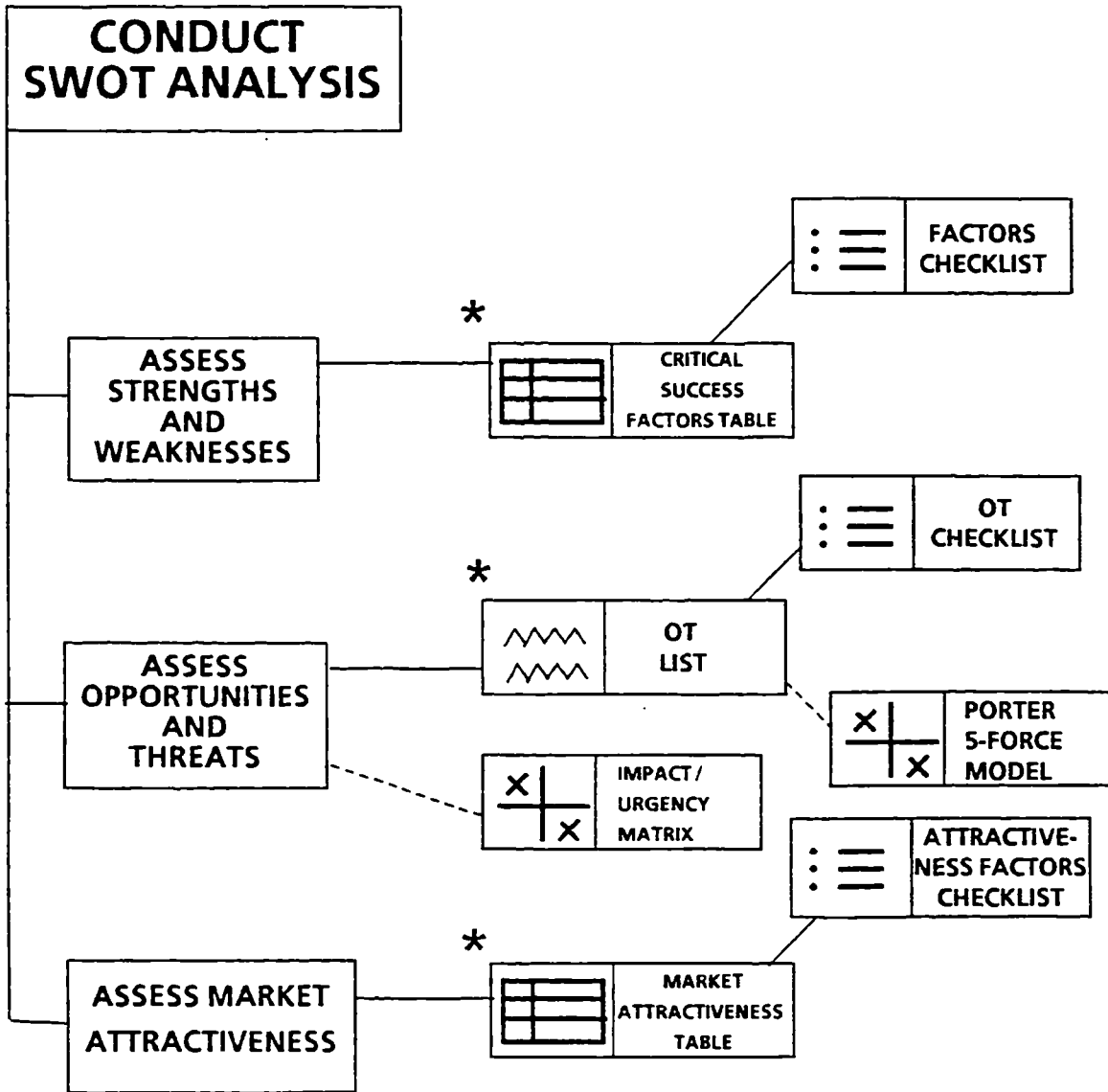
The Ansoff matrix may at this point suggest new markets and products that should be defined and considered.

3.3.3 Conduct Audit

Conducting the marketing audit is split into two stages. Firstly, carrying out the SWOT analysis. Secondly, summarising one's current position.



3.3.3.1 Conduct SWOT Analysis



The objective is to assess the state and prospects of the products and markets already identified. Information needed at this point may have been collected in advance of the planning process, or it may be collected now.

Assess Strengths and Weaknesses

The strengths and weaknesses of the company's products in its markets can be summarised in a Critical Success Factors table for each product within the chosen focus. It is very important to get this right, and to validate it against information on the competitors in the market and their strength in the markets. If the information is not available to sufficient accuracy, it should be obtained. After all, one is identifying factors critical to the success of the business. A checklist is available of possible factors to consider.

This function, then, is performed for each product within the chosen focus. Such repetition is not explicitly represented on the diagrams, although it should be clear from the accompanying text.

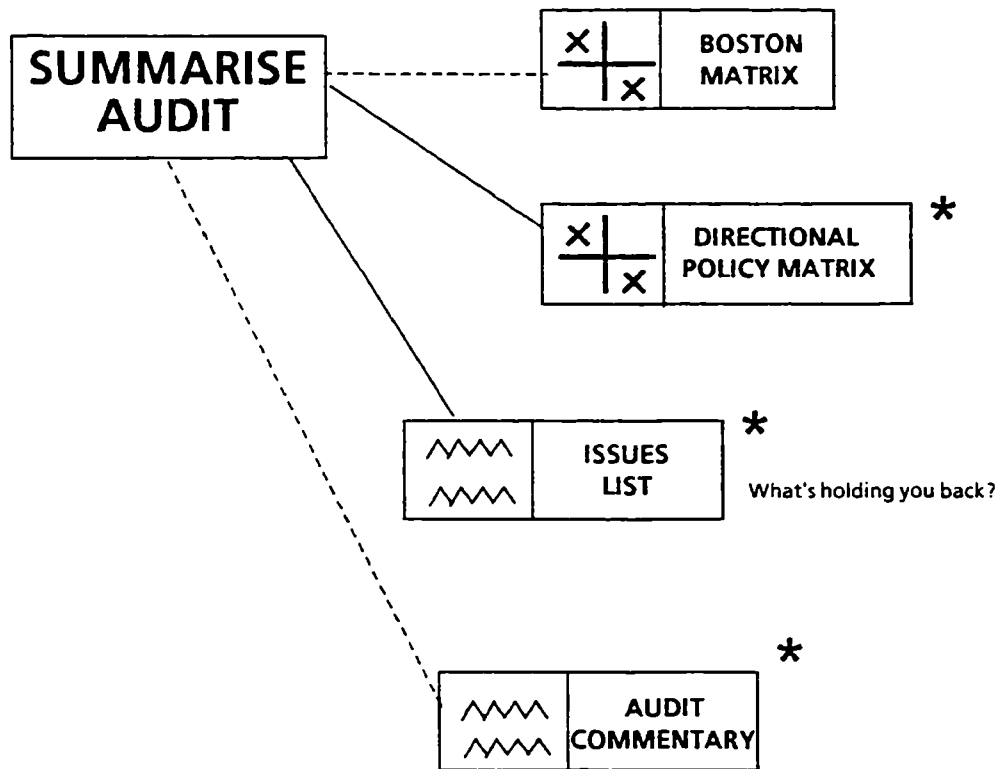
Assess Opportunities and Threats

The Porter 5-force model of pressures on you can assist in identification of threats. The Impact/urgency matrix gives guidance on whether to include the threats in the summary list. A checklist of possible opportunities and threats is available.

Assess Market Attractiveness

The Market Attractiveness table summarises the attractiveness of a market to the company. It is filled in for each market within the chosen focus. It thus complements the Critical Success Factors (CSF) table: CSF summarises the company's prospects of success in the market if it chooses to compete, whereas this table summarises the desirability of competing. Specification of the market's attractiveness as of now includes anticipation of the future of the market based on current information. More particularly, it is concerned with the market's attractiveness from now till the end of the chosen planning period. This is discussed further in the Forecast stage (section 3.3.4).

3.3.3.2 Summarise Audit



The objective is to summarise the current situation, including the position of the individual products in their markets and an overview of the unit's portfolio.

The essential component of this is the Directional Policy Matrix (DPM), with the current picture of the portfolio, and current projections. The projections can then be modified during the setting of objectives. The axes of the DPM have already been determined during the Audit, being the CSF factors and weightings, and the market attractiveness factors and weightings. A circle is also used to indicate the product's contribution to revenues. Guidelines for the reduction of the number of products to be displayed to a sensible number may be used; and the axes may be changed and/or relabelled in order more effectively to differentiate between products, if initially they are excessively clustered. Groups of products, including portfolios, may meaningfully be plotted on the DPM, as well as single products: McDonald gives an example of Cranfield School of Management's courses.

As a further refinement to the representation, the circles may have a shaded segment with size proportional to the product's market share.

Note that the elements plotted on DPM are product/market combinations, rather than products or markets: so a product sold into two markets will result in two circles on the DPM. Each product/market combination is an instance of the Product for Market entity in the data model. When discussing DPM, however, product/market combinations are sometimes loosely referred to as products for simplicity.

The Boston matrix may be used if it is appropriate in this case, on the grounds of its greater simplicity. Similar remarks apply to those above about the DPM.

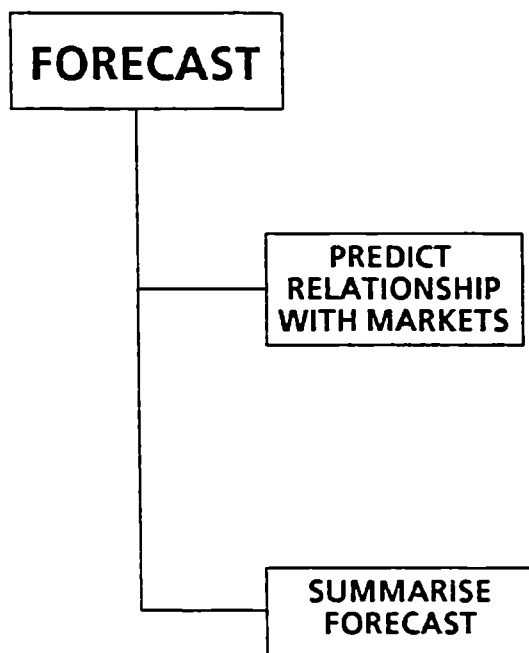
Issues that are holding back the business unit may at this point be defined. These may relate specifically to the improvement of particular critical success factors scores.

An audit commentary may be provided to add explanatory text to any of the above if desired.

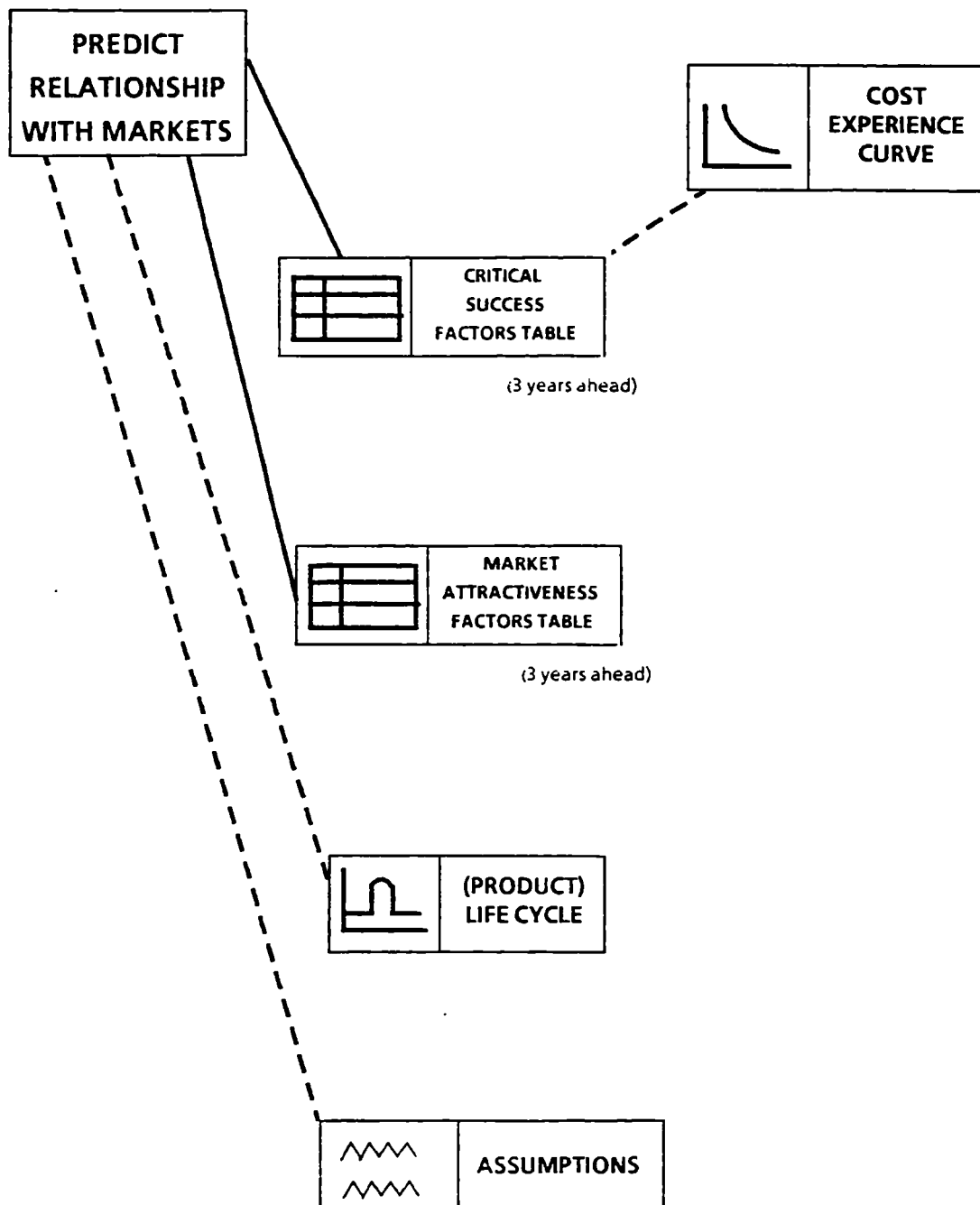
3.3.4 Forecast

Compiling a forecast is split into two stages. Firstly, predicting one's relationships with the markets under consideration. Secondly, summarising the resulting forecast.

This function is only now performed because it is only after a market and the unit's current position within it has been analysed that it is sensible to set about predicting the unit's future position within that market.



3.3.4.1. Predict Relationship with Markets



This function involves prediction of the unit's relationship with its markets at the end of the planning period, to complement the assessment of the current relationship by the Conduct Audit function.

There is a need to predict the unit's competitive position within the markets; the future attractiveness of the markets; and the unit's sales within the markets. This is done by considering trends, without intervention.

Critical Success Factors table

For each product displayed on the DPM during the audit summary, the CSF table is recalculated for the position at the end of the planning period. This prediction should be done on the basis of current trends, and represents what the planner predicts will occur if no specific remedial action is taken. The factors and weights should be the same as those used before, to facilitate comparison: it is only the scores that change. An implication of this is that any changes envisaged in the needs of the market should be taken into account when first determining the factors and weights.

The cost experience curve may be of use in predicting future costs, which may be relevant to the competitive position.

Market Attractiveness table

For each market, the market attractiveness table is recalculated for the end of the planning period. This is a slightly subtle distinction, but one to which meaning can be attached after some thought. Just as the market attractiveness scores produced during the audit took into account the current position of the market and its immediate prospects up to the end of the planning period, this recalculation takes into account the predicted position of the market at the end of the planning period and its immediate prospects from then onwards (e.g. over the following three years). For example, the factors will typically include market size and market growth: the first calculation considers market size now and current market growth, as a means of judging the market's immediate prospects; the second considers predicted market size in three years and the growth rate predicted in three years, as a means of judging what will happen to the market thereafter.

As with the CSF table, the factors and weights themselves should not be changed for this recalculation. Only then can the attractiveness scores can be meaningfully compared.

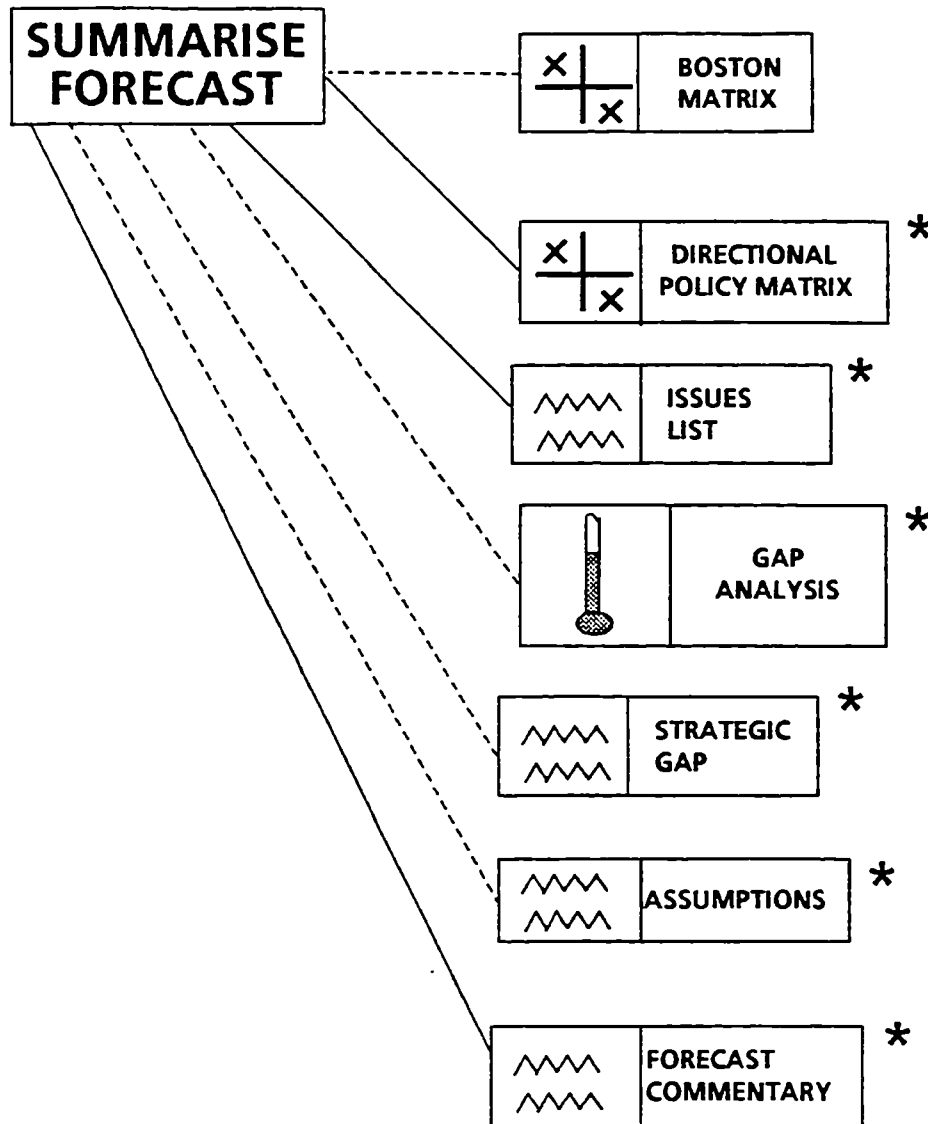
Product Life Cycle

The future size of the market has already been predicted. Prediction of our share of the market can now be made, based both on the prediction of future size, and our current and forecast competitive position recorded in the CSF tables. Drawing the product's future sales against the trends for the market as a whole may be useful in this. Like the CSF predictions, this prediction records what the planner thinks will happen if no action is taken to influence current trends.

Assumptions

Many assumptions will have been made about the shape of the future in arriving at these predictions. Some of these may be identified as particularly important in terms of their impact on the predictions and thus on any plans made; these can be documented in an assumptions list.

3.3.4.2. Summarise forecast



The summary of the unit's position can now be expanded to incorporate the forecasts based on current trends, to give a basis for objective setting.

The forecasts for CSF, MAF and product sales can be represented on DPM, by drawing a circle for the forecast position of each product and linking it with an arrow to the current position. Similarly for the Boston matrix, if being used.

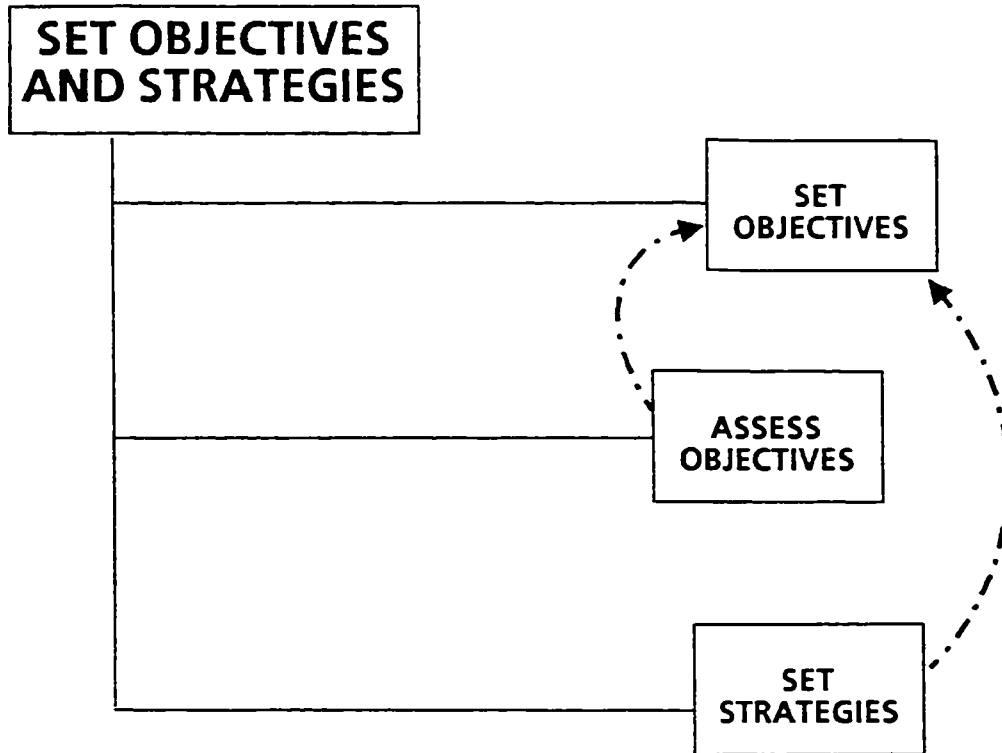
Further issues may have emerged, which can now be documented.

A gap may now be apparent between the corporate objectives and the current predictions. There may also be a "strategic gap" between the corporate strategies and the implications of current trends.

The assumptions list can now be completed.

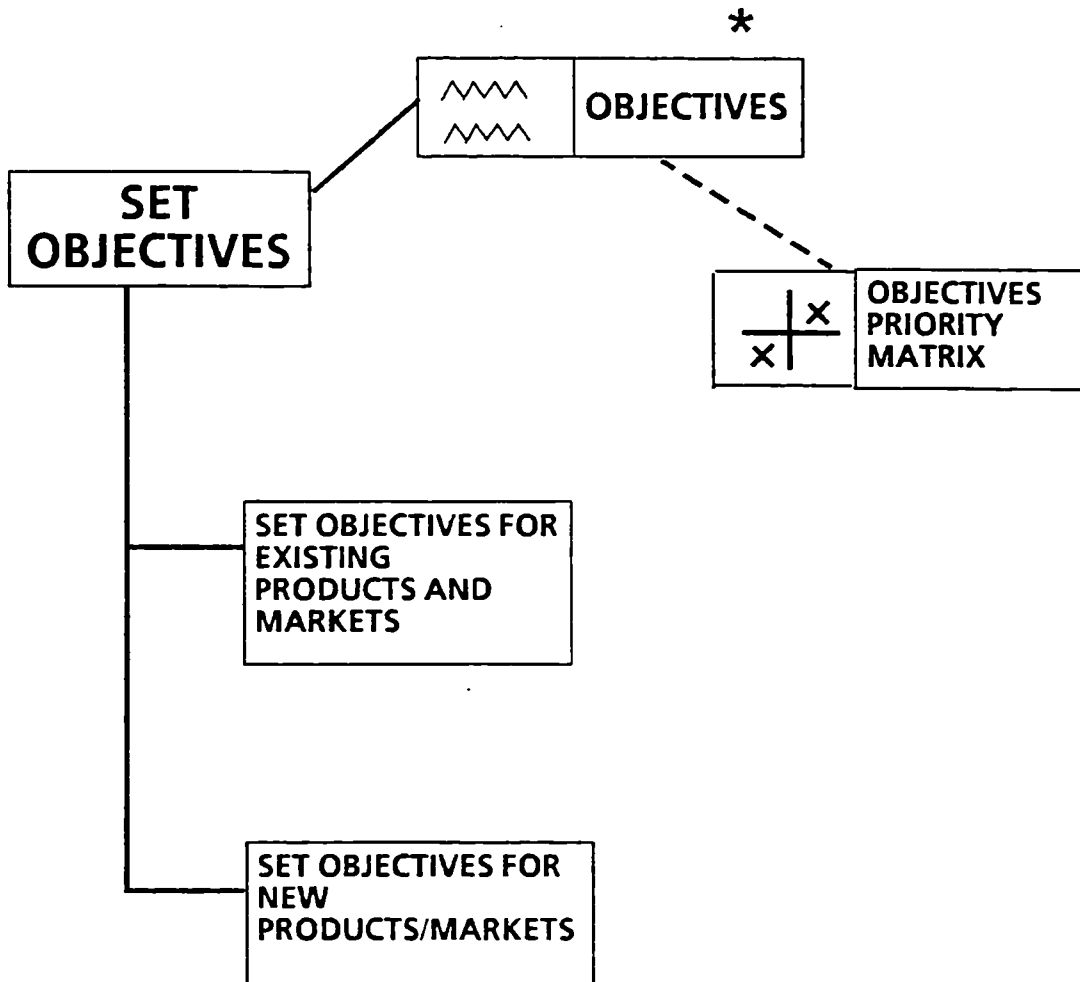
A forecast commentary can be added, giving explanatory text about any aspect of the summary.

3.3.5 Set Objectives and Strategies



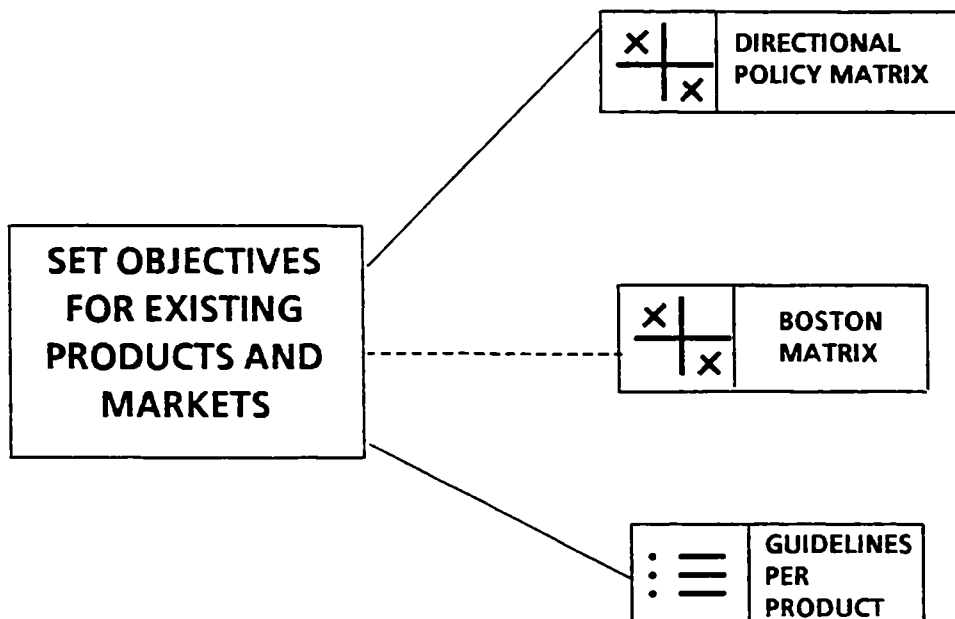
The purpose of this function is to produce a list of objectives and strategies. First, objectives for products are set, based on the forecast summary and any guidelines available. These are then assessed against the broader picture of the portfolio balance. This may involve going back and reconsidering the objectives. Strategies can then be set for the products: this more detailed inspection may reveal inadequacies in the objectives. Criteria for ending this iteration include the closure of the financial and strategic gaps, the coverage of issues raised in previous stages of the process, and more generally the satisfaction of the planner.

3.3.5.1 Set Objectives



Objectives are set both for existing products and markets, and for new products and markets. The objectives priority matrix can be used to document the impact and urgency of the objectives, and to derive a measure of the objectives' relative importance. The output is a list of quantified objectives.

3.3.5.1.1 Set objectives for existing products and markets



DPM gives a framework for setting objectives for existing product/market combinations. There are two respects in which a forecast for a product can be changed to indicate a differing objective. The CSF score can be changed to indicate an intention to change our competitive position by altering one or more of the component scores; and the contribution to revenue can be changed. The former results in a horizontal movement of a circle, the latter results in a change in size of a circle, relative to the forecast position. The MAF score cannot be changed, as this would be meaningless: no action within our power (as producer) can alter the attractiveness of a market.

So there are three distinct representations of a product/market combination on DPM:

DPM1 The present position, identified during the audit

DPM2 The forecast position on current trends, identified during forecasting

DPM3 The objective position, identified during objective setting.

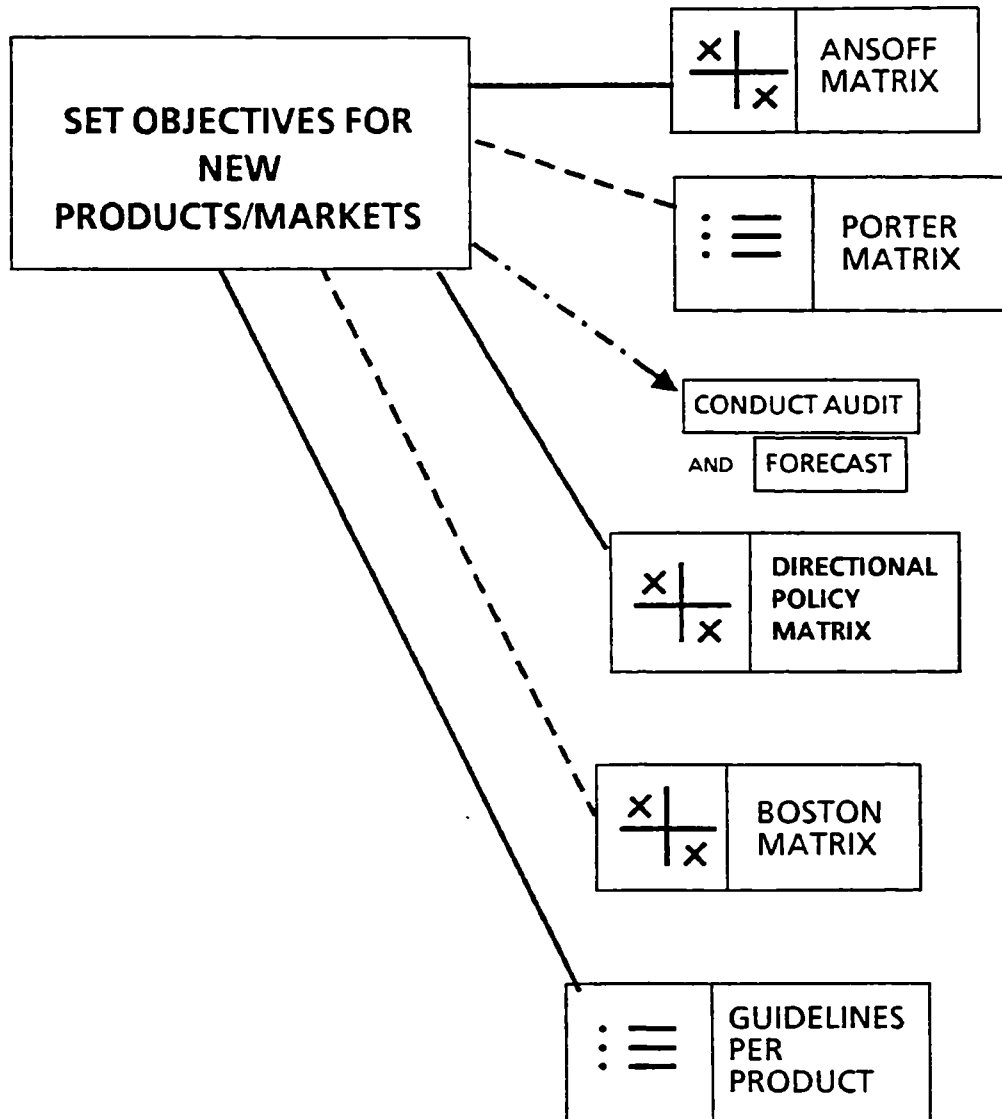
DPM2 and DPM3 are on the same horizontal line for a given product.

If a shaded segment is used to indicate the product's market share, the size of the segment is dependent on the circle size: if the DPM3 circle's radius is increased above the radius of the DPM2 circle representing the forecast position, the segment will expand, because a larger contribution to revenue than forecast can only result from obtaining a larger market share.

In setting objectives, assistance is available in the form of directional policy guidelines for each product, based on the product's position on the diagram. These should be taken into account, but they are not prescriptive, nor precise, as they merely indicate the rough strategy that should normally be employed for products in that position.

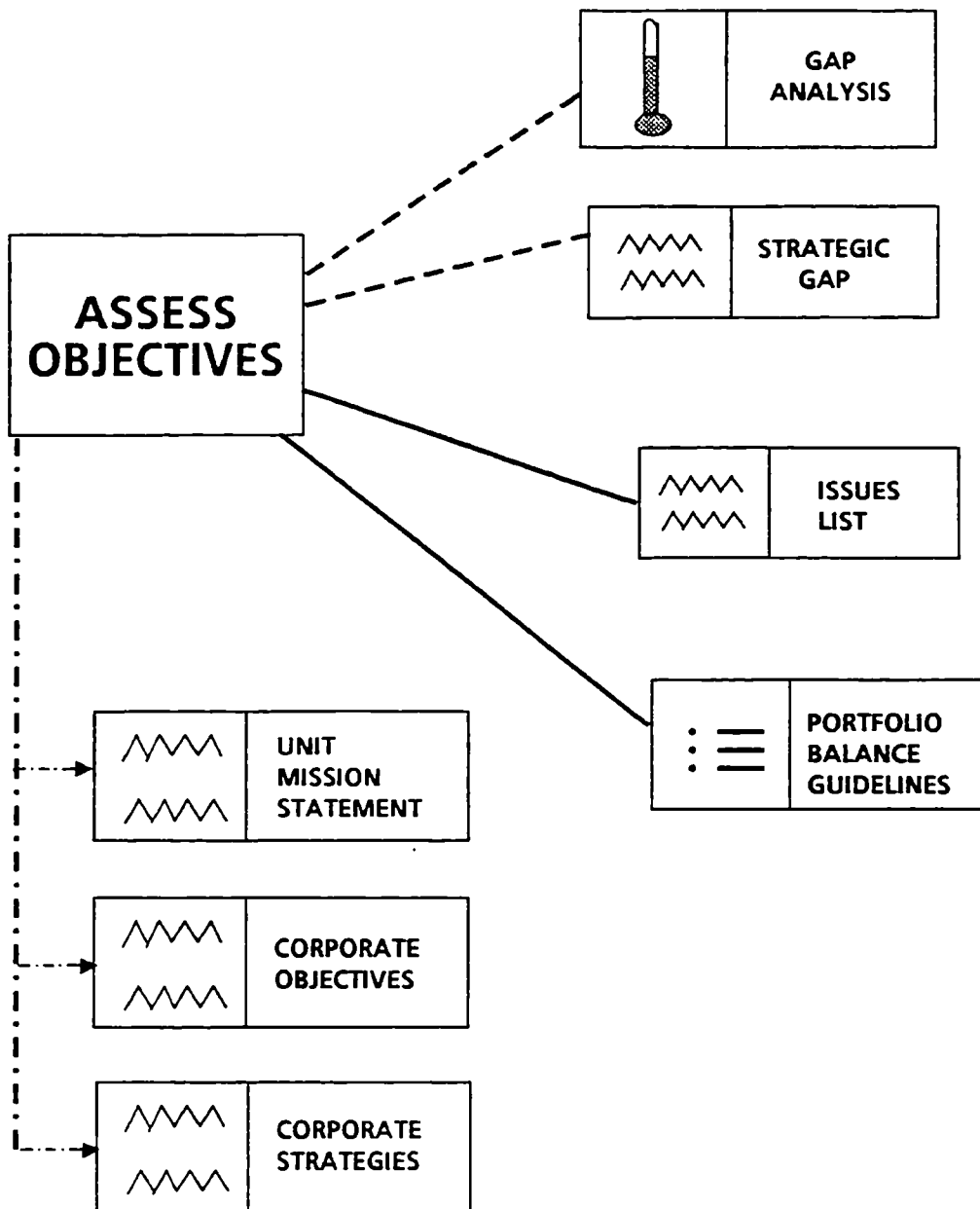
If the Boston matrix is being used, objectives can similarly be set by altering the horizontal position and circle size, though in this case a change in horizontal position (relative market share) will directly result in a change in circle size (contribution to revenue) and vice versa, unless the price is altered.

3.3.5.1.2 Set objectives for new products and markets



At this point new ideas may be generated or considered, using the Ansoff matrix to suggest an order of consideration. This is particularly likely to occur after the first iteration, when a gap has been identified by the Assess Objectives function. If the ideas have not been included in the analysis from the start, market segmentation will need to be defined, and an audit and forecast will need to be carried out before objectives can be set as before.

3.3.5.2. Assess Objectives



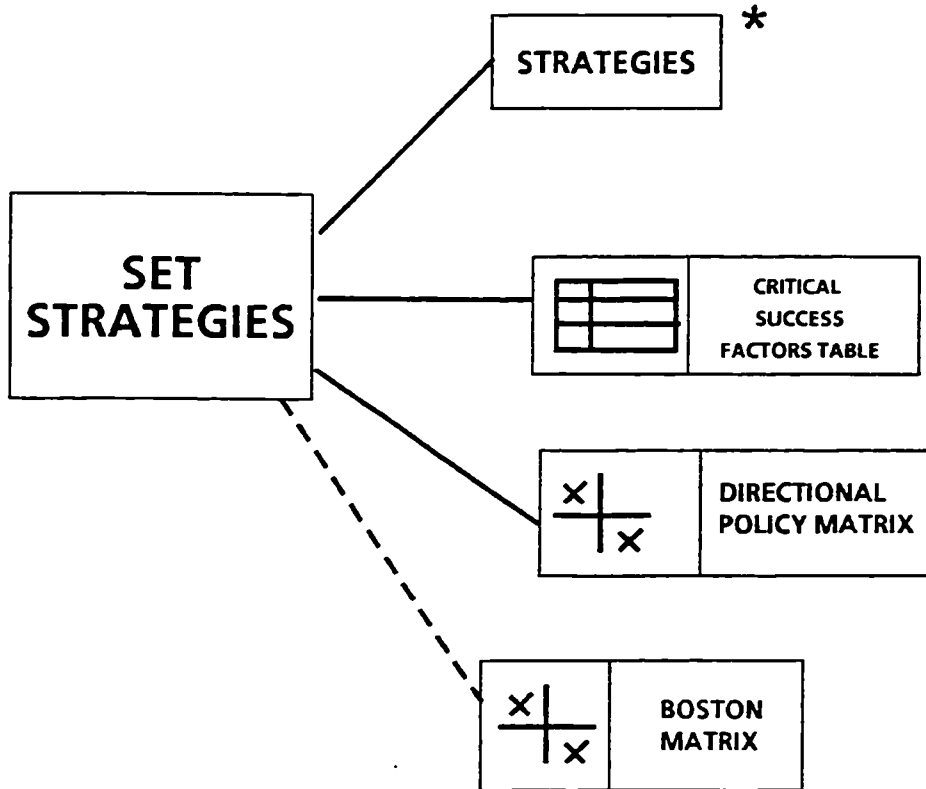
In some organisations, particularly those driven by financial control, gap analysis will be used to drive objective setting for the existing product range and consideration of new ideas, with iteration continuing until the gap is closed. In others, the process will primarily be driven by consideration of a "strategic gap", with financial objectives being influenced by what is possible given the constraints of the corporate strategies (such as "maintain competitive advantage through cost leadership").

The objectives should in any case be considered against the list of issues identified, to check they have all been addressed in the objectives.

Portfolio balance guidelines form the second style of guideline available from the Directional Policy Matrix, to complement the guidelines for individual product/market combinations. These indicate whether a portfolio is balanced: the classic example is of a product range where revenue is healthy at present, but where future prospects are inadequate.

In assessing objectives, it may be decided that a fault lies not with the objectives being assessed, but with the unit mission statement, corporate objectives or corporate strategies; and changes may result in these, which involve a larger iteration over the whole planning process. A simple example is the case where a product range is ideally suited to long-term investment, but where the corporate objectives concentrate on short-term contribution to revenue. Such changes will naturally normally occur only after negotiation, and often the needs of the organisation as a whole may override what is optimal for a particular business unit considered in isolation.

3.3.5.3. Set Strategies

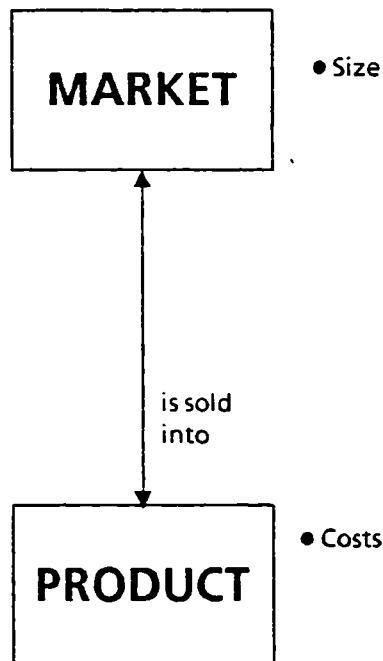


Strategies can now be identified to meet the objectives. These will frequently involve action that directly affects a CSF score, or a product's contribution, so the strategies define how an objective involving DPM movement is to be achieved. The cost of strategies will need to be considered against budgets, but this has not been addressed in detail, and is to some extent outside the defined Exmar scope. Again, the Boston matrix may be used as an alternative.

3.4 Data Model

3.4.1 Notation

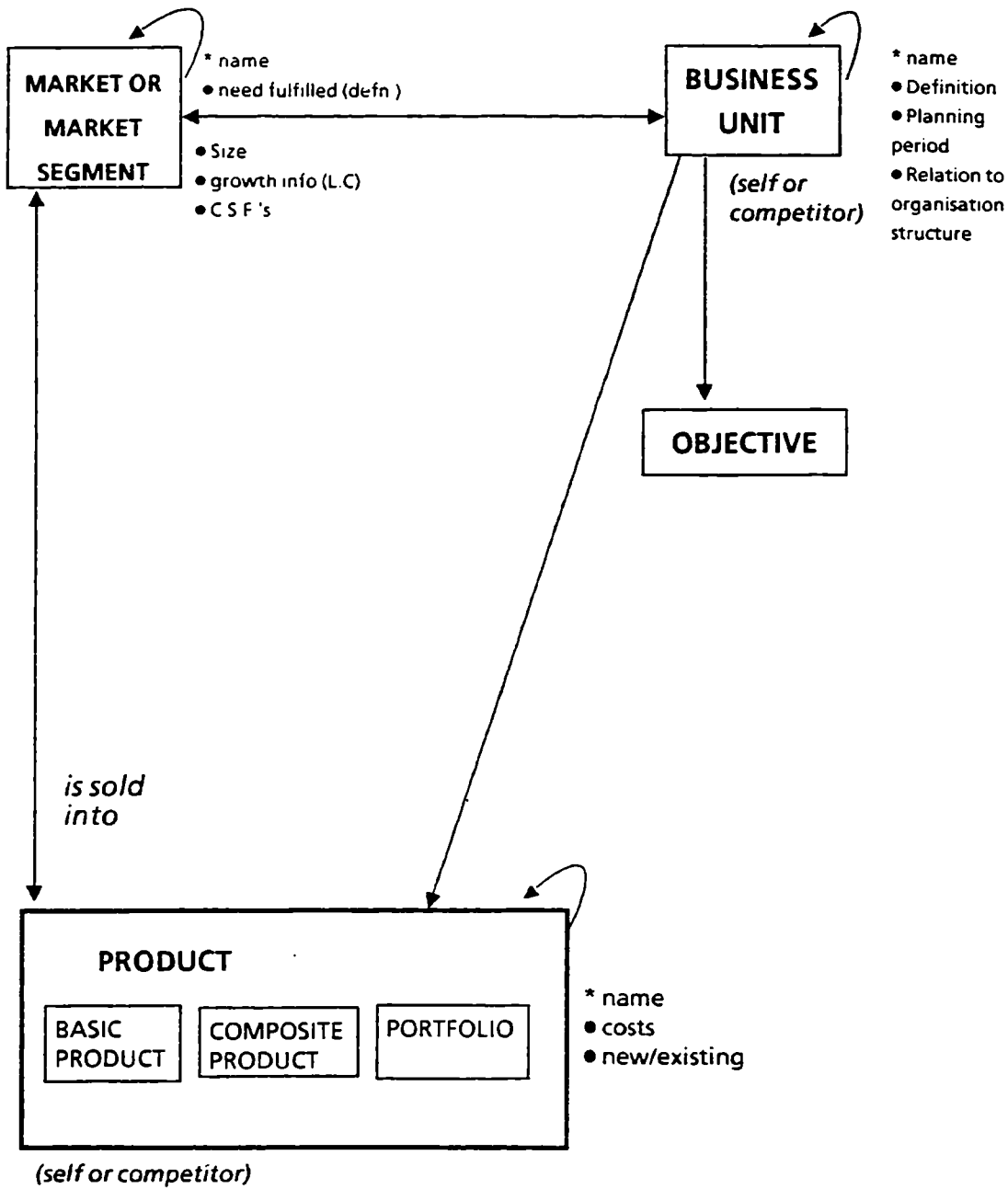
The data model diagrams presented later in the section are in a format known as Entity Relationship Diagrams.



Boxes represent "entities" and lines represent "relationships". An entity is anything you wish to hold information about, such as Products and Markets. The information can be represented by blobs by the box, with text describing the information. Each item is called an attribute, such as a market's size. A star in place of a blob indicates an attribute that can be used to identify the particular entity concerned.

A relationship represents some connection between the entities. For example, products are related to markets in that a product may be sold into a given market. An arrow leading from entity A to entity B indicates that a given instance of entity A may be related to more than one of entity B. Text by the line may be used to indicate the nature of the relationship. So a product may be sold into more than one market, and a market may have more than one product sold into it. This case, where there is an arrow at each end, is called a many-to-many relationship.

3.4.2 Data Model (I)



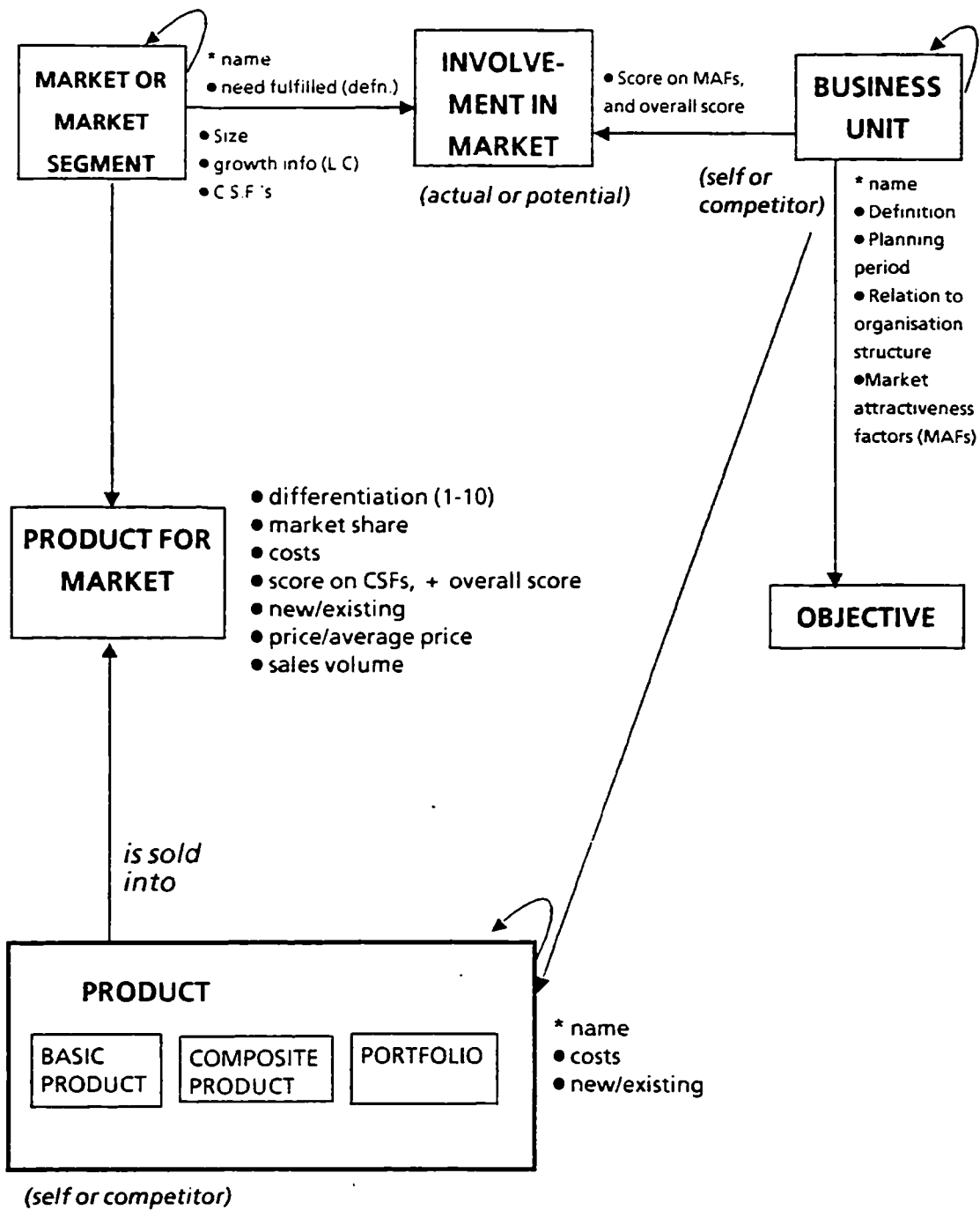
This gives a simplified data model, as a step towards the full model. Products are in a many-to-many relationship with markets they are in, as are business units. Products, markets and business units may all be nested within others.

Composite products are products consisting of several other products, which are sold individually as well. An example might be a variety pack of cat food. A portfolio is a set of products that, by contrast, is not sold as a set, but which is in some way related. The total range of cat foods offered is an example. If a product is neither of these, it is called a basic product.

The critical success factors and weightings that apply to a given market are common to all competitors in the market, so they are an attribute of the market itself in the model.

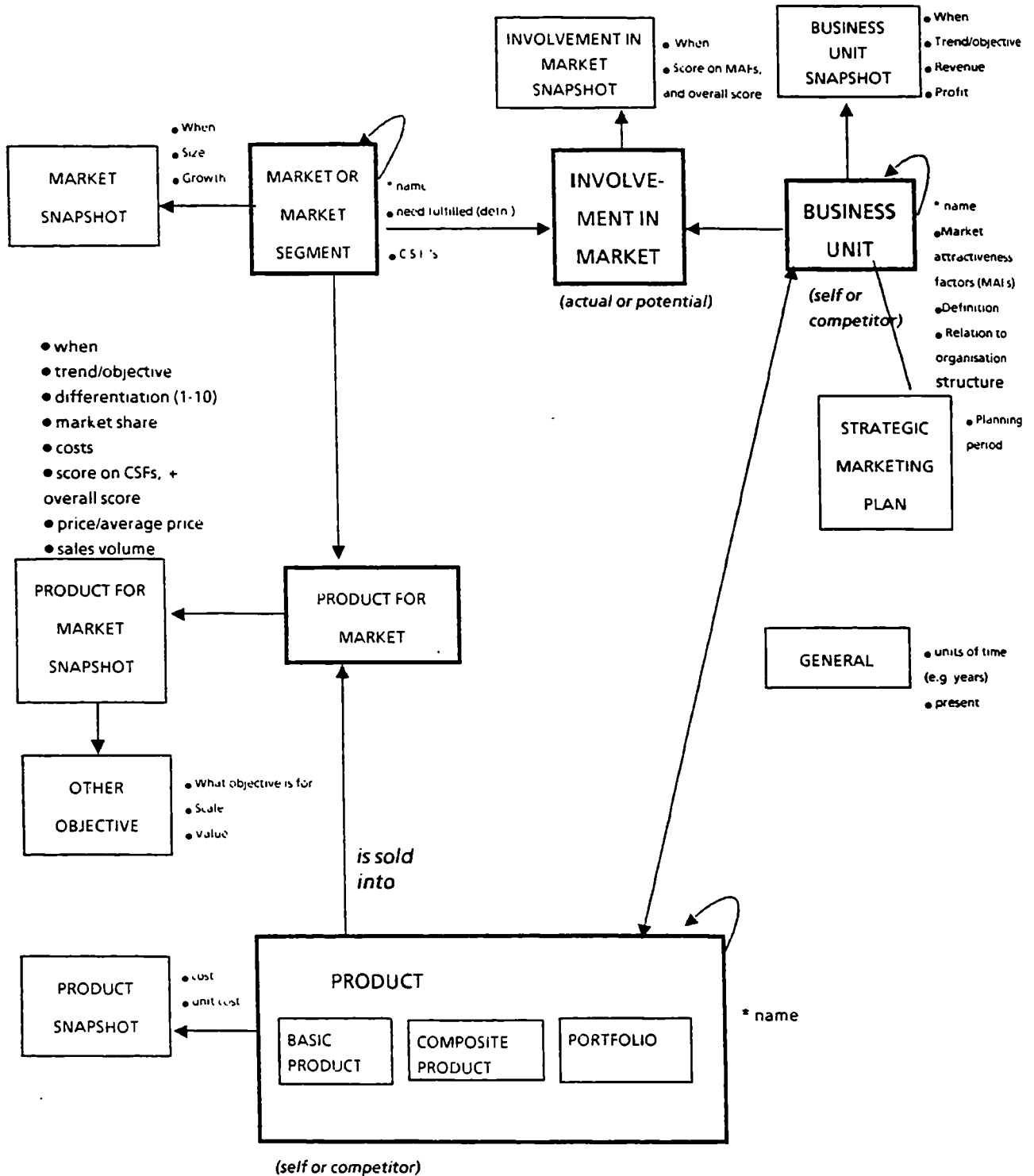
This diagram is inadequate when you consider information such as market share. Market share is not an attribute of products: a given product may be sold into two markets, in each of which it has a different market share. So a new entity is needed "between" Product and Market. Similarly, the attractiveness of a market to a given firm is specific to that firm, so a new entity is needed between Market and Business Unit.

3.4.3 Data Model (II)



An important area in which this model needs extension is in modelling of features that change over time. This is only loosely described in this version, for example by the attribute "Growth info" for markets. The following diagram resolves this inadequacy.

3.4.4 Data Model (III)



Representation of time

The representation of information that changes with time is tackled in this diagram by dividing entities into two components, a static component (e.g. Market) and a dynamic component containing information that changes over time (e.g. Market Snapshot). So a single market will be related to maybe six Market Snapshot instances, one for each year from three years ago ($t - 3$) to the end of the planning period in three years' time ($t + 3$), with differing information as to market size and growth. This enables time dependent information to be modelled, provided the information is only needed in discrete units (typically years). This is at present thought to be adequate for strategic planning.

Other new entities

"General": the data model represents a view of the world, including its current state and predictions of the future, at a given point in time. The "General" entity provides a place to document when the present is, in the units of time being used (typically years).

Strategic Marketing Plan: it is conceivable that a single set of data based on the model (e.g. a single computer system database) might be used for more than one marketing plan, as different plans might, for example, relate to the some of the same markets. The Strategic Marketing Plan entity has been introduced to model this. It relates to the business unit for which the plan is being created.

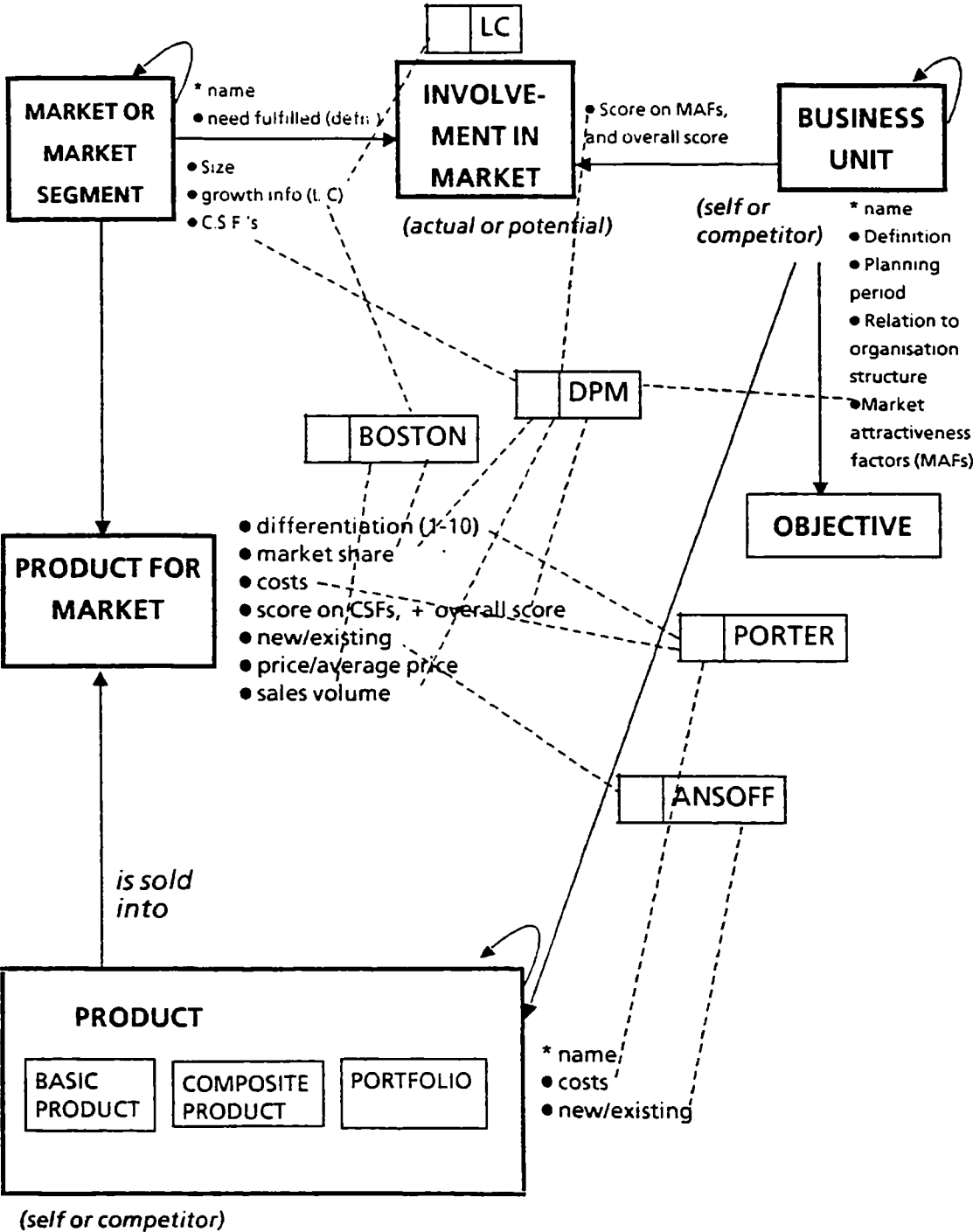
Objectives

Corporate Objectives are features of the business unit, and relate to a specific point the future; so they are represented by Business Unit Snapshots. Marketing objectives relate to a specific product for market, and again include specification of a time in the future at which they are to be met, so they pertain to Product For Market Snapshots. Many marketing objectives can be represented by standard attributes such as market share and sales volume; but arbitrary quantifiable objectives for the Product For Market are also possible, and to allow this a Product for Market may have one or more "Other Objectives".

3.5 Technique interrelationships

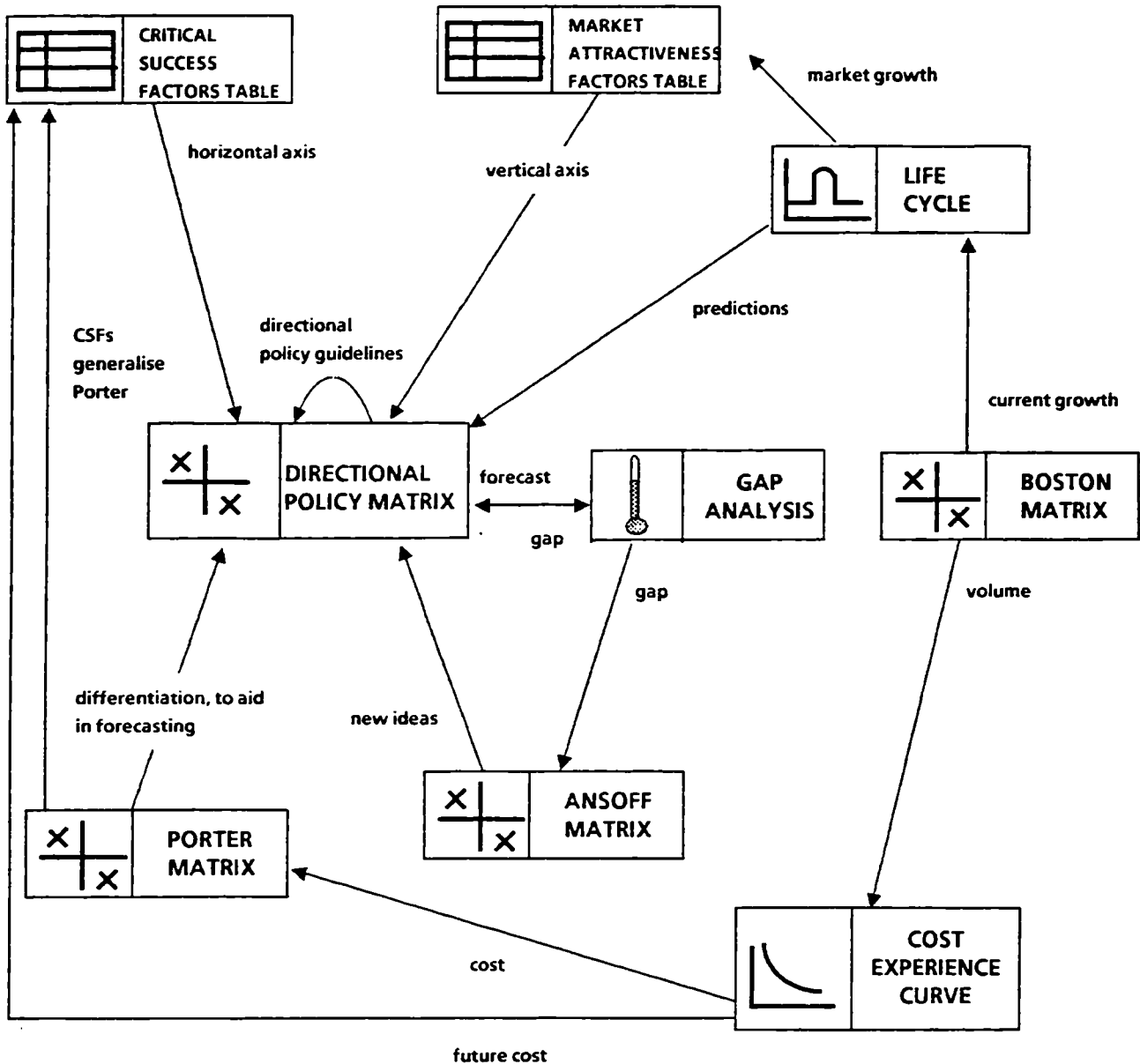
3.5.1 Data used by techniques

The (rather messy) diagram below shows the data used as input by some of the techniques modelled. It uses the simpler Data Model (II).



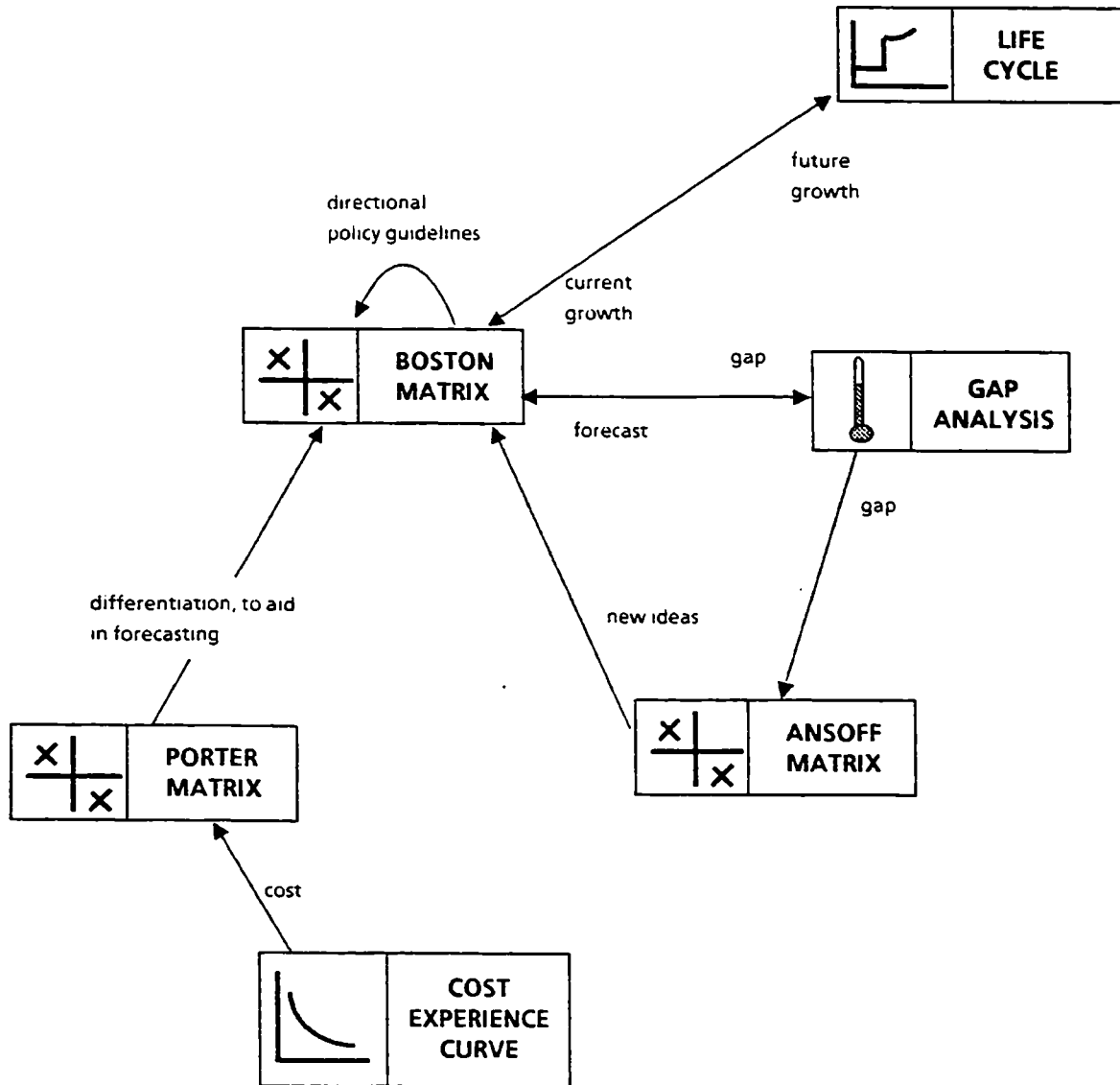
The diagrams below show various connections identified between techniques. They assume that by using a technique, any data required by it is entered into the model by some means, so the data is available for another technique.

3.5.2 Technique interrelationships (I)



x
 → : provides x as input to

3.5.3 Technique interrelationships (II)



B. Sample EXMAR screen snapshots

This appendix contains some sample printouts of screen layouts for the four versions of the EXMAR system. It is organised in four parts:

- B1. Demonstrator
- B2. Prototype
- B3. MacroScope system
- B4. Visual Basic system.

These screen snapshots are used to illustrate the description of the different versions of the system in chapter 6.

B1. Demonstrator

Contents:

- B1.1 Navigation: main browser and a detailed browser
- B1.2 Data entry example: current market snapshot and CSF scores
- B1.3 Graphics example: Porter matrix
- B1.4 DPM, with advice and gap gauge

Figure B1.1 Navigation: main browser and a detailed browser

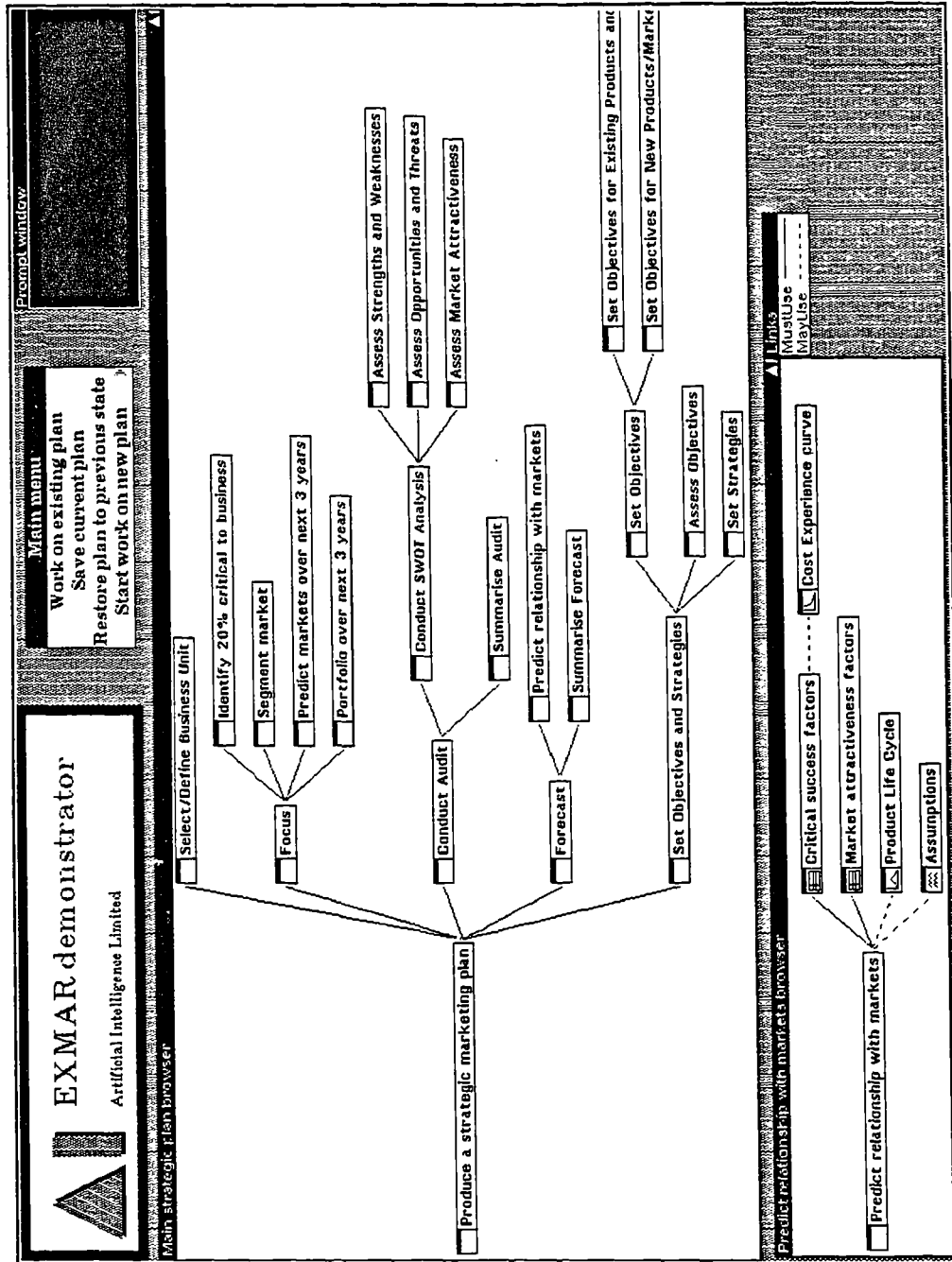


Figure B1.2 Data entry example: current market snapshot and CSF scores

Current Market Snapshot

Accept Cancel Close

Market Name: Food-processing

Market Size (m) : 13.1

Market Attractiveness : 9

Product for Market: IBL Food-processing Bearings

Price (£) : 3.8

Unit Volume (m) : 9

Market Share (%) : 68

Calculated Revenue Contribution (£m) : 34.2

Calculated Strength in Market : 8

Critical Success Factor Table

Market Attractiveness Factor Table

Current Critical Success Factors for Food processing

Critical Success Factors Form

Factors	Weight	IBL Score	Contribution	Competitor 1	Contribution
1: Quality	20	9	1.8	4	.8
2: Price	15	6	.75	6	.9
3: Differentiation	25	7	1.75	4	1.0
4: Image	20	7	1.4	3	.6
5: Support	20	9	1.8	6	1.2
Strength in Market: IBL			7.5	Competitor 1	4.5

Accept Cancel Close

Figure B1.3 Graphics example: Porter matrix

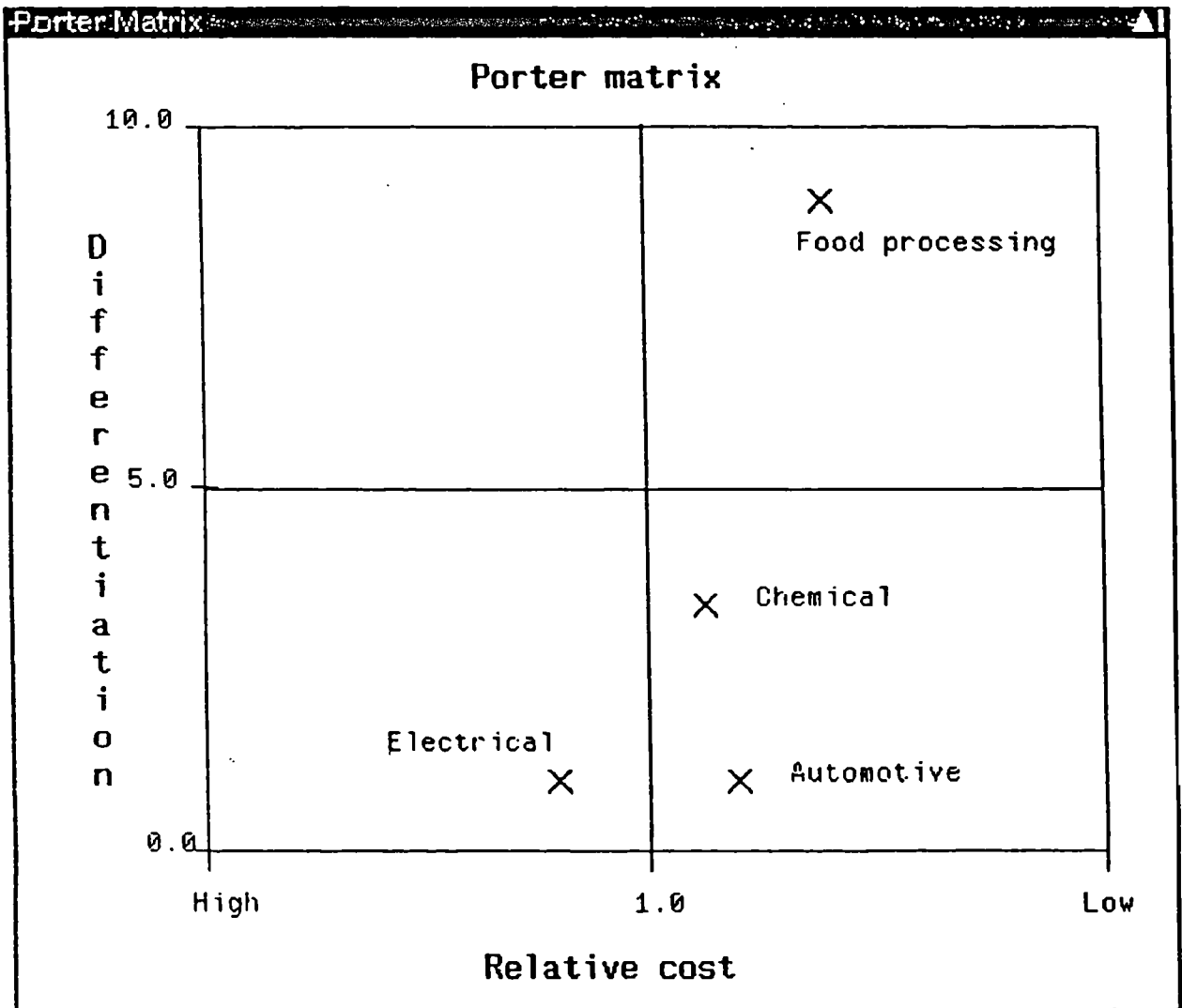
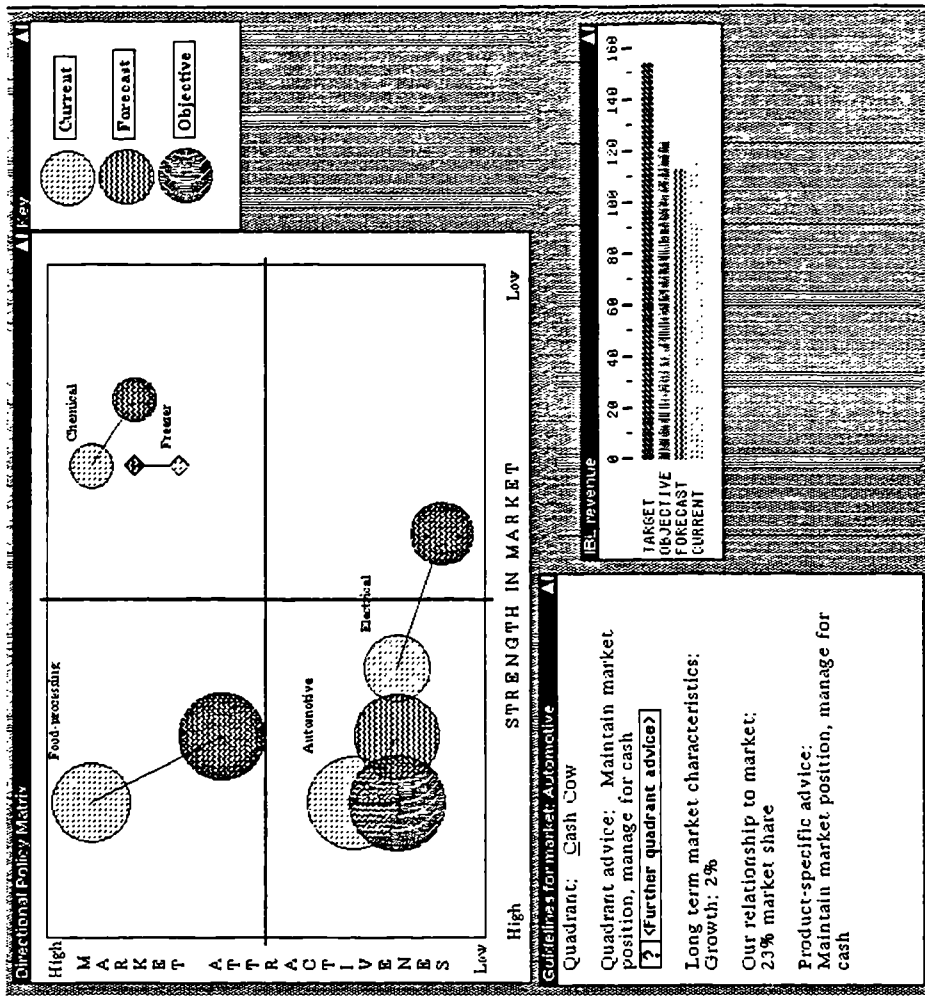


Figure B1.4 DPM, with advice and gap gauge



B2. Prototype

Contents:

B2.1 Task overview

B2.2 Process support: action panel, guidance browser and status display

B2.3 Process advice: avoiding clustered circles on DPM

B2.4 Data form example: CSFs

B2.5 DPM, and data form obtained from it

B2.6 DPM advice

B2.7 Gap gauge

B2.8 Defining strategies: CSF score changes and related text

Figure B2.1 Task overview

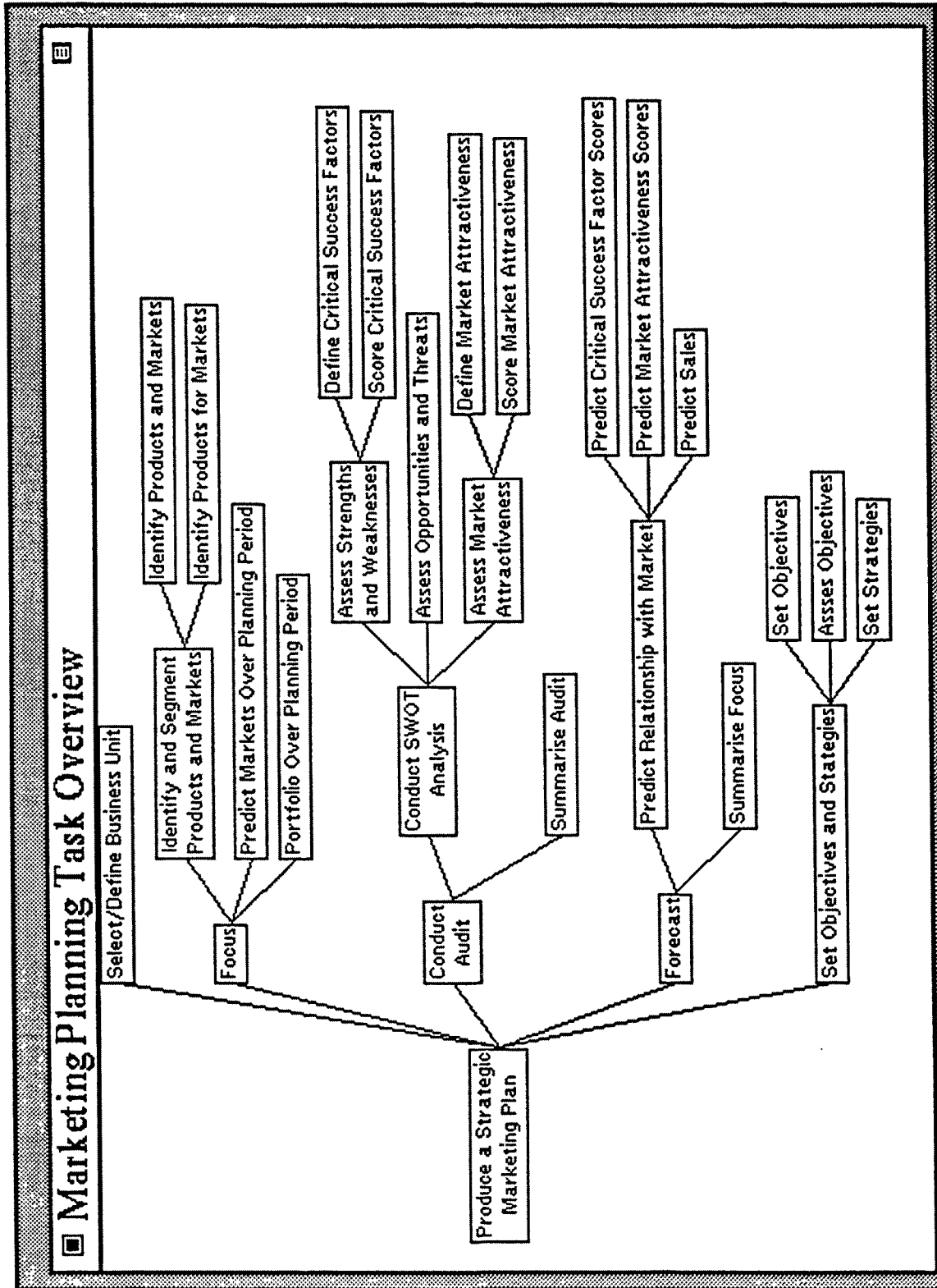


Figure B2.2 Process support: action panel, guidance browser and status display

Action Panel: IBL9093

DPM	GG	SD	Other
Business Unit			
Product For Market			
New			
New			
IBL-Bearings			
IBL-SuperBeari			

IBL-Bear-for-Auto			
IBL-Bear-for-Chem			
IBL-Bear-for-Elect			
IBL-Bear-for-Freez			

MAPS
 C S F O S
 IBL scores IBL scores

Edit
 C F O S
 osf scores osf scores

Remove
 Delete

Status Display: IBL9093

Focus Completed	Audit Completed	Forecast Completed	Objectives Set	Strategies Set
IBLBear-for-Auto				
IBLBear-for-Chem				
IBLBear-for-Elect				
IBLBear-for-Freez				
IBLSupB-for-Chem				
IBLSupB-for-				

Guidance Browser: IBL9093

System Guidance	Marketing Planning Guidance	Marketing Plan Document
Select/Define Business Unit		
Focus		
Identify and Segment Products and Markets		
Identify Products and Markets		
Identify Products for Markets		
Predict Markets over Planning Period		
Portfolio over Planning Period		
Conduct Audit		
Conduct SWOT Analysis		
Assess Strengths and Weaknesses		

Figure B2.3 Process advice: avoiding clustered circles on DPM

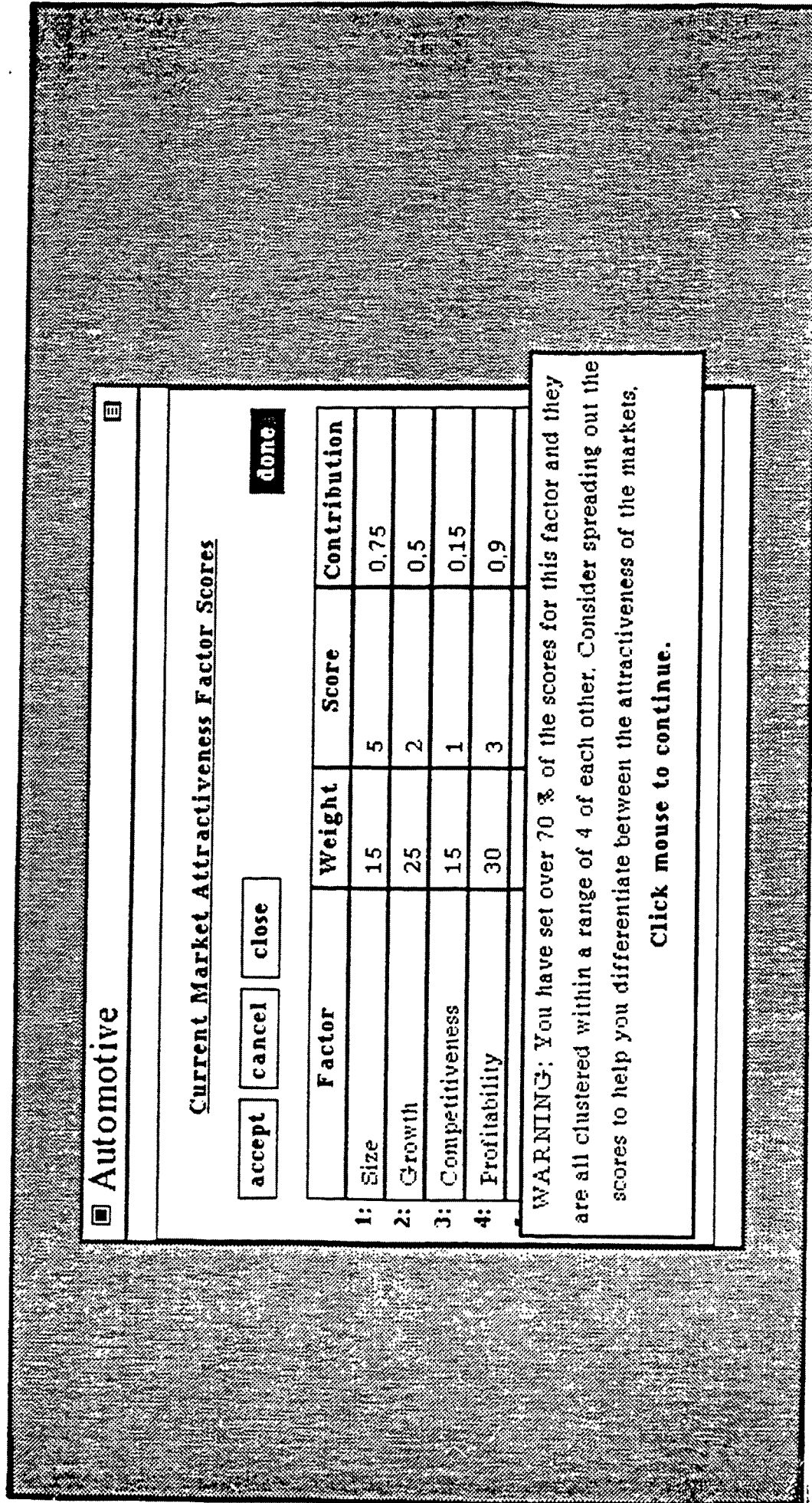


Figure B2.4 Data form example: CSFs

■ Guidance Browser: IBL9093

System Guidance

Marketing Planning Guidance

Marketing Plan Document

Predict Markets over Planning Period
Portfolio over Planning Period
Conduct Audit
Conduct SWOT Analysis
Assess Strengths and Weaknesses
Define Critical Success Factors

■ Automotive

Critical Success Factors

	Factor	Weight
1:	Quality	20
2:	Price	30
3:	Differentiation	10
4:	Image	20
5:	Support	20
6:		
	Total:	100

Define Critical Success Factors

Critical Success Factors (CSF's) are defined as the few key things which a competitor has to do right to succeed in a particular market segment. Examples of factors might be product performance, speed of service and price; a checklist follows at the end of this section. There will be a different set of CSF's for each market.

In the Critical Success Factor form for each market, you are asked to identify up to six CSF's and to put a percentage weighting against each one. Experience has shown that the number of factors should not exceed six to ensure that the analysis is understandable. The weighting represents the relative importance of each factor. The weights should add up to 100.

It is very important to make the factors and weights objectively represent the workings of the market. After all, one is identifying factors critical to the success of the business. They should be based on

Figure B2.5 DPM, and data form obtained from it

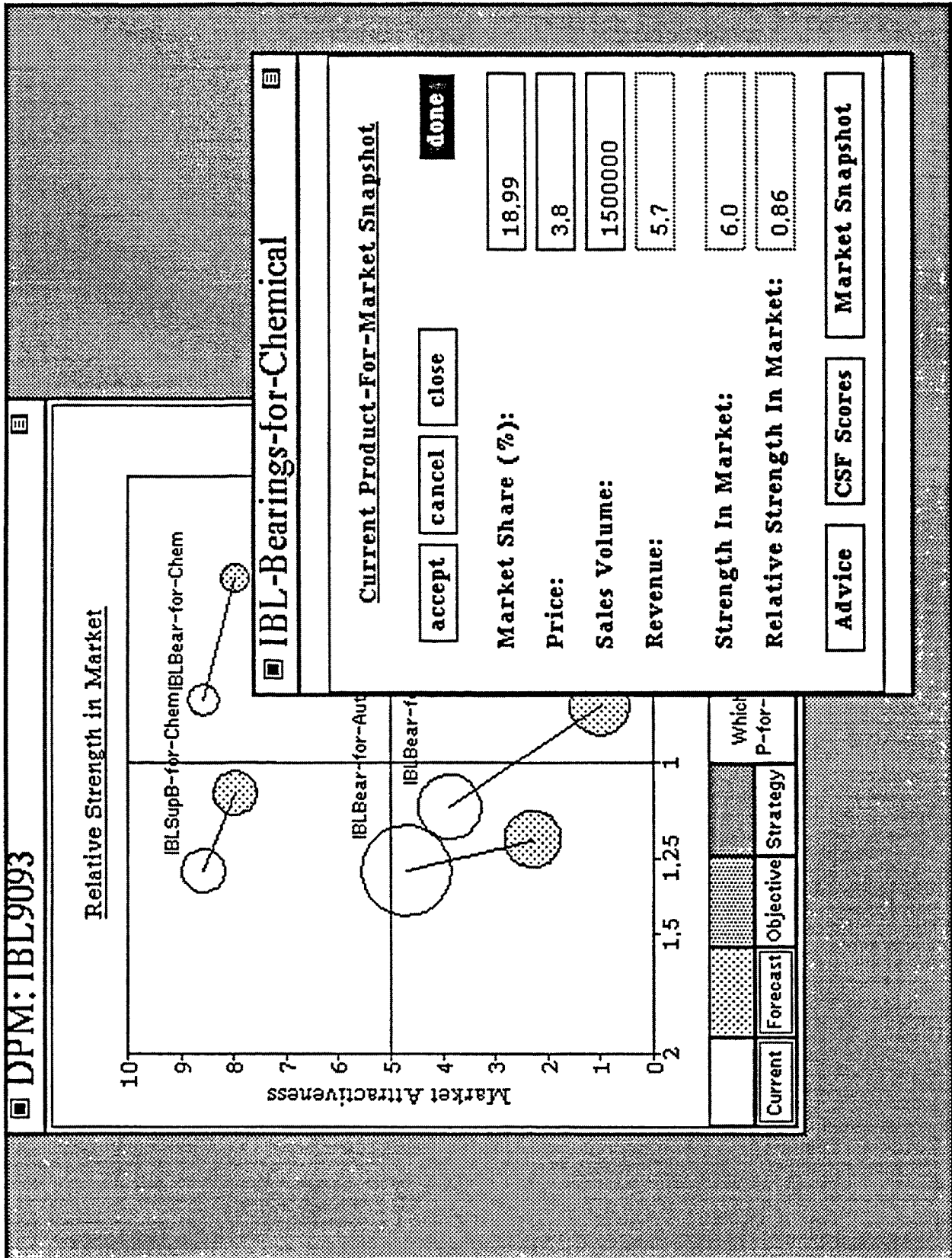


Figure B2.6 DPM advice

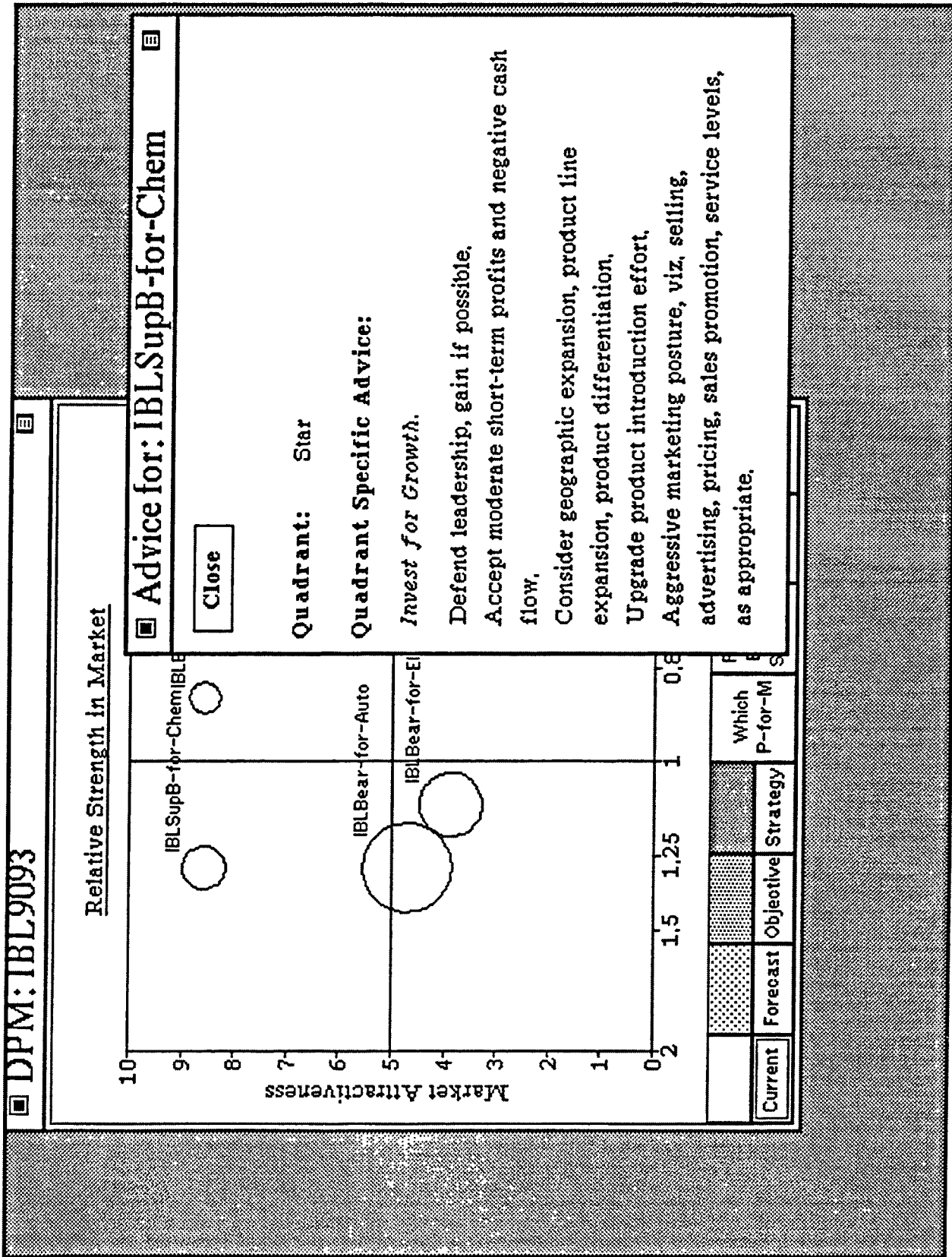


Figure B2.7 Gap gauge

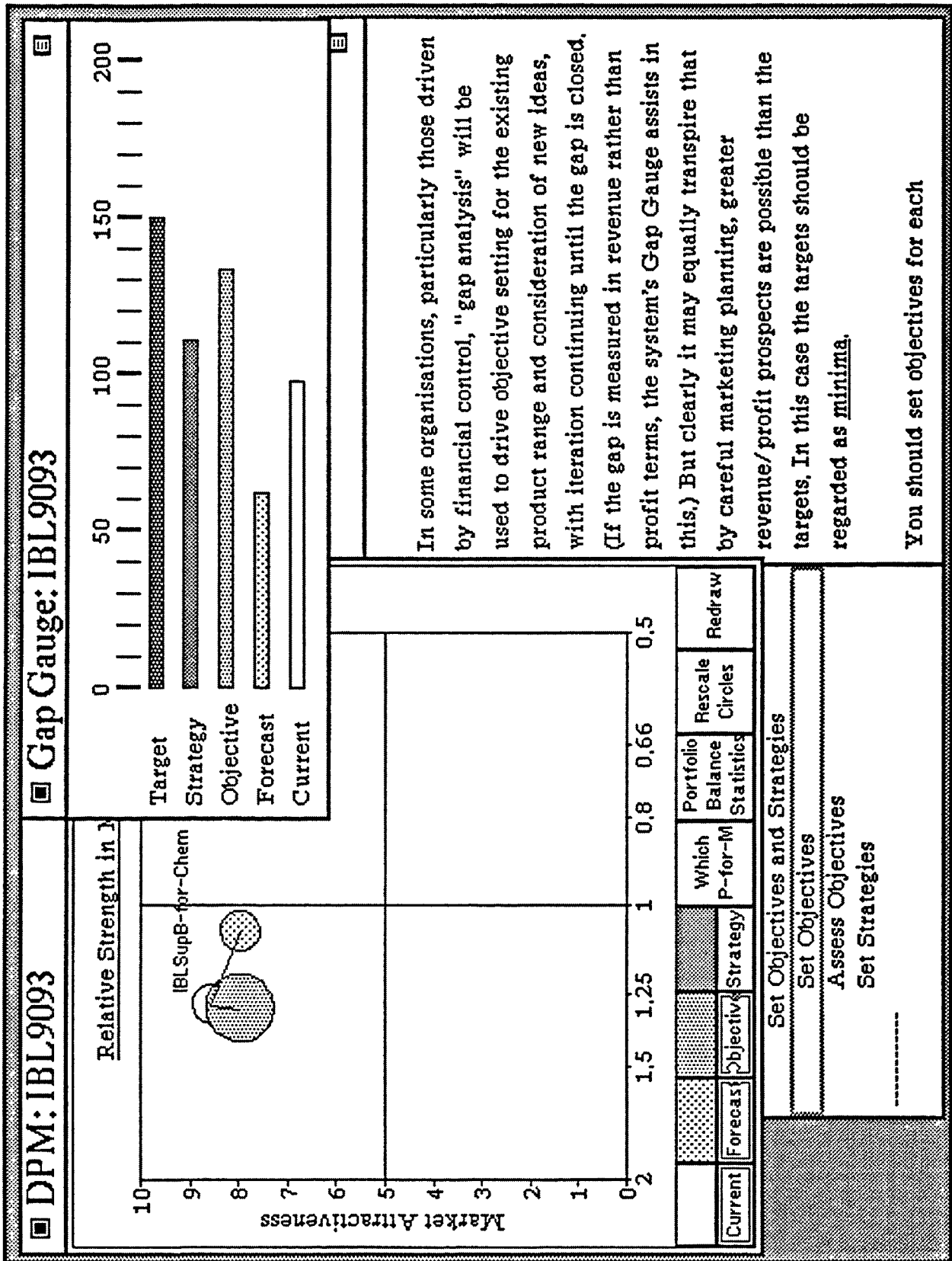


Figure B2.8 Defining strategies: CSF score changes and related text

Guidance Browser: IBL9093

Marketing Plan Document

System Guidance

Forecast

- Predict Relationship with Market
- Predict Critical Success Factor Scores
- Predict Market Attractiveness Scores
- Predict Sales
- Summarise Forecast
- Set Objectives and Strategies
- Set Objectives
- Assess Objectives
- Set Strategies

STRATEGIES

IBL Bearings for Chemical market

1. Match pricing of IndProd.

We need to accept low profit margins in order to build market share in this important market. Specific actions:

- a) Track IndProd pricing quarterly; Market Research Manager
- b) Set pricing levels within 5% of IndProd; Product Manager

	Factor	Weight	Score	Contribution	Competitor	Contribution
1:	Quality	20	6	1,2	7	1,4
2:	Price	30	8	2,4	8	2,4
3:	Differentiation	10	7	0,7	6	0,6
4:	Image	20	6	1,2	5	1,0
5:	Support	20	8	1,6	8	1,6
6:						
	Strength in Market :			7,1	Competitor:	7,0

Product-For-Market Snapshot

B3. MacroScope system

Contents:

- B3.1 Status display
- B3.2 Mission and objectives
- B3.3 Define markets
- B3.4 Ansoff matrix
- B3.5 CSF bar chart
- B3.6 Opportunities and threats
- B3.7 Directional policy matrix
- B3.8 Market size and revenue (Trends stage)
- B3.9 Market attractiveness (Trends stage)
- B3.10 Marketing objectives
- B3.11 Product life cycle (Objectives stage)
- B3.12 Strategies (1): CSF score changes
- B3.13 Strategies (2): associated actions
- B3.14 Assess marketing objectives
- B3.15 Gap Analysis
- B3.16 Plan parameters (1)
- B3.17 Plan parameters (2)

Figure B3.1 Status display

Close	Window	Business Unit	Audit	Trends	Assumptions	Status	Help
General							Objectives
Close	Window	Define Business Unit	Definitions	Prd-Mkt Life Cycle	Prd-Mkt Life Cycle	Crit Success Fctrs	Help
		Conduct Audit	Financial Perform	SWOT Analysis	Strs & Weaknesses	Strs & Weaknesses	
		Predict Trends	Summarise Audit	Financial Perform	SWOT Analysis	CSF Bar Chart	
		Assumptions	Summarise Trends	SWOT Analysis	CSF Bar Chart	Opps & Threats	
		Set Objectives & Strategies	Objs & Strats	Assess Objectives	Assumptions	Mrkt Size & Rev	
Plan	Prod-Mrkt	Key	Not Applicable	Not performed	partially complete	Prd-Mkt Life Cycle	
						Prd-Mkt Life Cycle	
						Outline Strategies	
						CSF Bar Chart	
						Secrets Meet Objs?	
						Complete	

EXMAR Current Selections
 Plan: INTBEAR Business Unit: IBL
 Product: Market: Product Category:
 Printing file ... Please wait

Figure B3.2 Mission and objectives

Close	Window	Define Business Unit	Mission and Objectives	Help
Complete your mission statement below Role or contribution of the unit		<input type="text" value="Public limited company"/>	Corporate/business unit objectives Enter the objectives that have been set for the final year of your planning period. If no objectives have been set leave blank	
Definition of the business		<input type="text" value="Industrial wheel components"/>	Target Revenue <input type="text" value="150000"/>	
Distinctive competence		<input type="text" value="Range of products/services satisfying total requirement of most customers"/>	Other objectives, in words <input type="text" value="Reduce reliance on undifferentiated segments to 60% by 1996"/>	
Indications for future direction		<input type="text" value="Selective acquisition
Differentiation where possible within same core business"/>	<input type="button" value="Update"/> <input type="button" value="Clear"/>	

Figure B3.3 Define markets

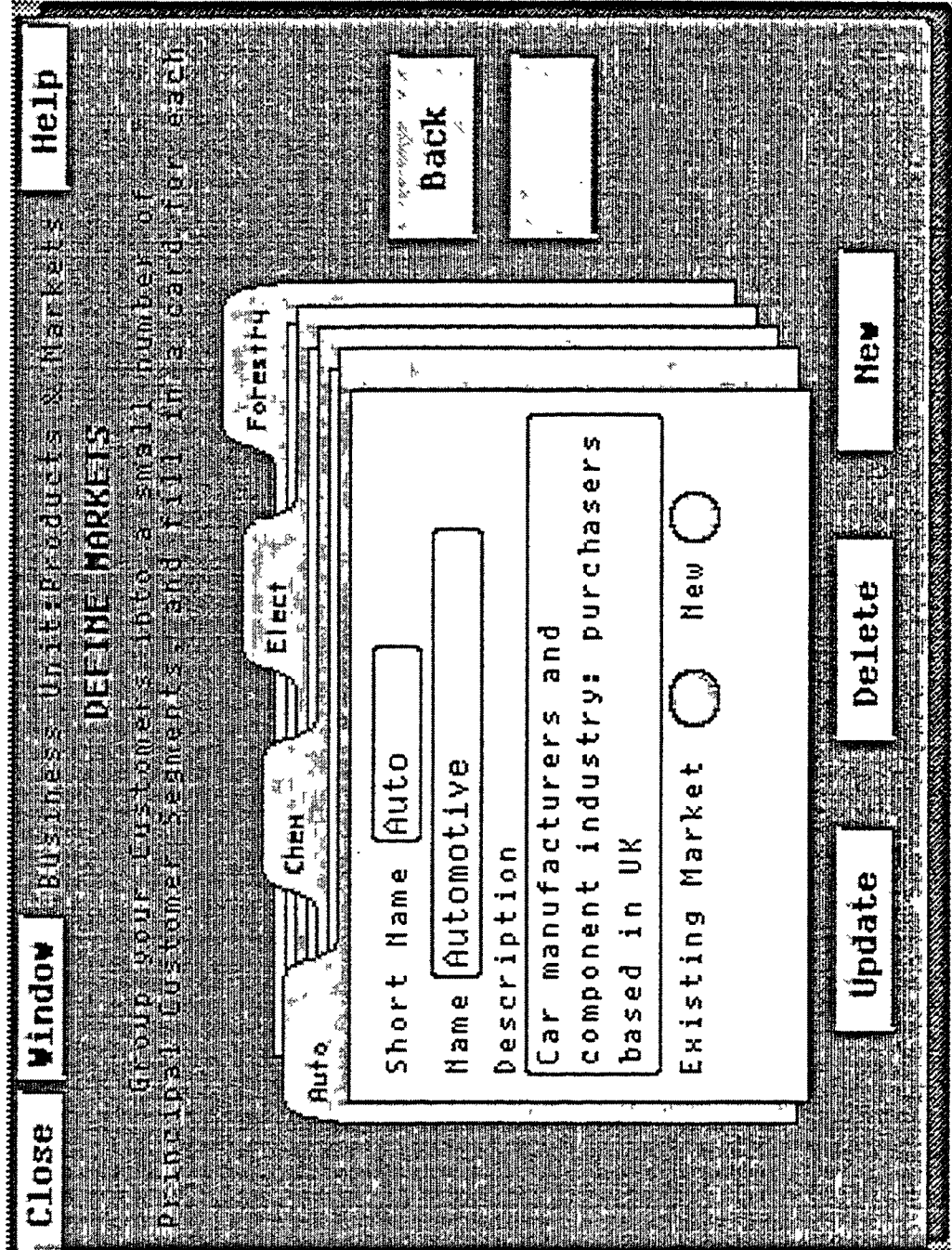


Figure B3.4 Ansoff matrix

Close Window Business Unit: Define Products and Markets Help

DEFINE WHICH PRODUCTS ARE SOLD INTO WHICH MARKETS BY SELECTING THEM WITH THE MOUSE

PRODUCTS MARKETS

KEY

PRODUCT OR MARKET

- EXISTING
- NEW

PRODUCT - MARKET

- PROD - SOLD INTO MARKET
- PROD - NOT SOLD INTO MARKET

OTHER PRODUCT - MARKET

Figure B3.5 CSF bar chart

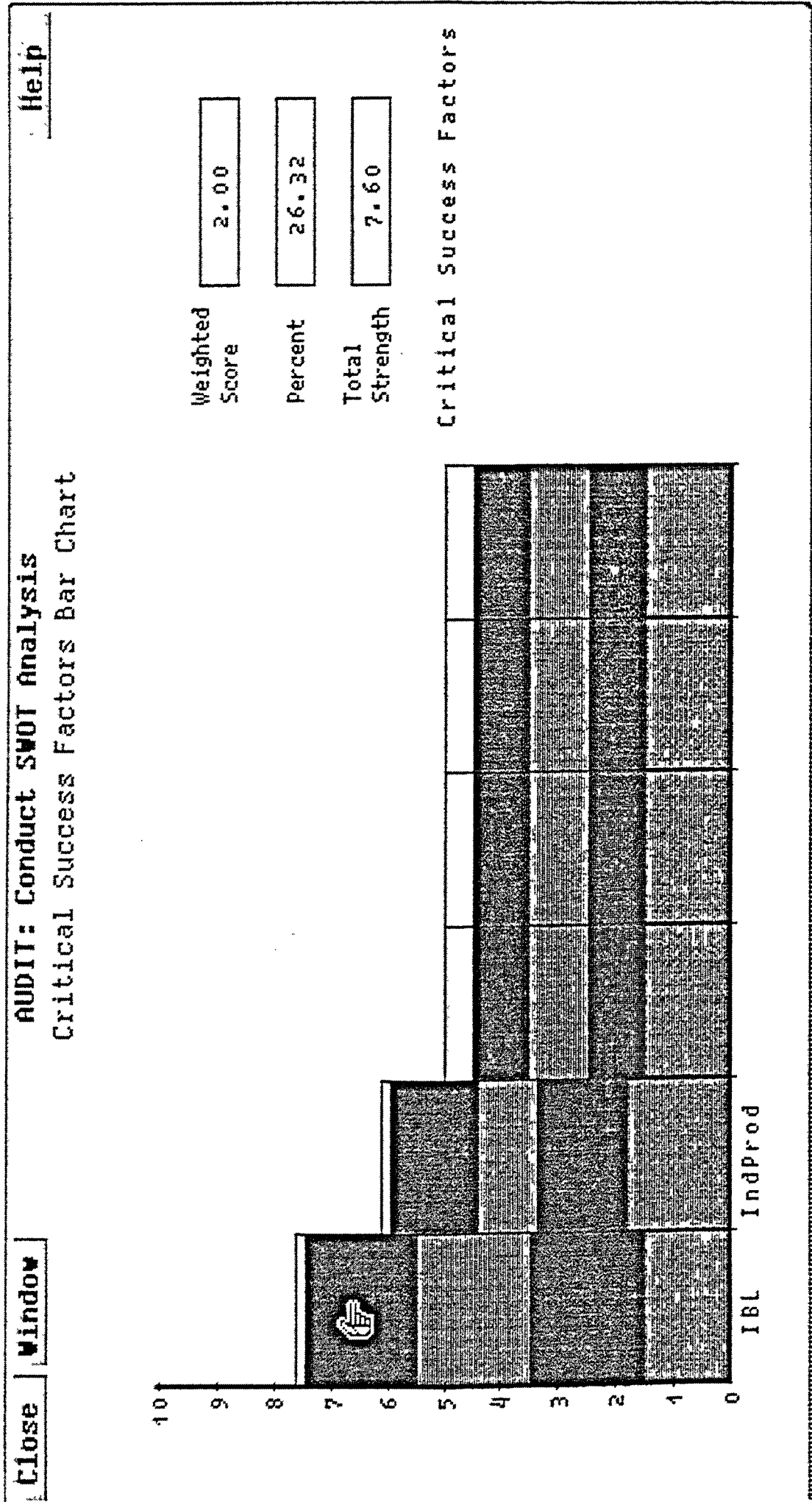


Figure B3.6 Opportunities and threats

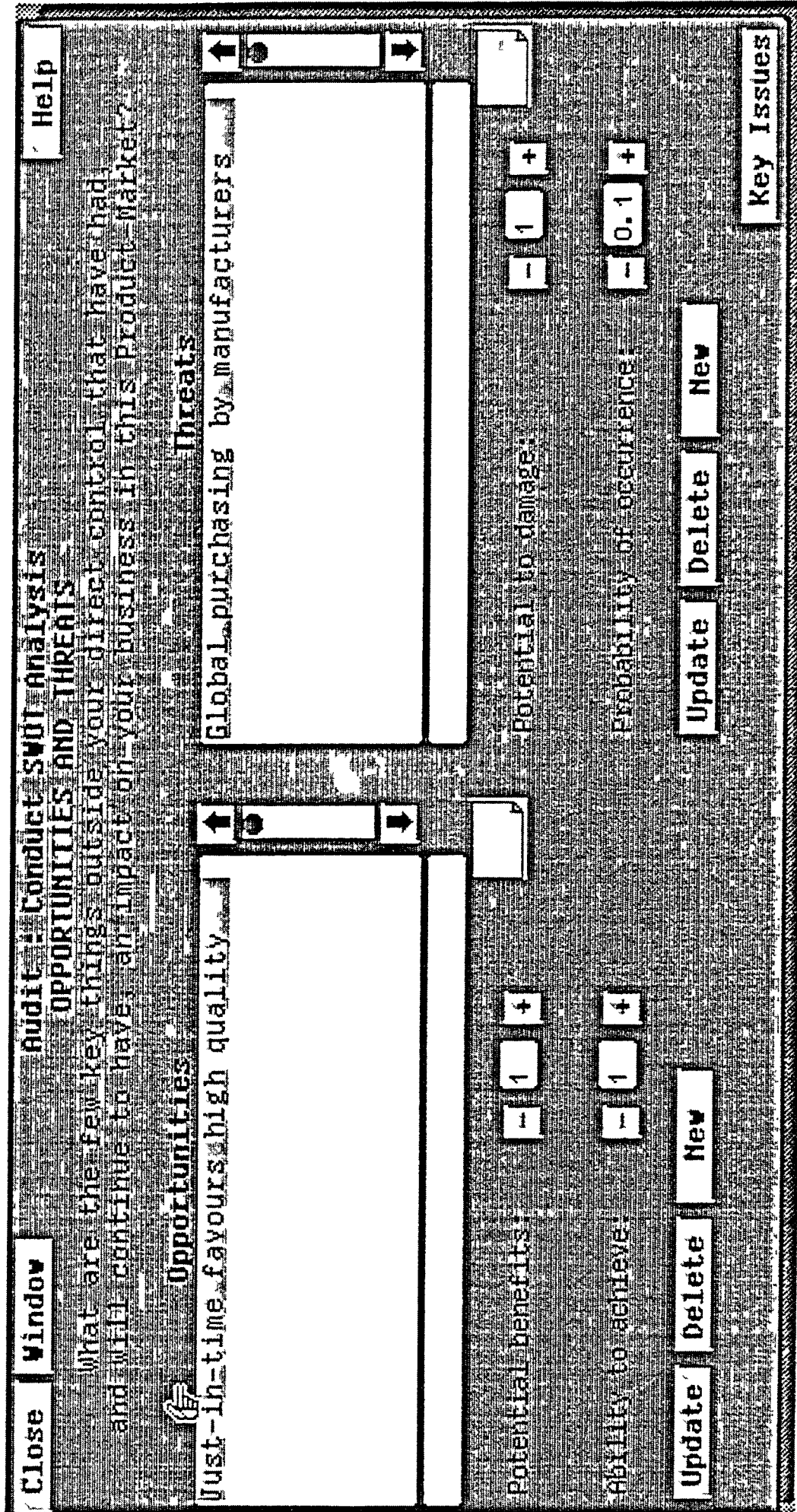


Figure B3.7 Directional policy matrix

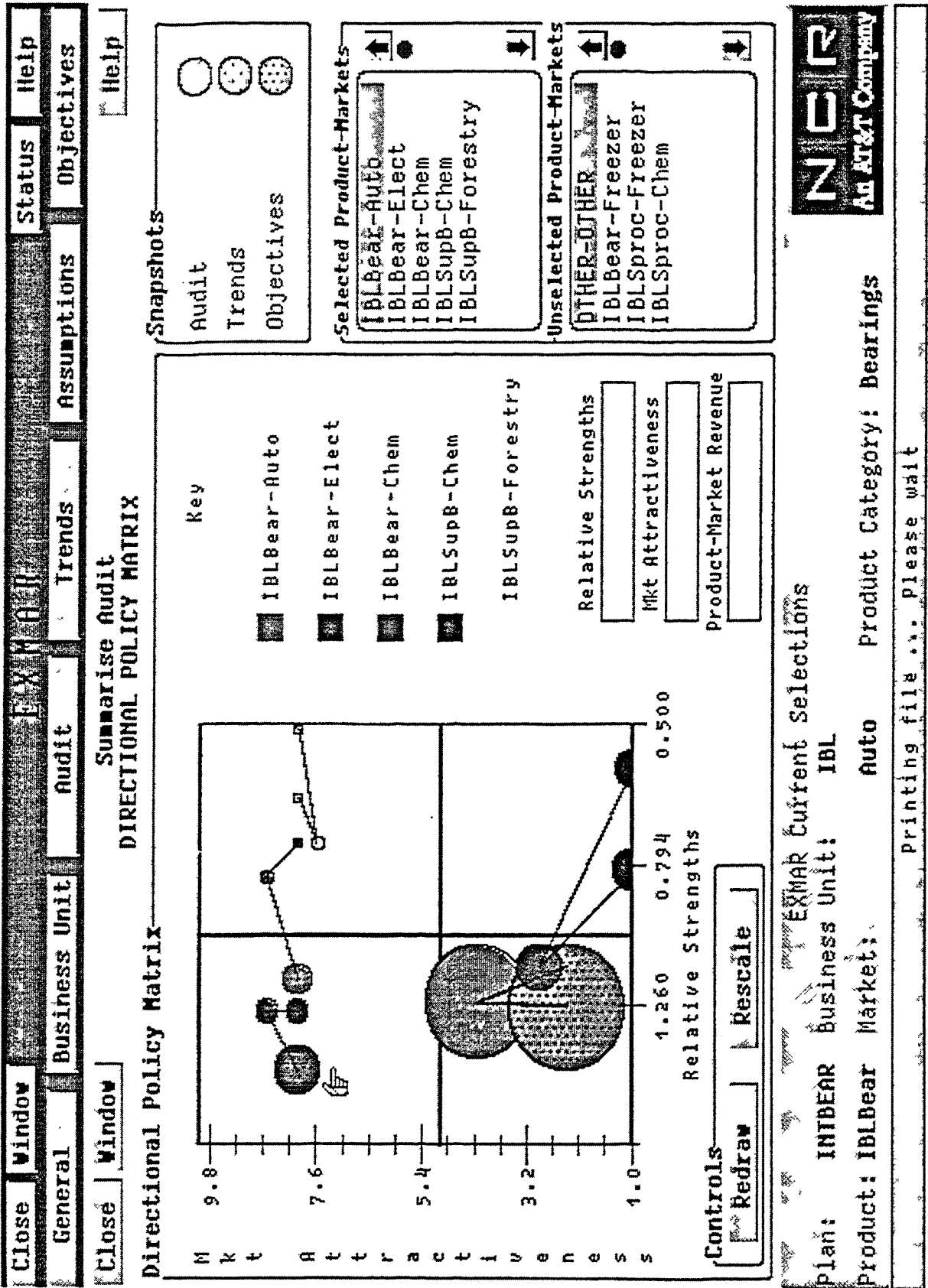


Figure B3.8 Market size and revenue (Trends stage)

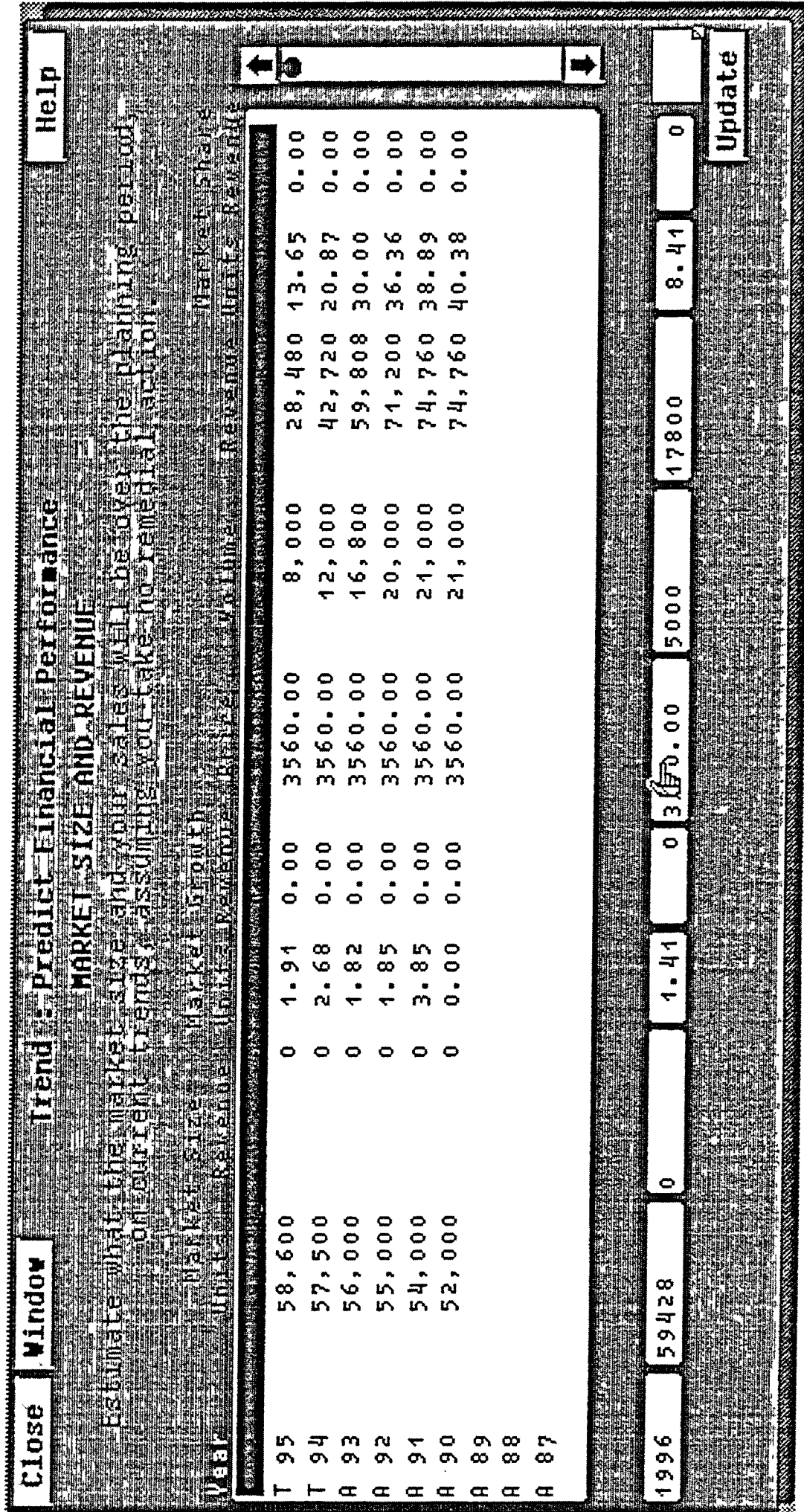


Figure B3.9 Market attractiveness (Trends stage)

Close
Window
Trends: Update SWOT Analysis
Help

Will any of your Product-Markets be more, or less, attractive at the end of the planning period? If so, make appropriate modifications.

MARKET ATTRACTIVENESS SCORES

Factor: Compet. Growth Profit. Size Vulnerab

Weighting: 15 25 30 15 15

Scoring Criteria:

Product-Market

Product-Market	Compet.	Growth	Profit.	Size	Vulnerab
IBLBear-Freezer	4	10	10	1	9
IBLBear-Auto	1	2	3	10	8
IBLBear-Chem	8	10	9	6	9
IBLBear-Elect	1	1	1	6	9
IBLSproc-Freezer	8	5	10	2	8
IBLSproc-Chem	6	5	3	3	6

Product-Market:

Compet. Growth Profit. Size Vulnerab

Copy current to trend

Update

Figure B3.10 Marketing objectives

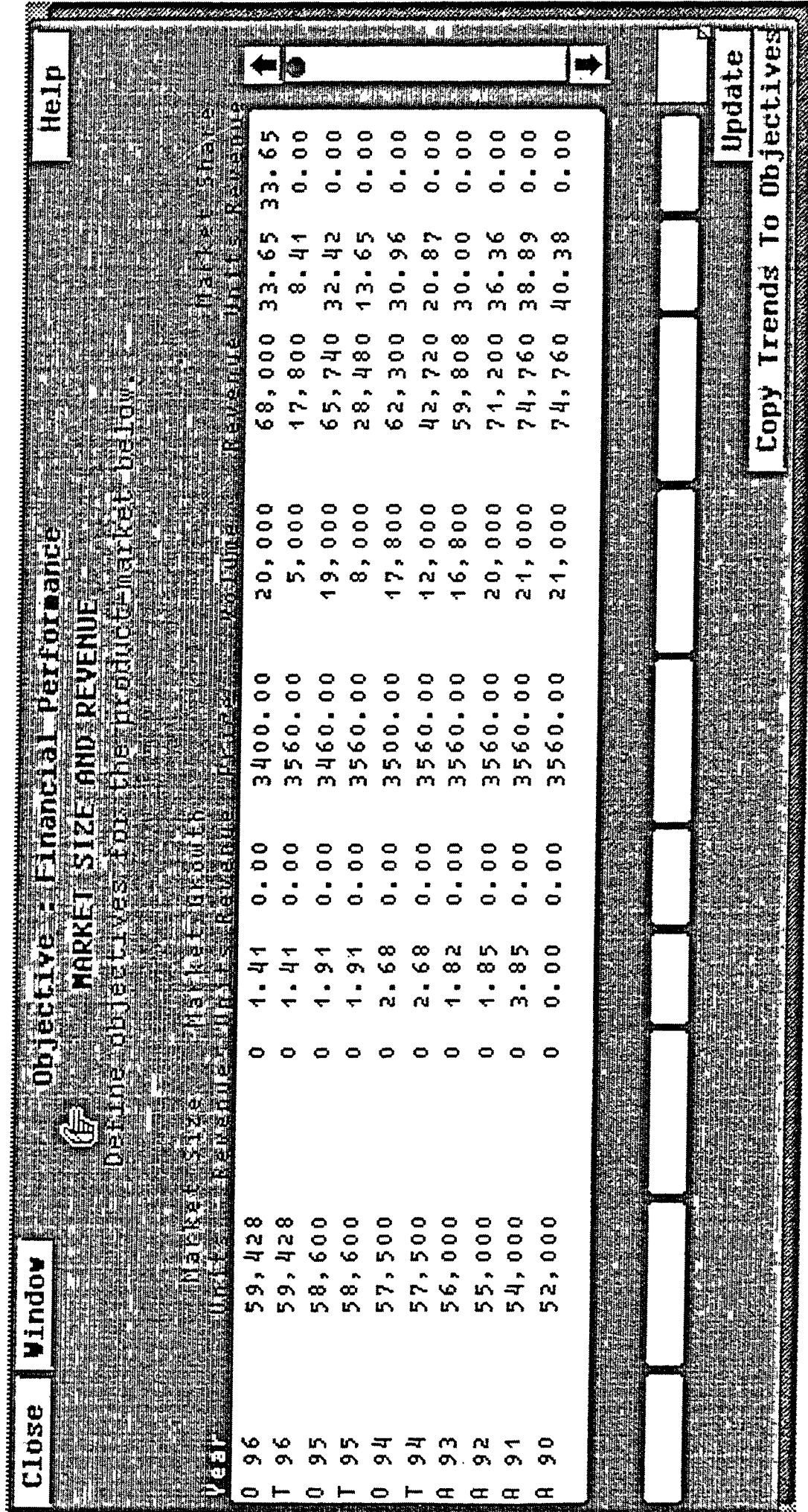


Figure B3.11 Product life cycle (Objectives stage)

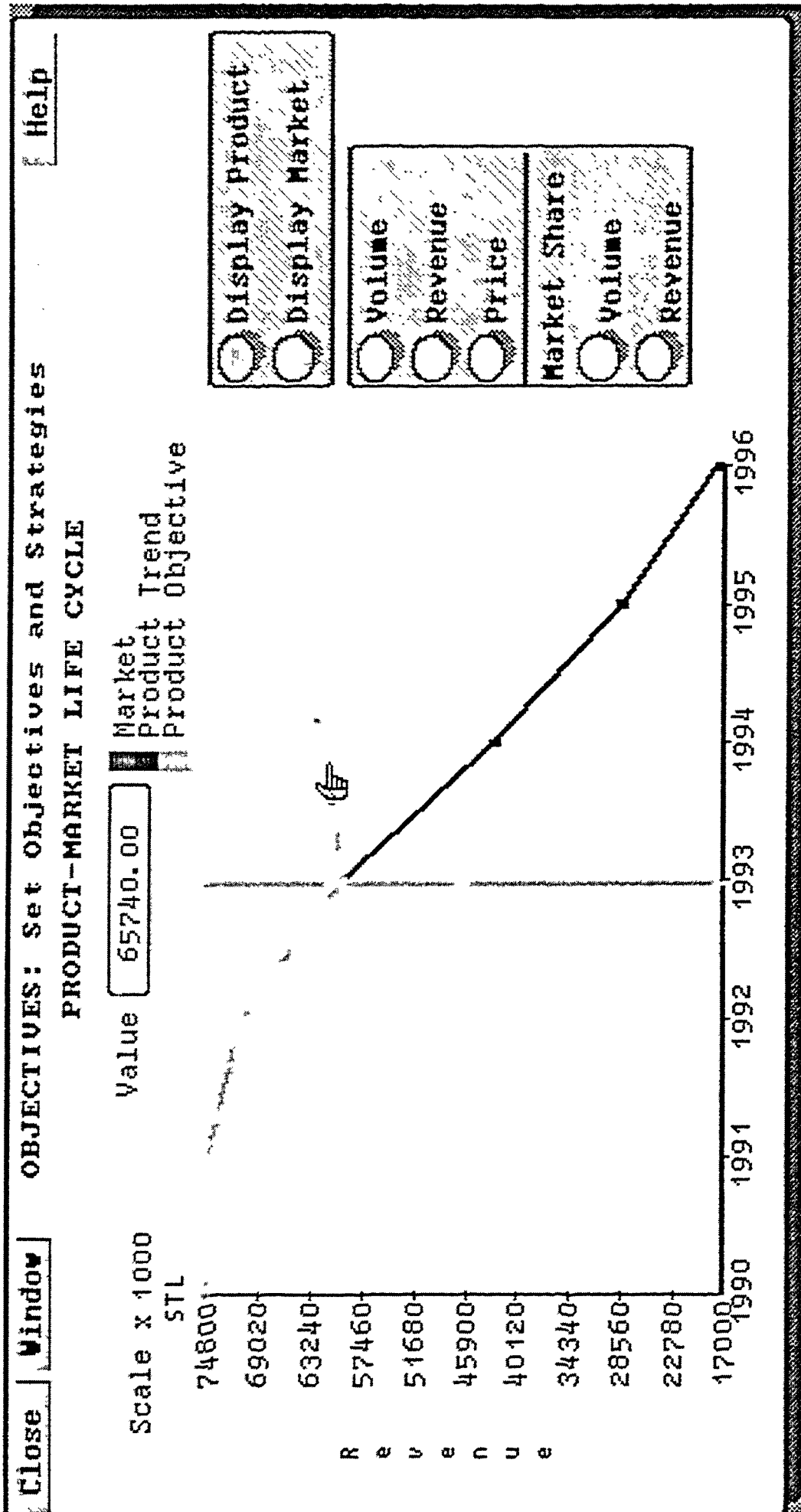


Figure B3.12 Strategies (1): CSF score changes

Close Window
Set Objectives and Strategies
Help

Select the CSF Score you propose to change.
 Click other strategy if no CSF score is to be changed.

Competitor Name

Product Name (Optional)

Competitor Analysis

Critical Success Factor Weight

IndProd

IBLBear

Self

1 Comp

2 Comp

3 Comp

4 Comp

5

IBL

IBLBear

Self

1 Comp

2 Comp

3 Comp

4 Comp

5

5

5

5

5

5

5

5

5

	20	10	10	5	5	5	5	5
Quality								
Price	30	3	6	6				
Differentiation	10	1	6	1				
Image	20	10	8	9				
Support	20	10	10	8				
Weighted Average	7	8	6.3	5	5	5	5	5

Critical Success Factor Weight

IBL Scores

CSF Scores

5

5

5

5

5

5

5

Other Strategy

Copy Trend to Strategy

Key Issues

Strategy Detail

Update

Figure B3.13 Strategies (2): associated actions

Close Window
Business Unit
Audit
Trends
Assumptions
Status
Help

Close Window
Set Objectives and Strategies
Help

I) Select the CSF Score you propose to change

II) Click other strategy if no CSF score

Competitor Name: IBL

Product Name (optional): IBLBear

Competitor Analysis: Self

Critical Success Factor: Weight: 0

Quality: 20 10 10

Differentiation: 10 1 6

Image: 20 10 8

Support: 20 10 10

Weighted Average: 7 8

Critical Success Factor: Weight: 30

Price: 6

Other Strategy: Copy Trend to Strategy

Plan: INTBEAR Business Unit: IBL
EXMAR Current S

Product: IBLBear Market: auto
Product Category: Bearings

Printing file ... Please wait
An AT&T Company

Figure B3.14 Assess marketing objectives

Close
Window
Help

Objective - Financial Performance

MARKET SIZE AND REVENUE

Now compare the impact on sales of the strategies you have defined with the product market objectives shown below.

Year	Market Size Units	Market Growth Units	Revenue Units	Units	Units	Revenue Units	Units	Revenue Units	Units
O 96	59,428	0	1.41	0.00	3400.00	20,000	68,000	33.65	33.65
T 96	59,428	0	1.41	0.00	3560.00	5,000	17,800	8.41	0.00
O 95	58,600	0	1.91	0.00	3460.00	19,000	65,740	32.42	0.00
T 95	58,600	0	1.91	0.00	3560.00	8,000	28,480	13.65	0.00
O 94	57,500	0	2.68	0.00	3500.00	17,800	62,300	30.96	0.00
T 94	57,500	0	2.68	0.00	3560.00	12,000	42,720	20.87	0.00
A 93	56,000	0	1.82	0.00	3560.00	16,800	59,808	30.00	0.00
A 92	55,000	0	1.85	0.00	3560.00	20,000	71,200	36.36	0.00
A 91	54,000	0	3.85	0.00	3560.00	21,000	74,760	38.89	0.00
A 90	52,000	0	0.00	0.00	3560.00	21,000	74,760	40.38	0.00

It is your judgment they do not meet the criteria (no, through) the process (agree, unable) the goal (no, only) missed the objectives and make adjustments by the plan.

Update
Copy Trends To Objectives

Figure B3.15 Gap Analysis

Note: this screen snapshot includes an outstanding software bug in which 'product extension' should read 'market extension'.

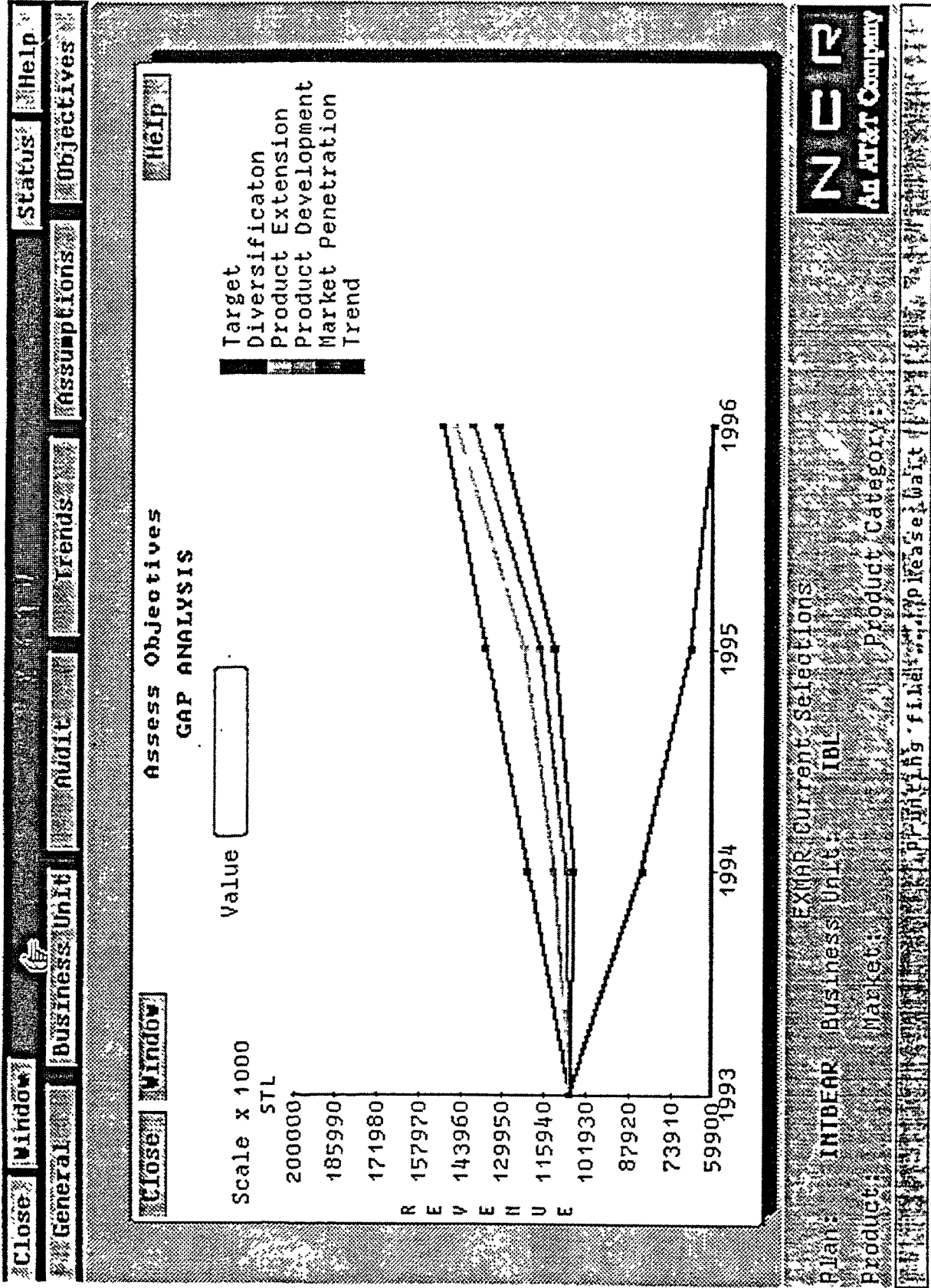
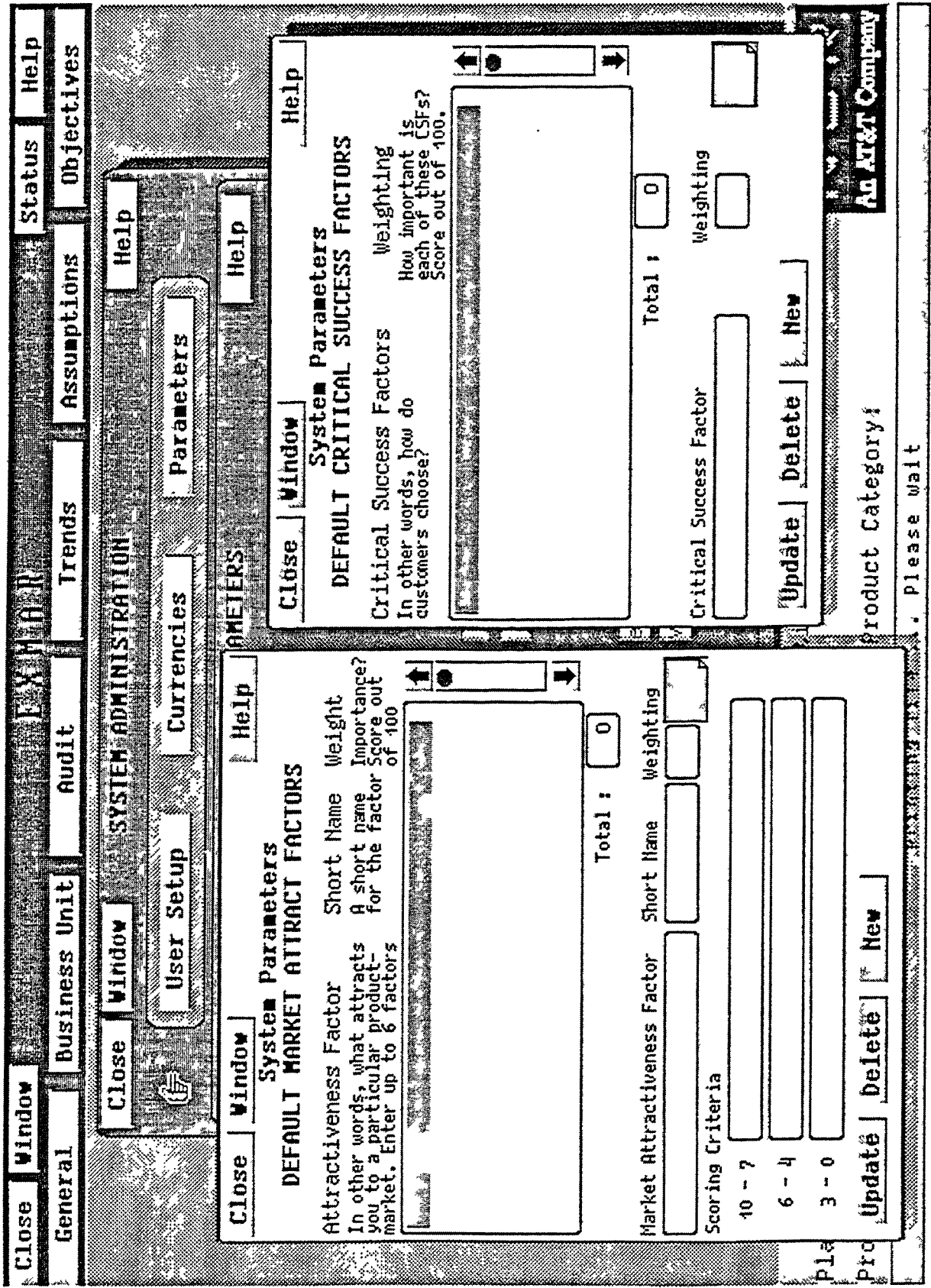


Figure B3.16 Plan parameters (1)

Close Window		PLAN PARAMETERS		Help	
Price Label	Price	Volume Label	Volume	CSFs	
Plan Length (years)	3	Year Format	1993-98		
Currency Code	ST2	Revenue multiplier	1,000		
Price multiplier	1	Price multiplier	1		
DPW Calculation	Average	DPW X Direction	From-High	Best Comp	
DPW X Label	Relative Strengths	DPW Y Direction	High-Low	High-Low	
DPW Y Label	Mkt Attractiveness	Use Categories	No	Yes	
					Update

Figure B3.17 Plan parameters (2)



B4. Visual Basic system

As described in chapter 5, this version of EXMAR resulted from coding by Strategic Marketing Systems Ltd to the author's specification. The cooperation of Strategic Marketing Systems Ltd, who own the copyright in the resulting programme, in reproducing these diagrams from the system is gratefully acknowledged.

Contents:

B4.1 Ansoff matrix and perceptual map

B4.2 Gap analysis

B4.3 Extracts from sample plan (1 of 4): contents

B4.4 Extracts from sample plan (2 of 4): market overview

B4.5 Extracts from sample plan (3 of 4): SWOT analysis

B4.6 Extracts from sample plan (4 of 4): Portfolio summary

Figure B4.1 Ansoff matrix and perceptual map

	Bearings	HighPerfB	Assemblies	Systems
Auto		Y		
Chemical				Y
Food	Y		Y	
Electrical	Y		Y	Y

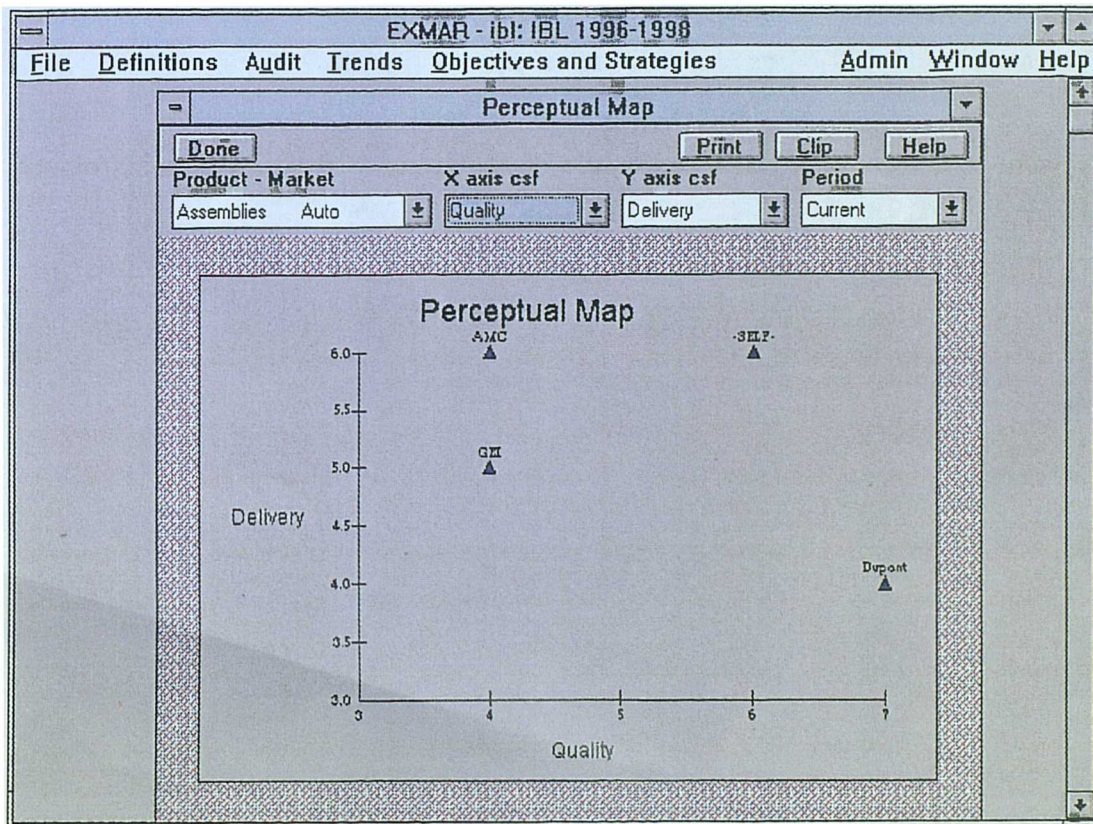


Figure B4.2 Gap analysis

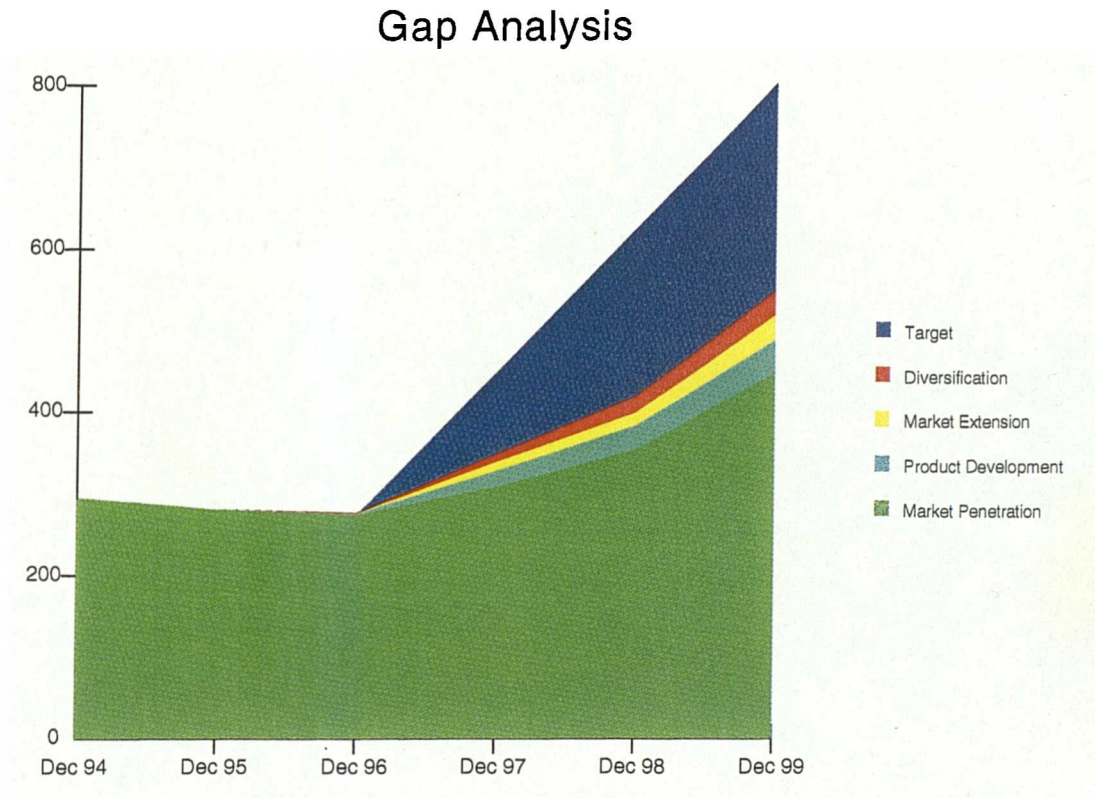


Figure B4.3 Extracts from sample plan (1 of 4): contents

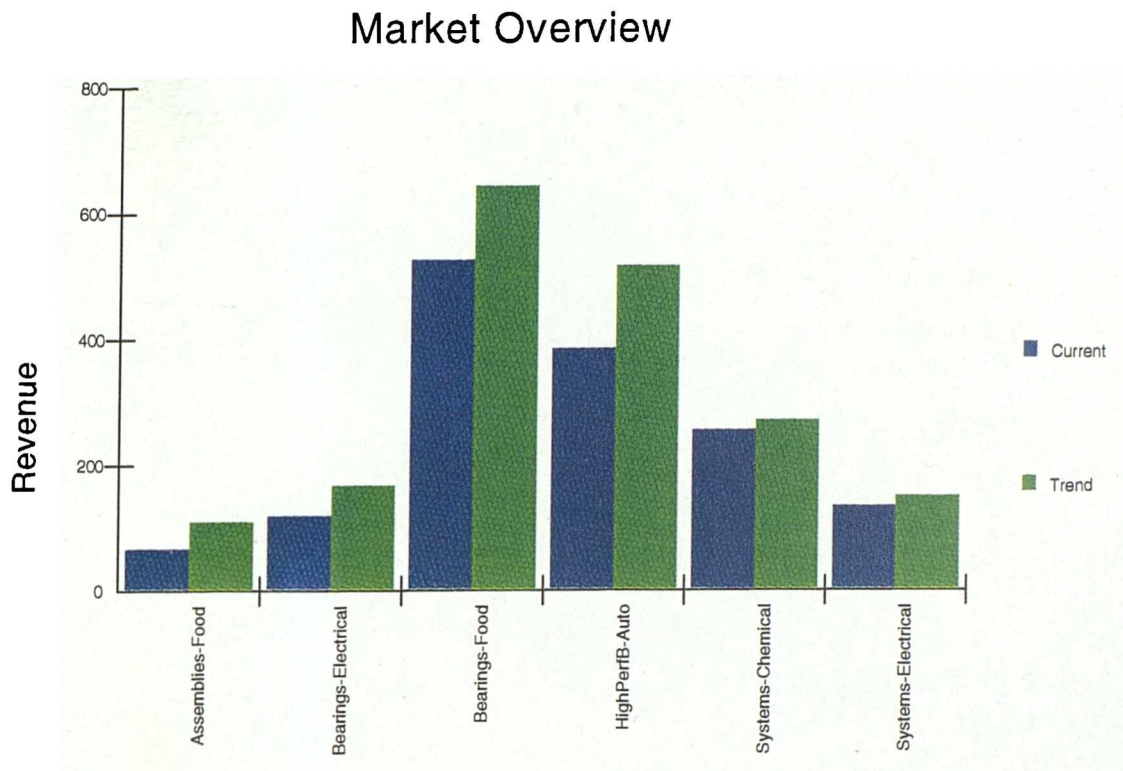
Strategic marketing plan: IBL 1997-1999

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2.1 Revenue and Market Share.....	2
2.2 Margin	2
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4. Market Overview	4
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5.2 Bearings - Electrical	7
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5.6 Systems - Electrical	11
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8.2 Bearings - Electrical	17
8.3 Bearings - Food.....	18
8.4 HighPerfB - Auto	19
8.5 Systems - Chemical	20
8.6 Systems - Electrical	21

Figure B4.4 Extracts from sample plan (2 of 4): market overview

4.2 Market Size Comparison



4.3 Market Attractiveness

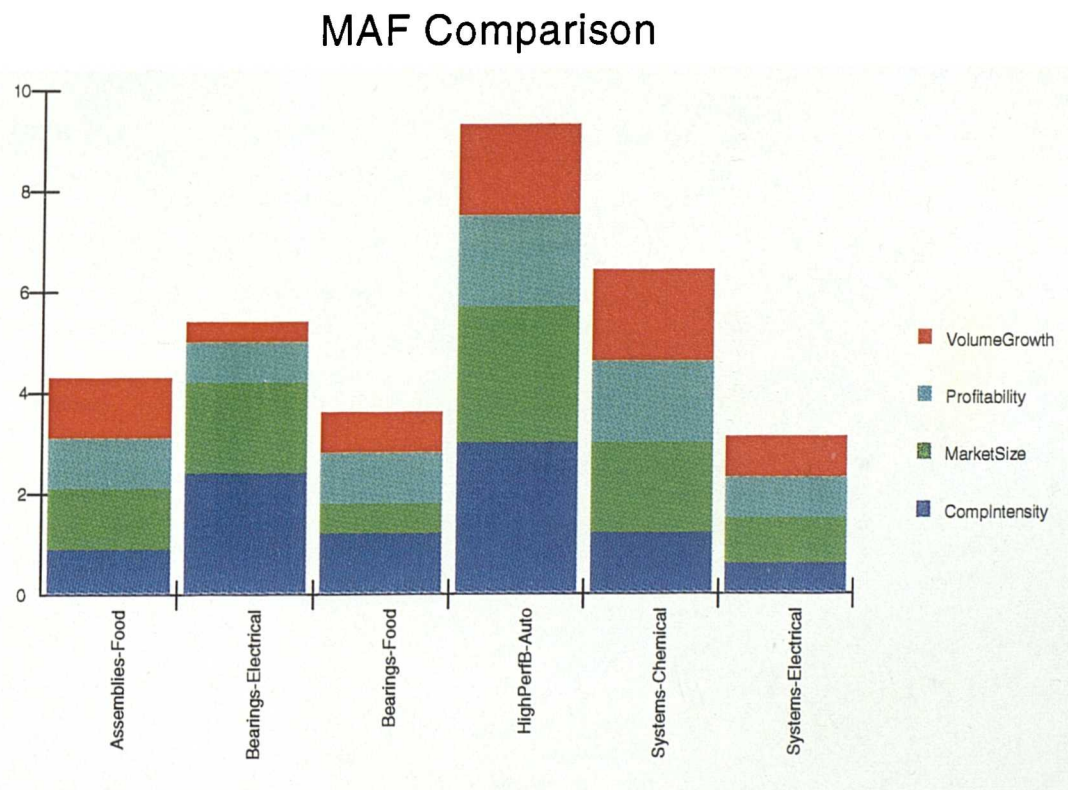
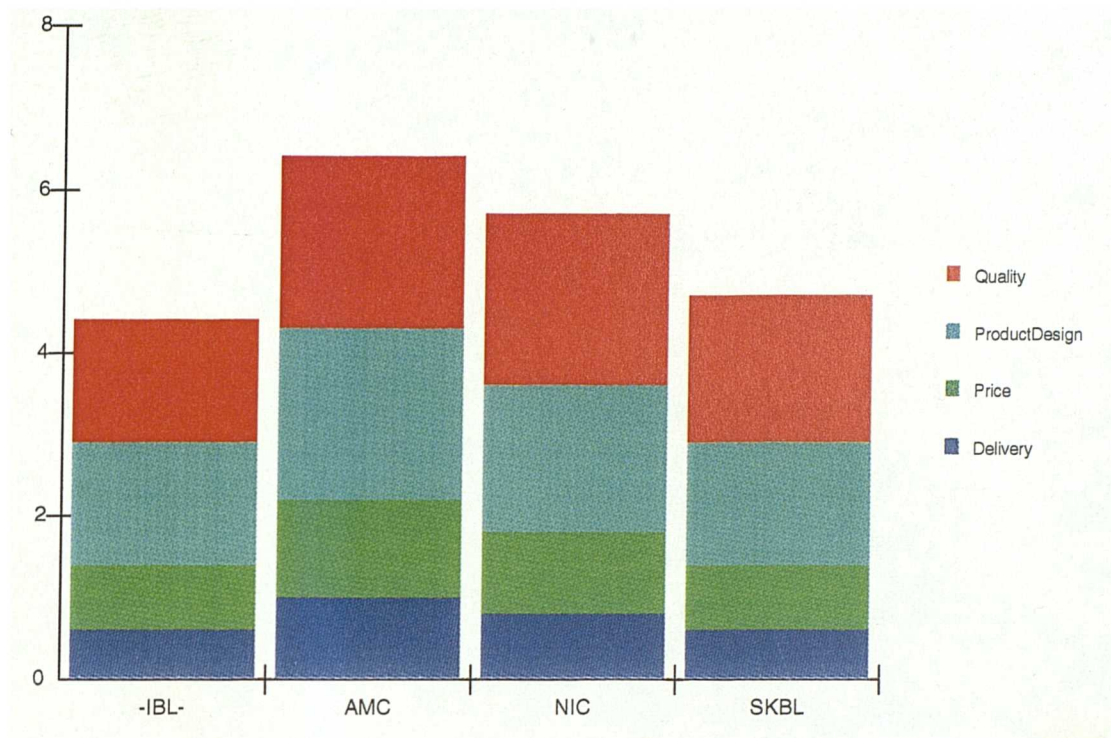


Figure B4.5 Extracts from sample plan (3 of 4): SWOT analysis

5.2 Bearings - Electrical

CSF Comparison



Opportunities and Threats

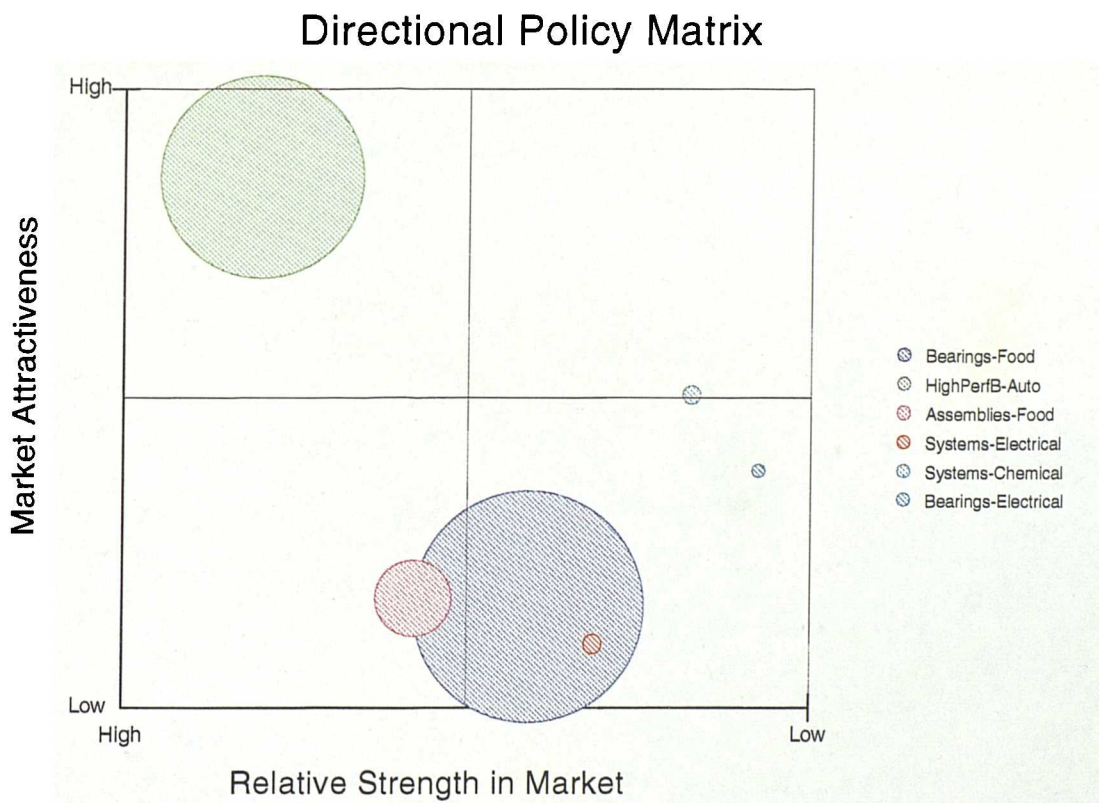
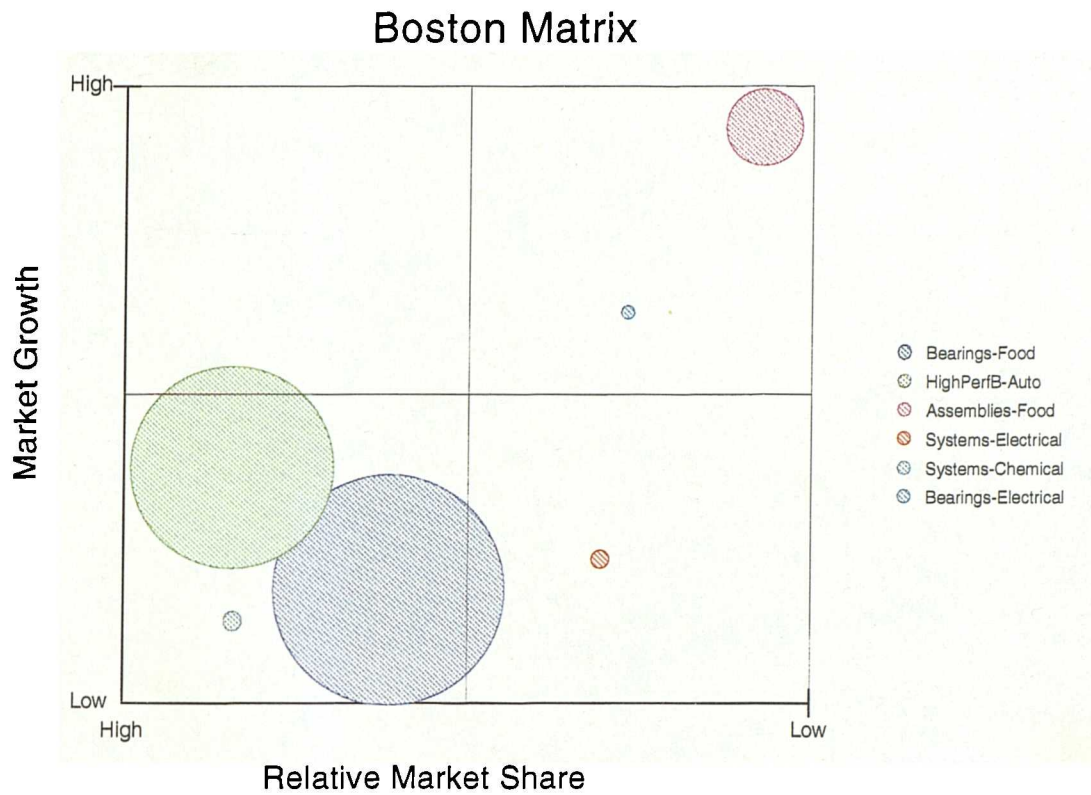
Opportunities	Use new distribution system to match AMC delivery Address perceived price difficulties through selective discounts to major accounts and sales materials emphasising lifetime cost
Threats	Continuing success of rivals' quality initiatives Possible price war when trade barriers reduced next year
Key Issues	Regain quality/design high ground while maintaining service leadership Modification of pricing strategy to increase penetration of selective accounts

Competitor Analysis: AMC

Summary of strengths	High perceived quality following previous difficulties Good bespoke design skills Aggressive pricing
Summary of weaknesses	While service not currently a major issue in this market, AMC probably weak here Some major accounts reluctant to use due to past experience - lingering image problem
Business Direction and current Objectives/Strategies	Continue market share strategy with investment as necessary

6. Portfolio summary

6.1 Current situation



C. Questionnaire

There follows a copy of the questionnaire used in the survey of Exmar users.

EXMAR USERS' QUESTIONNAIRE

This questionnaire is for each person who has been involved with Exmar in your organisation, whatever your involvement has been - whether, for example, as a hands-on user, a participant in an Exmar-aided planning session, a recipient of reports incorporating Exmar output, a director/manager of Exmar users, or an executive evaluating the system. It is designed to discover your **personal views** about Exmar, rather than the views of the organisation.

For the purposes of this questionnaire, the following terms are used.

- Marketing planning is the planned application of marketing resources to achieve marketing objectives.
- Marketing objectives are the targets or goals to be pursued and achieved within a given time period.
- A marketing plan is a written statement of these objectives and how they are to be achieved.

How to complete the questionnaire:

Please answer all the questions

There are no right or wrong answers - just answer according to your current views

*Many of the questions ask for a response on a scale of 1 (you **strongly disagree** with the statement) to 5 (you **strongly agree** with the statement). Please circle one number that most closely corresponds to your views*

When considering questions relating to your organisation, assume each applies to the organisational unit most relevant to you, for example the corporate whole, a single business unit, or a division

Finally, return the questionnaire in the pre-paid envelope provided.

Data gathered through this questionnaire will be treated in the strictest confidence. No information that would identify a company or an individual will be provided to Exmar developers, distributors, or indeed to anyone other than the researchers.

		Strongly Disagree				Strongly Agree
EFFECT ON THE PLANNING PROCESS						
1	Because of Exmar's focus on certain marketing tools and techniques, we use a narrower range of them than we did before	1	2	3	4	5
2	Consistent use of Exmar within an organisation would ensure that a consistent logical process is followed at all levels	1	2	3	4	5
3	Using Exmar leads to more effective use of marketing tools and techniques	1	2	3	4	5
4	Exmar forces you to use too rigid a planning process	1	2	3	4	5
5	Exmar ensures that common pitfalls in marketing planning are avoided	1	2	3	4	5
6	Our procedures for marketing planning in this organisation are so structured that they act as a hindrance rather than a help	1	2	3	4	5
7	Exmar guides the user through a logical process, ensuring key aspects are covered	1	2	3	4	5
EFFECT ON UTILISATION OF DATA						
8	Due to Exmar, more of the information I need in marketing planning is available	1	2	3	4	5
9	Due to Exmar, less of the relevant data is considered in marketing decisions	1	2	3	4	5
10	Exmar highlights areas where further information is required	1	2	3	4	5
11	The system provides a useful central point for key data	1	2	3	4	5
12	Exmar reduces the accuracy of information used in planning	1	2	3	4	5
13	It takes longer to obtain the information I want with Exmar than without it	1	2	3	4	5
EXPLORING ALTERNATIVE STRATEGIES						
14	When planning for a product/market, the route to be taken is normally clear from our previous strategy	1	2	3	4	5
15	With Exmar, you consider fewer alternative strategies than you would using pen and paper	1	2	3	4	5
16	Exmar provides the "fresh pair of eyes" that is essential if planning is to be able to break the accepted truths that have been built up by the organisation	1	2	3	4	5

		Strongly Disagree				Strongly Agree
17	During marketing planning in this organisation, a number of alternative strategies are considered in depth	1	2	3	4	5
18	With Exmar, alternative approaches are considered in less detail than would happen without the system	1	2	3	4	5
TIME USAGE						
19	I have sufficient time to devote the effort needed to marketing planning	1	2	3	4	5
20	Exmar leads to less efficient use of management time	1	2	3	4	5
21	Exmar relieves time constraints when planning	1	2	3	4	5
22	Our planning process is compressed into too short a period	1	2	3	4	5
23	Exmar reduces the amount of time required to complete a plan	1	2	3	4	5
24	Exmar reduces the time needed to update a plan for subsequent years	1	2	3	4	5
25	Exmar increases the time spent on clerical/secretarial activities supporting marketing planning	1	2	3	4	5
COMMUNICATION EFFECTIVENESS						
26	Functions other than marketing are extensively involved in the marketing planning process	1	2	3	4	5
27	Exmar makes it more difficult to understand points made by each other when planning	1	2	3	4	5
28	Exmar increases the isolation of the marketing function from other functions such as operations	1	2	3	4	5
29	Each marketing plan in our organisation is primarily produced by one individual	1	2	3	4	5
30	Exmar leads to a less equal level of participation between executives involved in marketing planning	1	2	3	4	5
31	The system increases the degree of consensus about conclusions reached during planning	1	2	3	4	5
32	Exmar leads to greater agreement on the process for the development of a marketing plan	1	2	3	4	5
33	Exmar is normally used by a single individual rather than a group	1	2	3	4	5

	Strongly Disagree				Strongly Agree
34 Marketing planning discussions become less focused on the task in hand when Exmar is used	1	2	3	4	5
PLAN QUALITY					
35 In this organisation, the marketing plan may document what objectives are to be achieved, but it does not specify how they are to be achieved	1	2	3	4	5
36 You can easily pick out the important points in our marketing plans	1	2	3	4	5
37 The intervention required to achieve objectives is better documented when Exmar is used	1	2	3	4	5
38 Exmar increases the problem of marketing plans containing too much detail	1	2	3	4	5
39 When plans are produced with Exmar's assistance, the really critical information can be identified more easily	1	2	3	4	5
40 Exmar increases my confidence in marketing planning decisions	1	2	3	4	5
41 Our marketing plans contain too much detail	1	2	3	4	5
LEARNING EFFECTS					
42 Exmar has given me a better idea of the necessary steps in marketing planning	1	2	3	4	5
43 Exmar spreads marketing planning knowledge and expertise throughout the organisation	1	2	3	4	5
44 It's easier for the organisation to preserve and build up its marketing knowledge and expertise if it doesn't use Exmar	1	2	3	4	5
45 Exmar increases understanding of one's markets and the organisation's place within them	1	2	3	4	5
46 Use of Exmar has increased my knowledge of marketing tools and techniques	1	2	3	4	5
47 Due to Exmar, we are now more confused over definitions of planning terms	1	2	3	4	5
MARKETING PLANNING WITHIN THE ORGANISATION					
48 Senior management fully understand the concept and role of marketing	1	2	3	4	5
49 The information needed to plan effectively is not available	1	2	3	4	5

	Strongly Disagree				Strongly Agree
50 Top management are unwilling to think beyond today's needs or problems	1	2	3	4	5
51 Strategic goals are clearly defined by top-level management at the start of the planning process	1	2	3	4	5
52 Senior managers provide adequate feedback on proposed strategies during development of marketing plans	1	2	3	4	5
53 Plans are followed through to turn them into action	1	2	3	4	5
54 Senior management comprehend and support the principle of marketing planning	1	2	3	4	5
55 Once produced, our marketing plans sit on a shelf unread until next year	1	2	3	4	5
56 Due to Exmar, senior management's support for marketing planning has increased	1	2	3	4	5
57 Our marketing plans are implemented better due to Exmar	1	2	3	4	5
58 Communications between planners and senior management are direct and frequent	1	2	3	4	5
59 Exmar has kept planning live rather than being a once a year exercise never again referred to	1	2	3	4	5
60 Exmar reduces top management's involvement in the marketing planning process	1	2	3	4	5
EXMAR IMPLEMENTATION					
61 I was given sufficient training to use Exmar	1	2	3	4	5
62 Top management feels that the time and resource spent on Exmar is wisely invested	1	2	3	4	5
63 I can get adequate support on how to use Exmar	1	2	3	4	5
64 Senior management is strongly in favour of the concept of Exmar	1	2	3	4	5
ATTITUDE TOWARDS MARKETING PLANNING					
65 I am more daunted by the task of marketing planning due to Exmar	1	2	3	4	5
66 Marketing planning is essential in the increasingly competitive business environment that exists today	1	2	3	4	5
67 My enthusiasm for marketing planning has increased due to Exmar	1	2	3	4	5

		Strongly Disagree				Strongly Agree
68	I have a thorough understanding of marketing tools and techniques	1	2	3	4	5
69	I have a thorough understanding of the marketing planning process	1	2	3	4	5
EXMAR'S EASE OF USE						
70	Exmar is easy to learn	1	2	3	4	5
71	I feel able to control Exmar	1	2	3	4	5
72	Exmar is clear and understandable	1	2	3	4	5
73	Exmar's user interface is flexible	1	2	3	4	5
74	It is hard to become skilful in operating Exmar	1	2	3	4	5
75	Exmar is difficult to use	1	2	3	4	5
OVERALL SATISFACTION						
76	Exmar does <i>not</i> offer significant help to marketing practitioners in the preparation of marketing plans	1	2	3	4	5
77	I have become dependent on Exmar	1	2	3	4	5
78	Exmar is extremely useful	1	2	3	4	5
79	As a result of Exmar, I am seen as more valuable in this organisation	1	2	3	4	5
80	All in all I think that Exmar is an important system for this organisation	1	2	3	4	5
81	I personally benefited from the existence of Exmar in this organisation	1	2	3	4	5
82	I have come to rely on Exmar in performing my job	1	2	3	4	5
83	Exmar offers the potential to help marketing practitioners significantly in the preparation of marketing plans after further development	1	2	3	4	5
84	Marketing planning is effective within this organisation	1	2	3	4	5
EXMAR PURCHASING						
85	To what extent were you involved in the decision to purchase Exmar?	No involvement	I was consulted	My purchase decision		
		1	2	3	4	5

ADDITIONAL INFORMATION

This section is designed to collect background information on your position within the organisation and your use of Exmar.

86 Name of your organisation _____

87 Name of your division/business unit (if appropriate) _____

88 Your name _____

89 Title of your position _____

90 Within which functional area are you employed?

- Marketing/sales
- Computing/IT
- Finance/accounting
- General management
- Production
- Technical
- Personnel
- Other (please specify) _____

91 For what period, if any, has your job included an involvement in marketing planning?

___ years ___ months (Enter 0 if none).

92 In what ways have you used Exmar? Tick all those that apply.

- Managed users of Exmar
- Operated the system personally
- Participated in planning session(s) in which Exmar was used, but where the system was operated by a colleague
- Collected information to input into Exmar
- Received information incorporating outputs from Exmar, e.g. marketing plans, reports, presentations
- Other (please specify) _____

93 What has been the purpose of your use of Exmar? Tick all those that apply.

- To evaluate Exmar's potential
- To aid in marketing planning
- To learn more about marketing planning
- Other (please specify) _____

94 Roughly how many hours have you spent operating Exmar, or participating in sessions where the system was used, in the last year? _____

95 How many months have you been using Exmar? _____

96 How many organisational levels are you below the chief executive or managing director of the organisation? _____

97 How many employees report to you, if any? (Enter 0 if none.) _____

98 What budget are you responsible for, if any? (Enter 0 if none.) _____

99 What plans have you produced, or helped to produce, with Exmar's assistance?

Strategic marketing plan(s) (> 1 year ahead). Specify planning period (years): _____

1-year marketing plan(s)

Corporate/business unit plan (> 1 year ahead). Specify planning period (years): _____

1-year corporate/business unit plan

Other (please list): _____ Planning period: _____

Please list any positive or negative effects of Exmar you do not feel have been adequately covered by this questionnaire.

Feel free to attach an additional sheet if you would like more space.

Are there any features of Exmar, or missing features, that in your view have an impact on how much Exmar is used, or how effective it is, in your organisation?

Are there any other factors that in your view have had an impact on how useful or effective Exmar is in your organisation?

Thank you for taking the time to complete this questionnaire.

D. Refereed Papers

This appendix contains double blind refereed academic papers on the research. All of these papers have been published jointly with my supervisor, Professor Malcolm McDonald. A note on our respective roles may be helpful. Papers 2 to 4 were drafted entirely by me, although my supervisor has naturally been influential in defining the research direction, discussing ideas and commenting on methodology, results and paper drafts. Paper 1 was drafted jointly. The papers are as follows:

1. McDonald, M.H.B. and Wilson, H.N. (1990) State-of-the-art Developments in Expert Systems and Strategic Marketing Planning. *British Journal of Management*, 1, 159-170.

Describes the EXMAR demonstrator version within the context of a discussion of the applicability of expert systems to marketing planning and of the senses in which the expert systems term can, and cannot, be applied to EXMAR. Also reflects on the development process leading to the demonstrator system.

2. Wilson, H.N. and McDonald, M.H.B. (1994a) Decision Support Systems as Learning Aids: The Case of Marketing Planning. Refereed paper, *Proceedings of the Marketing Education Group Annual Conference*, University of Ulster, 1028-1037.

Presents an early analysis of data from the EXMAR multiple-case study (chapter 8) relating to the system's hypothesised learning impact. This is placed within the context of a literature review of the role of decision support systems as learning aids and an exploration of the analogy of decision support systems as process consultants.

3. Wilson, H.N. and McDonald, M.H.B. (1994b) Critical Problems in Marketing Planning: The Potential of Decision Support Systems. *Journal of Strategic Marketing*, 2, 249-269.

Reviews the rationale for applying DSS to marketing planning (presented in more detail in chapters 2 and 3), and then presents findings from the EXMAR system design evaluation (discussed more briefly in chapter 6).

4. Wilson, H.N. and McDonald, M.H.B. (1996) Computer aided marketing planning: the experience of early adopters. Accepted for *Journal of Marketing Management*, scheduled for publication in Vol 12(5).

Presents results from the 'exploration of generality of findings' relating to planning systems for multiple product-markets (presented in more detail in chapter 9).

State-of-the-Art Developments in Expert Systems and Strategic Marketing Planning

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SUMMARY This paper describes a case history of the development of an Expert System in Strategic Marketing Planning codenamed EXMAR. It traces the evolution of the system from the formation of the DTI club two years ago to the launch of the prototype model. The paper outlines the technical and domain-specific obstacles encountered en route and how these were overcome. A number of conclusions are drawn from the project. The principal one is that there is a bright future for expert systems in the field of strategic management.

Professor Malcolm McDonald is the principal expert to the club. Hugh Wilson is a senior consultant with Artificial Intelligence Ltd. He was also the knowledge engineer and the project manager. For readers who would like a simple explanation of Expert Systems, please refer to Professor McDonald's paper 'Marketing Planning and Expert Systems: an Epistemology of Practice', *Marketing Intelligence and Planning*, 7, 7/8, 1989.

1. Introduction

Although Expert Systems in one form or another, have been around for nearly a quarter of a century, virtually no progress has been made in their application to the domain of marketing and there are few products and no on-line systems available (Moutinho, 1988; Foster, 1985). This is principally due to the prohibitive costs involved in building Expert Systems, and there are no shortcuts to building them. It takes a considerable amount of skill, patience and several years of effort to develop an Expert System in a new area and get it in the field (Cebzynski, 1987). It is even more difficult to consider building a system in a 'soft' domain such as marketing, as this paper will illustrate. It is interesting to note, then, how the system which is the subject of this paper came into being.

During the 1980s, Japanese activity in the field of Expert Systems and related technologies prompted the EEC to give birth to the ESPRIT programme in an attempt to integrate European efforts. This in turn led to the DTI sponsored ALVEY and IED programmes, and other initiatives. An outcrop of these is a new DTI-sponsored club called EXMAR. EXMAR is a club of ten major British com-

panies. Formed in 1987, its objectives are to investigate the possibility of computerized assistance for strategic marketing planning by the development of a prototype, and to spread awareness of expert systems in club member organizations. It is funded by contributions from the member companies, and by the Department of Trade and Industry. The club's primary source of marketing expertise is Professor Malcolm McDonald of Cranfield School of Management. Marketing experience within club member companies is also being tapped.

The involvement of Artificial Intelligence Ltd. of Watford, with the club as technical contractor began in the second half of 1988, when AI Ltd. conducted an analysis phase, followed by production of a demonstrator and an appraisal of the way forward. The demonstrator was built in the Interlisp programming environment and the Loops object system on Xerox 1186 workstations. The requirements, functional and design specifications for a prototype, to be used for experimentation and evaluation by club members in their own organizations, were completed in August 1989, and work has now been completed on implementation. The prototype runs on IBM-compatible 386

machines, using Smalltalk-80 and Analyst, and was completed in January 1990.

Purpose and Structure of Paper

The purpose of this paper is to outline the progress of the EXMAR project, and to draw conclusions about appropriate computer support for marketing planning. In the next section, the approach taken to the analysis phase at the start of the project is outlined, and the system objectives that were derived are described. The nature of the logical model that emerged is discussed, and the demonstrator system based on it is described, emphasizing the nature and style of the support to the user provided by the system, how this reflects the logical model, and how this meets the system objectives. Section 4 describes the feedback from club members on the Demonstrator and how this is influencing current work on the Prototype. Two review sections 5 and 6, discuss the nature of the marketing planning domain, and the deductions that can be made about appropriate computer support. Finally, some conclusions are drawn on the appropriate approach to systems development in such 'soft' areas as marketing planning.

2. Previous Work and Early Observations

The initial requirements analysis produced a number of interesting problems for the project, which were to sow the seeds of expensive and time-consuming delay. These problems can be summarized as follows:

- (i) it became clear that not many of the member companies were particularly au fait with the methodology of marketing planning. This led to the problem of setting clear objectives for the project.
- (ii) the diversity of company industry types, ranging from capital goods to service industries, meant that no subsequent system could possibly be suitable for all circumstances.
- (iii) problems and subsequent proposed objectives ranged from 'To support a formal planning framework to improve discipline during the planning process' and 'To support further understanding of the effects of currency fluctuations' to 'To promote discipline in pricing control'.

For these reasons, it was decided to focus on the

process of marketing planning itself rather than on any situation-specific system. A firm of software consultants was appointed project manager and a knowledge based systems house was appointed principal contractor.

The systems house began a series of 12 half day interviews with Professor McDonald in order to develop a formal paper model as a basis for computerization. Unfortunately, although taped and transcribed, they were largely unfocussed due to the inexperience of the interviewers and little progress was made towards formal modelling of the marketing planning process, in spite of very specific guidance given by Professor McDonald to the interviewers. The problem centred around lack of proper project control by the project managers, confused expectations by members of the club based on marketing planning naivety, the inexperience of the knowledge engineers, and the passive role of the domain expert, which was necessary in view of the nature of the project. Several attempts on Professor McDonald's part to guide the system were brushed aside as politically inexpedient.

The result was that the paper outlining the tasks to be performed by the computer system targeted the whole marketing planning process rather than any subset, and because of this breadth, the process to be computerized was not documented in any detail, nor backed up by any substantive models and interrelationships. Other specifications required by the development methodology in use, such as financial requirements, system structure and so on, were never produced.

At this point, the project manager appointed new software consultants to take over the feasibility study and the delivery system.

The new contractor set about finding some common requirements among end users in order to outline the domain model, with a boundary definition showing which parts of the model would be tackled by the computer system. They set about establishing the following areas:

- scope
- constraints
- organizational impact
- maintainability
- extensibility
- technology
- time scales
- risk and cost versus quantifiable benefits

Artificial Intelligence Ltd., the new software con-

sultants, drew various conclusions about the appropriate technical approach:

- **The need for focus**

The previous work had been on a broad front, involving analysis into all aspects of strategic marketing planning. This is a vast topic, tackling many of the most fundamental problems inherent in business activity, and progress was therefore slow. There was a need to focus on a subset of the overall problem.

- **Feasibility and utility to be established**

The very title of the club, 'Expert Systems in Marketing', suggested that the use of expert systems techniques in this area was possible and appropriate. This assumption of feasibility was based on the observation that there existed demonstrable expertise, but why this might imply a classic rule-based expert system had not been addressed. This was a doubly large assumption as no previous systems (or work towards systems) were known in this application area. There was a need to address this early, as well as the related issue of how any system would be of use to the marketing planner.

- **Modelling and representation**

It was decided that the appropriate first step was to carry out analysis in a closely scoped subset of the problem, with the emphasis on modelling the area using whatever formal techniques were appropriate. An example of the choices deliberately not made at the start was whether any modelling of expertise adopted the 'low road' of embedding the expertise in data structures and code, the 'high road' of an explicit, 'deep' representation, or the 'middle road' of an explicit but heuristic representation (Brown, 1984). In this modelling work, the emphasis would be on representation rather than computation, as the essential first step towards any computer system.

- **The marketing swamp**

Marketing will be referred to later in this paper as a swamp of intuitive, experience-based practice with the occasional rocky peak of formal techniques. In the experience of Artificial Intelligence Ltd. the best place to start when modelling such 'soft' domains was often on the boundary between

the soft area and neighbouring more readily formalizable areas. In this case, that meant starting with the established formal techniques and working out from there.

3. Results of Analysis Work, and the Demonstrator

Several analysis sessions were held with Professor McDonald, and with marketing practitioners in club member organizations. This resulted in an overall EXMAR system objective, an outline model that was used as the basis for a demonstrator system, and a list of areas where further work was required.

The overall EXMAR system objective was defined to be:

'To provide assistance for the marketing planning process in such a way as to spread knowledge and further understanding of how and why the multi-various factors of the market interact and serve to define the parameters of the business activity.'

The remainder of this section describes features of the model, and how these were exploited in the demonstrator. The structure is an interleaved description of the two. Each subsection describes a model feature and the relevant aspects of the demonstrator.

3.1 Assistance to aid in interpretation and understanding

The model covers the data manipulated by a marketing planner when developing a strategic marketing plan, and structures the marketing planner's task. Many of the individual subtasks or processes of this task involve modelling by the user of the business context, or interpretation by the user of the information entered. There is much that a computer system based on the model cannot do for the user, and it became increasingly clear that its most appropriate aim is to assist.

The objective of the demonstrator was therefore to provide an interactive system that supports a marketing planner by providing tools that help the user to represent the state of the markets and products under consideration; to interpret this information so as to gain an understanding of the markets and one's place within them; and to determine a course of action based on this understanding.

3.2 Model of the process of generating a marketing plan

A hierarchical breakdown of the process the marketing planner should adopt to generate a marketing plan was defined. Encouraging the user to adopt this process is of value in itself, as the process incorporates much experience that helps avoid common pitfalls: for example, the need to arrive at an appropriate understanding of the current situation before setting objectives for the future.

The demonstrator uses this hierarchy as a basis for the user's navigation round the system. The initial screen display is shown to illustrate this (Figure 1). Also shown is a window for more detailed navigation round a particular stage.

Each box in the graphical browsers represents a stage of the process. The user carries out a stage by selecting a box with the mouse: the system then takes the appropriate action, which may for example be to present the user with a form to fill in, or to open a more detailed browser of the process for that stage.

To give an overview of the process: *Select/Define Business Unit* identifies which area of the business the marketing plan is for, and records the purpose of the business area. *Focus* identifies which of the unit's markets and products are of interest. *Conduct Audit* assesses the current position of the products and markets. *Forecast* predicts the future position of the products and markets, assuming we do not intervene, as a base-line for objective setting. Finally, *Set Objectives and Strategies* sets objectives for the business unit based on the information collected, analysed and summarized; and defines strategies by which the objectives are to be met.

Detailed browsers contain icons showing the nature of the support offered for a particular stage: for example, there are icons for graphical displays of information, for tables of numbers, and for free text. The *Predict Relationship with Markets* browser is illustrated as an example, also in Figure 1.

Users will largely go through the process depth first and top to bottom; but they are free to do otherwise, as there are many cases where they may legitimately wish to do so.

3.3 A generally applicable, sound data model

A data model was developed that captured and related the information considered during production of a strategic marketing plan. It has proved

essentially sound, and of general applicability to the wide range of marketing situations represented by the diverse club member companies. A simplified entity-relationship diagram of the model is given below in Figure 2, and briefly described.

The model has three cornerstone entities: *Business Unit*, the part of the organization for which the plan is being developed; *Product*, the products or services offered by the unit; *Market*, the markets in which it operates.

Critical Success Factors model the workings of a market by documenting the factors critical to the success of any product in the market, from the consumers' viewpoint. They are an objective assessment of how the market works, independently of the Business Unit's presence in it. The matching of products to markets is represented by the important Product for Market entity: a product's score on the Critical Success Factors relates to this entity.

Market Attractiveness Factors model the priorities of the business unit by documenting the factors determining how attractive a market is to the unit. Being a subjective assessment of the business unit's priorities, the criterion for their correctness must be the result of agreement between key executives. The matching of markets to business units is represented by the important Involvement In Market entity: a market's score on the Market Attractiveness Factors relates to this entity.

Time-dependent information is held in Snapshot entities, which are 'forms' which must be completed by the user, whose role is to supply the relevant information such as product costs, prices, unit definitions, and so on. For each plan, the demonstrator system holds data structures closely based on the data model. The user's primary means of manipulating the data is by using these forms, one of which is illustrated in Figure 3.

The top form shows current information about the Food Processing market for the fictional International Bearings Limited (IBL) company, which sells bearings into a variety of markets. The bottom form shows the Critical Success Factors defined for this market, with weights to illustrate their relative importance. For example, while price is important in this market, it is less so than several other factors, such as product differentiation and quality, the product's image, and the engineering support provided. It also shows a score for IBL and its main competitor against these factors, and a weighted average computed by the system, to represent IBL's overall strength in the market. This is

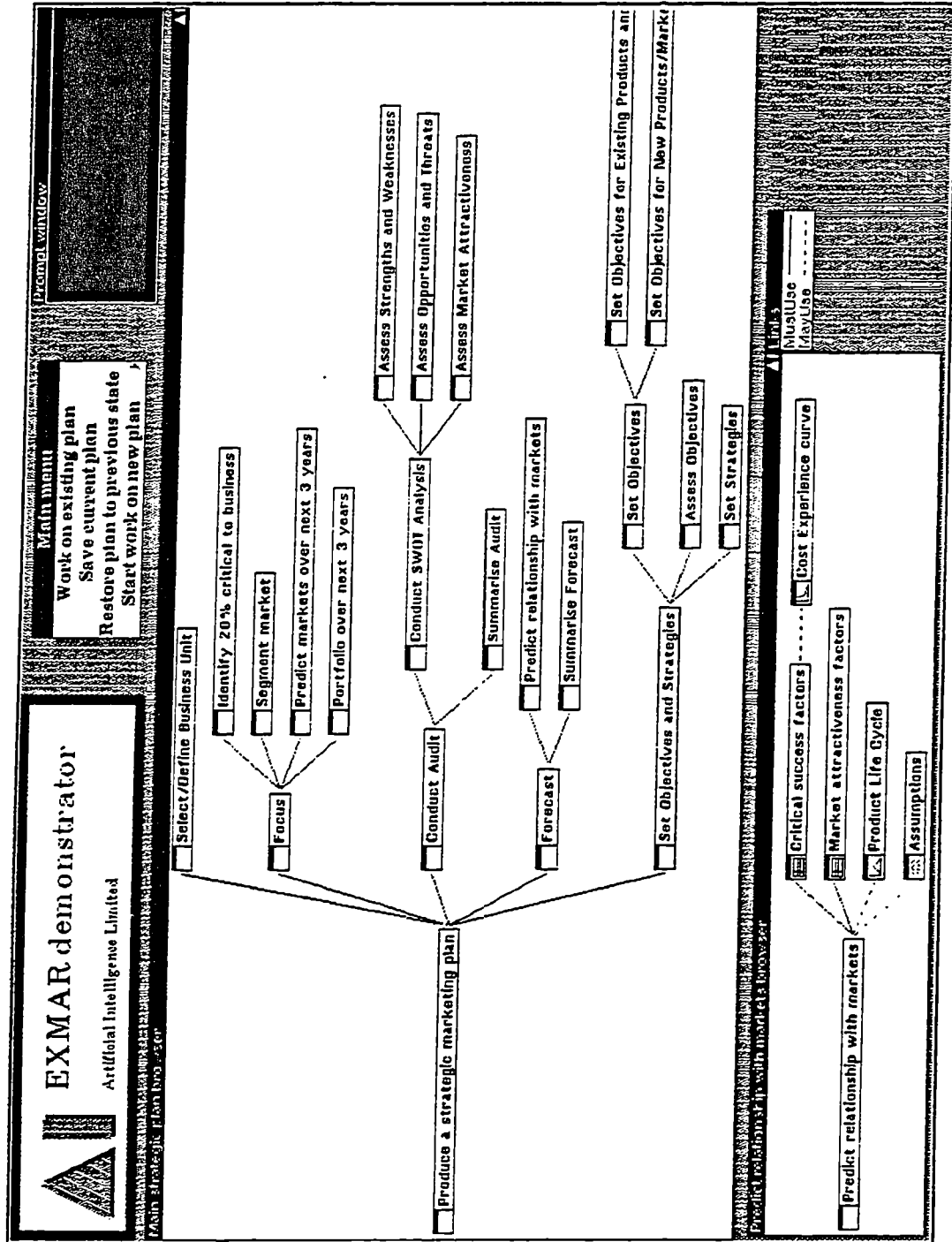


Figure 1. Initial screen display, with an example of a detailed browser

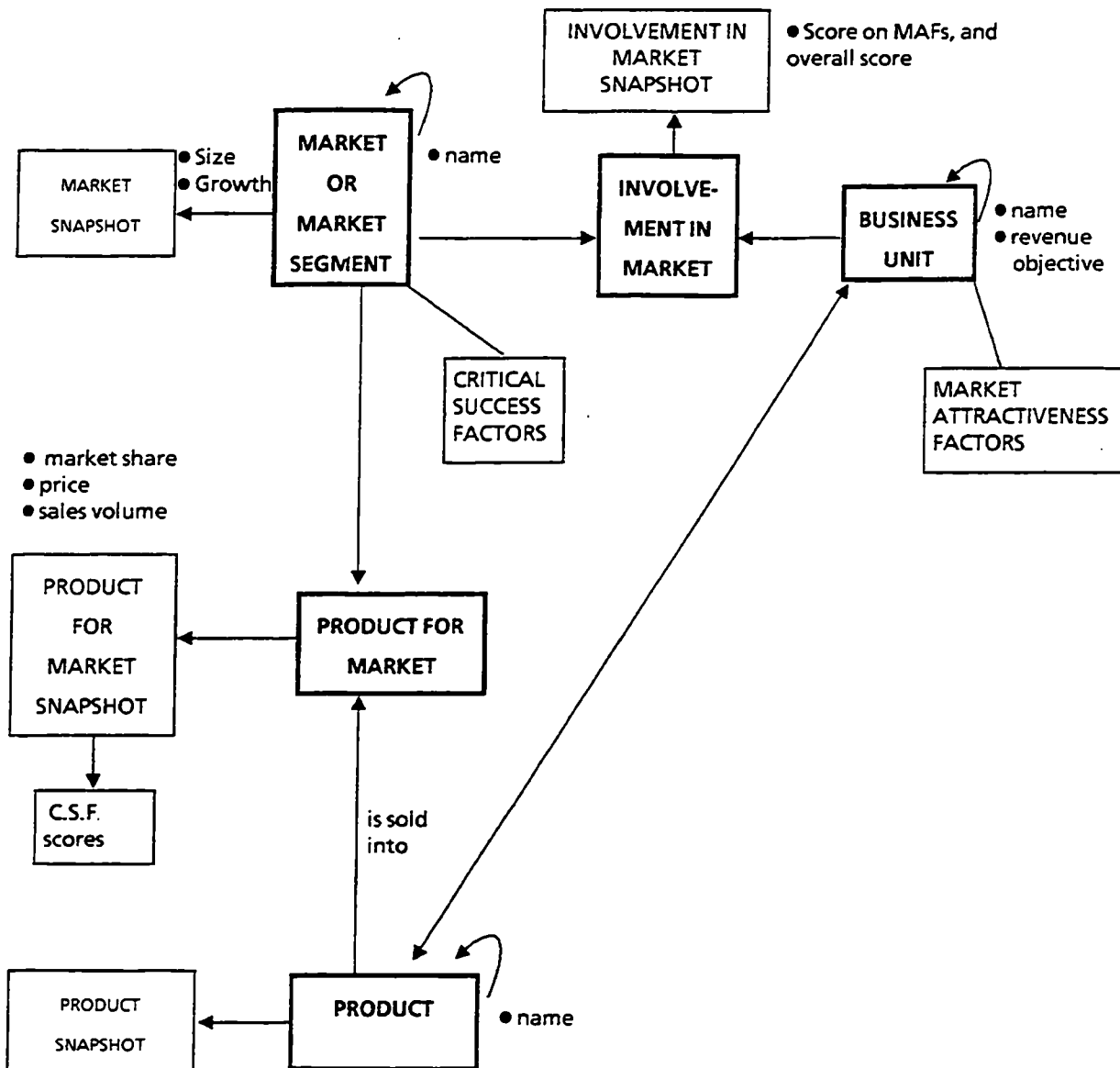


Figure 2. Simplified data model, in entity-relationship notation

copied to the top form by the system. The Market Attractiveness score on the top form results from a similar weighted average form for the attractiveness of the market against such criteria as the market's size, growth and profitability.

3.4 The use of techniques in the data model

The 'rocky peaks' with which the analysis work started are 'textbook' techniques for analysing an organization's markets and products, such as the Directional Policy Matrix, which is illustrated below (Figure 4), the Boston and Porter matrices, and so on. These view different aspects of the data model using differing graphical representations, to

aid in interpretation of the data. To extend our analogy, the data model thus forms the bridges between the rocky peaks to enable us to navigate the intervening swamp.

The screen snapshot in Figure 4 gives an example of how the demonstrator exploits these features by showing the underlying data presented in the standard formats. The Directional Policy Matrix plots, for each of IBL's markets, the market attractiveness against IBL's strength in the market. The size of the circles is proportional to the market's contribution to IBL's revenue (though it could have been set to any useful metric). Different circle shadings illustrate the current, forecast and objective situations for the product/market. (In terms of the data

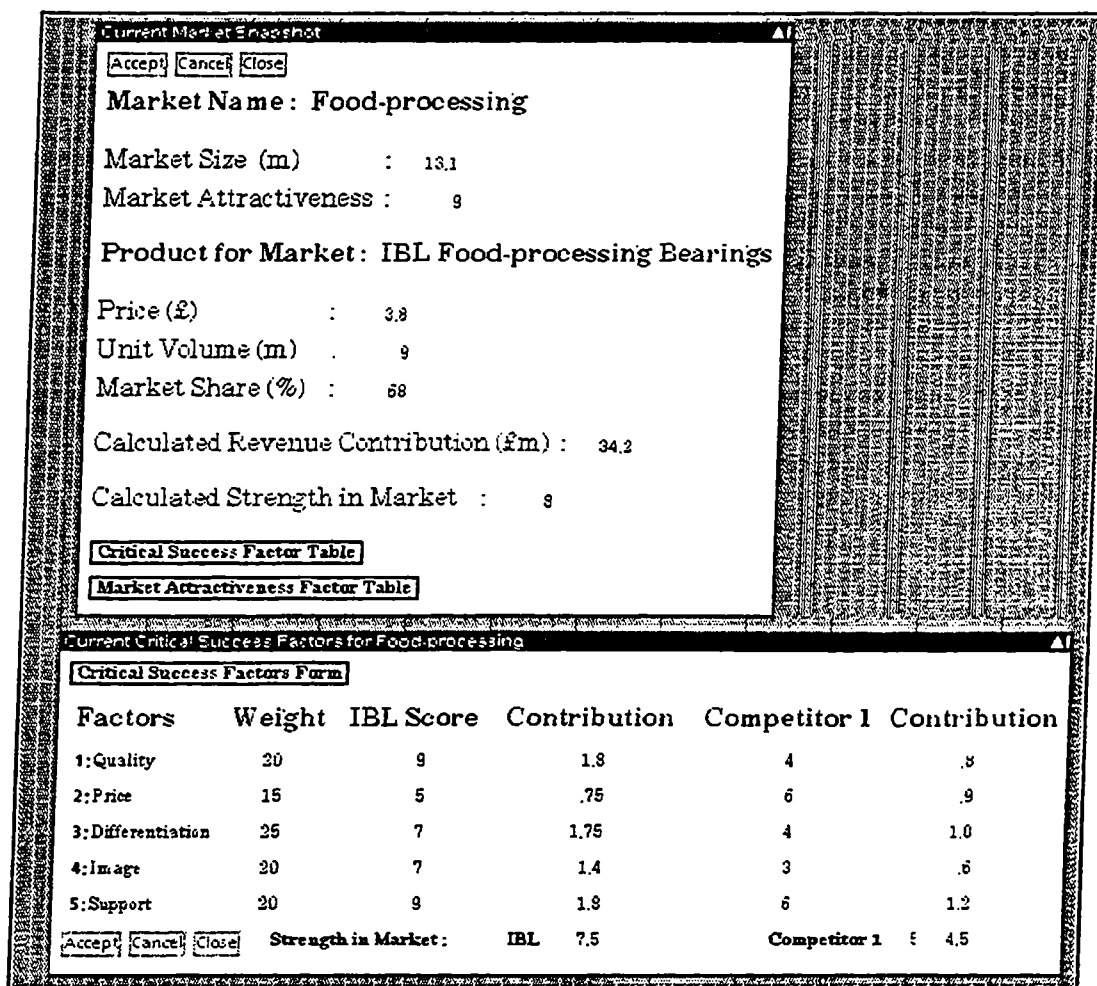


Figure 3. Typical forms for data notation

model discussed earlier, each circle strictly represents a Product For Market.)

The matrix aids in understanding both the situation of an individual product/market, and the balance of the portfolio of products. An example of the matrix's interpretation is that in all its markets, IBL is moving downwards and rightwards from the current to the forecast situation. This indicates a general weakening of IBL's position: the matrix illustrates what IBL intends to do about this for the automotive market by maintaining its competitive position while cutting costs where possible.

The demonstrator also provides on request standard, 'textbook' advice for a product-for-market in a given position on the matrix, as a guide to the planner in setting objectives. For example, for the automotive market, the system advises that the market position (strength in market, and market share) be maintained, but that subject to this the

market be managed for cash to fund development of more attractive markets. This is the only case in the demonstrator where it was felt appropriate that the system should take an active role of giving advice, rather than the passive role of presenting information in differing forms to aid the user in interpretation.

The diagram also shows a 'gap gauge', a bar chart showing the financial gap between the business unit's target revenue and the sum of the individual objectives so far set for the various markets.

3.5 Less structured information: checklists, free text

Some parts of the marketing plan were best expressed in text: for example, the business unit's mission statement, and lists of opportunities and threats. Also, in several areas, marketing expertise was identified that was not formalized beyond free

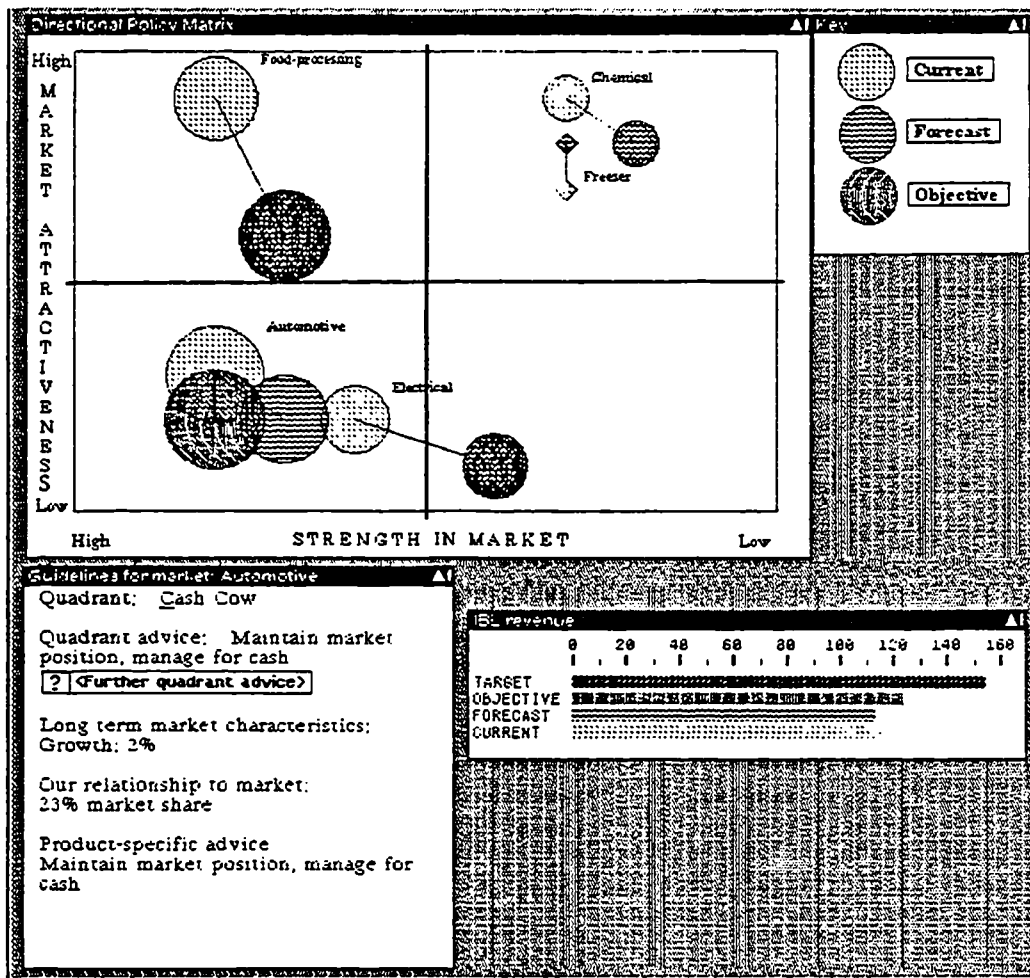


Figure 4. Data presentation to aid understanding

text in the model. Examples are checklists of common critical success factors; assistance with definition of a business unit's mission statement; and checklists of possible opportunities and threats to consider. This unstructured information was related, however, to specific points in the planning process, or to specific items in the data model. The demonstrator exploited this by making available text windows at appropriate points with icons on the browsers and elsewhere. This was implemented using the NoteCards hypertext system.

4. Demonstrator Feedback and the Development of a Prototype

The Demonstrator Model was first seen by Club Members in December 1988 and was given unanimous acclaim by all. The following were the features which they especially recommended:

The initiative is with the user The demonstrator leaves the user to decide what to do next. This was liked by the club members, who felt it to be appropriate for this application.

Evidence of utility Club members felt an operational system based on the demonstrator's ideas could be of significant use in the vital process of strategic marketing planning. This is an example of utility being addressed by the clients rather than by the developers.

Communication of the nature of the proposed prototype The demonstrator served to communicate the nature of the support that would be offered to a marketing planner by a fuller computer system, to club members and to the primary expert, Professor McDonald. With this innovative system, this was difficult to achieve on paper.

Use in specification of prototype The demonstrator was extremely effective in discussions with club members to aid with the specification of the prototype which was subsequently developed.

5. Review of the Value of Applying Expert Systems to the Marketing Planning Process

During the 1960s, attention was focussed on specific problem-solving applications in scientific fields. Many successful Expert Systems have been built, including MYCIN for diagnosing infectious diseases, (Buchan, 1984), and PROSPECTOR, a system for evaluating geographical locations for possible mineral deposits (Duda, 1979).

Management problems, however, do not lend themselves to quite the same precise logic as scientific problems. People do not solve most of life's problems by mathematical means, but rather by experience, knowledge and intuition. Marketing problems are dealt with in the same way, as most of them are logical rather than mathematical, and problem-solving knowledge, whilst available, is incomplete.

Decision-Support Systems and the like have traditionally used hard facts and static formulae which, given the correct data, provide correct answers. They belong more naturally to the logical, black-or-white, right-or-wrong world of computers. But managers in the world of marketing deal with uncertainties and often with vague concepts. One approach to pinning down the basis for such decisions is to attempt to model the decision-making process as a set of 'rules', or heuristics, that reflect the expert's own knowledge and experience about the problem in question. These 'rules' are hard to nail down and quantify – partly, perhaps, because the expert's experience enables him to think in terms of shades of grey, 'more or less', and 'approximately' – and partly because rules are not always an appropriate or sufficient representation. When human beings find a path through situations that are too complex and amorphous for the human mind to handle in a totally conscious, rational, scientific way, it can be difficult or impossible to elicit the means by which they do so.

Most people would acknowledge that in virtually any walk of life, the true expert has built up his expertise largely from experience and an intuitive grasp of problem-solving in the real world, some-

thing which is often referred to as the 'University of Life'. Indeed, many of the world's leading business people acknowledge that they owe their success not to formal business education and text books, but to their own experience, flair and intuitive good judgement.

Donald Schon (1984), describes this phenomenon as follows: 'Competent practitioners usually know more than they can say. They exhibit a kind of knowing-in-practice, most of which is tacit'. He cites an investment banker, who makes his decisions based on 70 to 80 per cent instinct, and only 20 to 30 per cent calculable rules. This 'gut feel' was a major asset to the bank in question. His point is that artistry is not reducible to discernible routines.

He describes scientific rigour as 'describable, testable, replicable techniques derived from scientific research, based on knowledge that is testable, consensual, cumulative and convergent', but then goes on to argue that much of what passes for scientific management is irrelevant because business problems do not come well formed. Certainly, most marketing problems are messy and indeterminate and successful practitioners make judgements using criteria which are difficult to define. Many academics would decry this as a lack of rigour, and in so doing exclude as non-rigorous much of what successful practitioners actually do.

The following quotation from Schon neatly sums up the problems facing not only teachers and researchers of marketing, but, more importantly, the initiators of expert marketing systems:

'In the varied topography of professional practice, there is a high, hard ground which overlooks a swamp. On the high ground, manageable problems lend themselves to solution through the use of research-based theory and technique. In the swampy lowlands, problems are messy and confused and incapable of technical solution. The irony of the situation is that the problems of the high ground tend to be relatively unimportant to society at large, however great their technical interest may be, while in the swamp lie the problems of greatest human concern.'

Marketing Planning remains one of the last bastions of ignorance in the field of marketing. The benefits of marketing planning are well documented and agreed (McDonald, 1984), yet so complicated is the process of marketing planning, and so confusing are the interrelationships between the

tools and techniques of marketing planning (Lepard, 1987), that very few British companies enjoy these benefits, as has been shown by a seminal paper by Greenley (1987), that reviewed all the major UK empirical research in this area. Indeed, there were as many dysfunctional results from the attempts of companies to initiate marketing planning procedures as there were benefits.

The problem to be addressed by Expert Systems in the marketing domain centres around how to take account of the intuitive artistry displayed by experts in situations of complexity and uncertainty in a way that is describable and susceptible to a kind of rigour that falls outside the boundaries of technical rationality. An important aspect of this is to identify where a computer system cannot hope to solve a problem on its own, and in such cases, how it can best assist the marketing manager.

The question, then, is how an epistemology of practice can be captured and represented in an Expert System.

6. Appropriate Technology in this Domain

6.1 Previous systems

To date, no one to our knowledge has seriously tackled the world of marketing with Expert Systems other than the MSI ADCAD system developed to advise on advertising design (Rangaswamy, 1988). After considering a variety of consumer and environmental factors, advertisers use a combination of empirical research, communication theory, and rules of thumb, to select communication objectives and select appropriate creative approaches.

The authors themselves list a number of weaknesses in ADCAD, but conclude: 'As one advertising executive put it: "it helps us to think a little deeper about the issues we have to consider in developing ads that are both strategically and executionally sound".' Another interesting and relevant conclusion was that most managers, when asked, said they would like to make use of existing theoretical and empirical knowledge of marketing when making decisions. However, few actually did use such knowledge. Expert Systems can bridge this gap by structuring, validating and disseminating marketing knowledge, whilst at a theoretical level, they challenge their creators to understand and critically evaluate the elements of marketing knowledge and their interrelationships.

6.2 Problems suitable for expert systems

In deciding whether marketing planning was a sensible domain for the application of Expert Systems technology, the MSI checklist fits our experience. Four criteria are provided:

1. *Are the key relationships in the domain logical rather than arithmetical?*

Concepts such as the strength of a product in a market, the attractiveness of a market or product differentiation are clearly not arithmetical – though numbers may be used to good effect in clarifying thought. So the answer is 'yes' (though not in the sense of mathematical logic).

2. *Is the problem domain semi structured rather than structured or unstructured?*

The marketing planning process has both structured elements – for example, the segmentation of a market, the relevant financial information – and related unstructured elements – for example, a mission statement or a list of forecasting assumptions. So the answer is 'yes'.

3. *Is knowledge in the domain incomplete?*

Since marketing planning and all its contextual problems remains one of the most under-researched areas of marketing, and since little has been published about the interrelationships of all the techniques of marketing in systems design, the answer is 'yes'. This is in fact the key to the whole project and why it was chosen in the first place by the club members.

4. *Will problem solving in the domain require a direct interface between the manager and the computer system?*

The intention is to have operational marketing managers using the system for the production of marketing plans, and the system can solve few of the problems by itself, so the answer is 'yes'.

6.3 The role of the computer

The potential benefits shown by the EXMAR demonstrator are due mainly to its assistance with the understanding and interpretation of the information entered. The end results may include a marketing plan, but it also includes an enhanced and readily communicable understanding of the business gained by the marketing planner. These ben-

efits are largely due to appropriate and varied display of the information.

Apart from data presentation, a computer system in this domain can perform the tasks for which computers have traditionally been used: managing data, maintaining constraints between data items like a spreadsheet, and performing routine calculations. These free up the user's thoughts for higher-level problems.

Finally, in some cases the computer can be more pro-active, offering advice, pointing out decisions that go against conventional wisdom, and so on.

The most appropriate technology for this mix of roles will itself be a mix. In the case of EXMAR, the software techniques included object-oriented programming, hypertext and use of windows-based programming environments, to enable swift development and a carefully tailored user interface. We have not found rule-based representations so far to be relevant, though they may be in future developments.

To some Expert Systems workers this emphasis on data presentation and low-level data management, as opposed to sophisticated calculation or reasoning, would constitute some sort of failure. We consider, however, that the objective of computer systems is to make the combination of user and system more effective than the user alone, not to build 'clever' computer systems. Even in the classic scientific expert systems such as those quoted earlier, the user interface frequently constituted more of the work, and more importantly delivered more of the benefits, than emphasis in the literature would suggest. We suggest that this applies even more in such 'soft' and ill-understood areas as marketing planning. The rapid recent progress in the power, and price, of the underlying software tools that enable graphical user interfaces to be provided will enable more such areas to be tackled effectively in the future.

6.4 Analysis approach

The analysis approach used for EXMAR was undogmatic and modest: to model the available expertise with whatever modelling techniques proved most appropriate, starting with the most well-established and documented, and verified, expertise. 'Don't run before you can walk' should not need emphasizing: but the early experience of the club shows that perhaps it still does. The very term 'Expert Systems' has led some to unjustified assumptions not just

of the feasibility of building computer systems based on expertise, but also of their utility, and of the most appropriate modelling and system-building tools (Bobrow, 1986). The alternative is classic software engineering, with an expanded tool kit of analysis and implementation techniques to draw upon as appropriate.

This may lead to the question about how and to what extent the model and demonstrator may be said to incorporate expertise. All aspects of the model and demonstrator can reasonably be said to be based on expertise: the process; the data model; the means of presentation of information; the checklists provided; and the one case where data-dependent advice is given. The system thus takes the 'low road' according to Brown's categorization discussed earlier. There is certainly much available (but not necessarily formalizable) expertise that has not been captured. The critical design task has been the effective definition of the boundary between the system and the user such that the user is encouraged to think about the issues that the system cannot of itself address. This conforms to the stated EXMAR system objective quoted earlier, of providing assistance for the marketing planning process in such a way as to spread knowledge and further understanding of the business and its markets.

7. Conclusions

A number of conclusions can be drawn from the EXMAR experience:

- (i) The development of EXMAR shows that it is possible to use Expert Systems methodologies to build support systems in complex areas of marketing management, especially if the domain is well defined, has a large number of factors to be considered and relevant expert knowledge is available.
- (ii) The more complex and amorphous the expertise to be captured, the longer it takes both the expert and the knowledge engineer to reach an acceptable approximation. It is clear that to develop an Expert System that is of some practical use requires both time and resources of massive proportions. This is supported by the MSI research paper, which concludes: 'There are no shortcuts to building a good Expert System. It takes a considerable

amount of skill, patience, and years of effort to develop an Expert System in a new area and get it into the field'.

- (iii) Expert Systems provide a consistency to human decision making which is valuable, since people tend to forget or ignore knowledge.
- (iv) EXMAR has generated considerable interest and support among the major multinational companies that form the club, because it forces them to think deeply and in a structured way about the issues that need to be considered in developing a strategic marketing plan.
- (v) Expert Systems are useful in helping both academics and practitioners to structure, validate, and use marketing knowledge and to better understand the interrelationships between the elements of marketing.
- (vi) Tight project control is vital. This view is supported by Mumford (1988). Many issues need to be considered, such as clear definition of subject matter, availability of inputs, and clear agreement with users on objectives, timescales and resourcing. The close involvement of the EXMAR club members has been essential in this respect. It has been achieved through an active working party, through agreed quality assurance criteria for each stage of the work, and through the use of a demonstrator.
- (vii) The potential advantages of Expert Systems in marketing are:
 - consistent advice
 - secure knowledge bases
 - making better use of experts
 - enhanced decision making
 - improved analysis.
- (viii) Since we live in an imperfect world, with imperfect problems and imperfect tools, it is unreasonable to expect a perfect Expert System until there are perfect experts and perfect technology. On the other hand, if an Expert System gives better advice than you would have had without it, it is probably worthwhile.

In conclusion, it is unlikely that Expert Systems will ever be able to give the same value as real

human experts, although clearly they can offer reasonable advice. Nor will they guarantee that you make the right decisions. But they can help you gain a proper perspective of the alternatives.

In a sense, Expert Systems will always be a bit like Distance Learning programmes, which can replace a bad teacher, but never a good one.

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DECISION SUPPORT SYSTEMS AS LEARNING AIDS: THE CASE OF MARKETING PLANNING

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ABSTRACT

Much marketing theory isn't practiced. Marketing planning in particular rarely occurs effectively. One of several reasons is inadequate knowledge and skills. A grounded theory study is described that investigates the potential of decision support systems for improving strategic marketing planning practice, and in particular for educating managers in the workplace. The system studied has a significant learning effect, as well as assisting with the immediate planning task. Through doing, users learn about the planning process, relevant marketing techniques and marketing information requirements. A precondition for successful system introduction is either a company-wide marketing philosophy or at least the perception of the need for one; this is one training need that the system cannot fill. In conclusion, decision support software can play an important part in bridging the gulf between marketing theory and practice.

THE GULF BETWEEN MARKETING THEORY AND PRACTICE

At a political level, Britain has been influential in applying marketing concepts to an increasing range of fields, such as education and health, with varying degrees of success and controversy. It is ironic that the place of marketing in British industry, which should be its undisputed homeland, is often poorly established, inadequately nurtured, ineffective, and subjected to financially-driven management that accepts the long-term erosion of market share for the sake of short-term profits (Chartered Institute of Marketing Study 1994). A study of Japanese and British companies in the UK (Wong et al 1988) found that 87 per cent of the British firms surveyed still had profit maximisation as their major short-term goal, while 80 per cent of their Japanese competitors focused on market share growth, which is not even measured by many British companies.

Nowhere is this clearer than in the gap between the marketing theory taught in business schools and managerial practice. A study by Reid and Hinkley (1989), asking respondents about techniques including the Boston and directional policy matrices, Ansoff, PIMS and the experience curve, concluded: "The results were skewed towards ignorance of all the techniques to which they were exposed. The majority were not at all familiar with any by name." An interesting conclusion from the MSI Expert System project, ADCAD (Rangaswamy et al 1988) was that although American companies would like to make use of existing theoretical knowledge of marketing, few did. Similar findings have emerged from Australia.

Research into marketing planning specifically shows this gap between theory and practice clearly. The optimal matching of what the customer wants with what the organisation has to

offer is not only the essence of marketing: it is self-evidently central in achieving competitive advantage. Managers therefore readily agree that this critical matching process needs planning, to determine how the organisation's products and services can best be offered to its markets over the period ahead to achieve the organisation's objectives.

Yet marketing planning, as described above, rarely occurs. Corporate plans, far from being intimately related to marketing strategy, are often extrapolations of past performance, or statements of desired performance with little indication of how these are to be achieved (McDonald 1984). Clear marketing objectives in terms of market share, volume or value, with marketing strategies to achieve them, are not specified (Greenley 1982). When the plan does not work, there is no basis for establishing what went wrong.

To what extent is education to blame for this state of affairs? A number of studies have shed light on the barriers that prevent the effective adoption of marketing planning (McDonald, *op. cit.*; Hopkins 1981; Ames 1968; Stasch and Lanktree 1980; Leppard and McDonald 1991; Hooley et al 1984). The barriers can be grouped into six areas:

- *Roles people play.* Senior management's support for marketing planning and participation in the process seem to be essential, as is adequate cross-functional involvement.
- *Cognitive.* Some organisations are hampered by inadequate knowledge and skills, or by a lack of innovation and a non-recognition of alternative strategies.
- *Systems and procedures.* These may be inappropriate in areas such as the manner in which marketing planning is introduced, the tailoring of a "textbook" process to an organisation, and the provision for following through marketing strategies to tactics.
- *Resources.* Planning can fail due to a shortage of adequate time, money or other resources.
- *Organisational environment/culture.* The organisation's structure or short-term reward systems may mitigate against successful planning. The culture may stifle idea generation or openness, or may reduce planning activities to an internal, political operation.
- *Data.* Shortage of the relevant information can render planning meaningless.

Consideration of this list makes plain that although education is not the only issue, it needs improving. This is confirmed by a Chartered Institute of Marketing survey (Cowell 1987) which found that the area where managers most needed improvements to their knowledge and skills in order to succeed was marketing planning. The CIM 1994 survey (*op. cit.*) shows that there has been little improvement in the last six years.

DECISION SUPPORT SYSTEMS AS PROCESS CONSULTANTS

Against this background, it is worth exploring every avenue to improve the education of managers in this vital area of managerial practice. Can information technology contribute to this task? Consideration of how education works in practice shows that there are broadly two areas in which IT might be applied. Firstly, marketing theory is conveyed by a variety of mediums: in the lecture room, through books and through distance learning materials. Computer-based training packages aim to support this area, by providing a cost-effective substitute for a lecturer with a whiteboard, with a higher degree of interaction than a book. Packages designed by one of the authors, for example, cover techniques such as portfolio matrices, as well as the marketing planning process itself. Now into their second generation exploiting graphical user interface technology, they have been used over a number of years to enable students to teach themselves basic models and frameworks, thus enabling the lecturer to add value in the classroom through the exploration of subtler issues.

But academics and consultants also teach through doing. Companies are assisted in applying the textbook theory to their organisation through process consultancy, which reinforces the theory through its guided application in practice, and adapts standard approaches to the specific needs of the company. The number of companies who are assisted in this way seems to be relatively small, however, due to the high costs involved. This raises the question whether IT can be used to complement, or substitute for, this process consultancy role.

Where within IT do we look for support on these issues? Most classic expert systems have gone beyond assistance with process to advise on the substance of the domain. In this hyperbole-laden area, where prescription far outweighs practice (Mingers and Adlam 1989), most successes have been in relatively well-understood domains where problem-solving can be formalised moderately easily (Wright and Rowe 1992). But like much of management decision-making, marketing planning has at best certain tractable rocky peaks of formal theory, surrounded by swampy lowlands where "problems are messy and confused and incapable of technical solution" (Schon 1984). This suggests that, like many wise short-term consultants, systems developers are best advised to concentrate on assistance with the planning process and techniques, and under-emphasise advice on which marketing objectives and strategies should be adopted.

This philosophy represents a cross between expert system and decision support system (DSS) approaches. Luconi et al (1986) usefully distinguish the technologies according to where the control lies for "flexible strategies" - procedures to explore and analyse the problem and possible solutions. According to their definitions, in expert systems the control lies with the computer, while in DSSs the user is in charge. They define a third category that appears the closest match with the requirements in marketing planning: that of "expert support systems", where responsibility for the process is shared between the system and the user.

In the remainder of this paper, we will simply use the term "decision support system" for simplicity, although the different strands of research that need to be drawn on have been borne in mind.

The notion that decision support systems can assist with on-site marketing education is largely untested in the marketplace. Computerisation of the marketing function has to date concentrated on operational rather than strategic applications (McDonald, Hewson and Wilson 1993). Commercial products targetted at marketing planning and marketing strategy are small in number and low in penetration, and there are likewise few bespoke systems developed by organisations for internal use (Shaw 1994).

The hypothesis that decision support systems can reduce cognitive problems in marketing planning is not fundamentally implausible, however. Research into other domains of managerial activity shows encouraging parallel cases. An early objective of decision support systems was to make management science models more available and usable (Little 1970). DSSs have been found to result in a greater depth of analysis (Pinsonneault and Kraemer 1989), suggesting perhaps a measure of success with this objective. Appropriate graphical display has been shown to impact decision-making positively (Jarvenpaa 1989), suggesting that if a DSS reduces the effort involved in generating the display, it will render graphical marketing techniques more usable. Little observed that if a system helped a user to perform a task appropriately, the user would often learn how to perform similar tasks.

A related goal of decision support systems has been to encourage the consideration of more alternative solutions to a problem. This has been found to occur in some studies, though not in others. Systems can also challenge previous perceptions: Dickmeyer (1983) found DSS users more likely to change their minds due to a planning exercise.

Some of the non-cognitive barriers to marketing planning offer similarly encouraging parallels from other domains. Group DSSs can lead to greater participation among members of a group (Pinsonneault and Kraemer, *op. cit.*), suggesting that a wider involvement in marketing planning could result. They can be helpful in structuring group planning exercises (Nunamaker et al 1988). Some studies have found time savings (eg Bayer and Harter 1991), though experimental results are inconsistent on this point. Nunamaker et al (*op. cit.*) found that system use made participants in planning sessions less restrained by organisational roles and responsibilities in their dialogue, and less likely to be intimidated by their colleagues' status. This resulted in a greater openness. The role of computer systems in providing a convenient central point for data and allowing more efficient dissemination is well researched, though an internal system will not of itself generate external information.

So although it is clear that software systems could never be a panacea, the literature suggests that it is well worth investigating whether decision support software can deliver similar educational benefits in marketing planning to those that have been gained in other areas of management.

RESEARCH OBJECTIVES AND METHODOLOGY

Our research proposition is that an appropriately designed and implemented decision support system can improve strategic marketing planning practice.

We are researching the proposition by the formative evaluation of a system codenamed Exmar, which has been designed by the authors (McDonald and Wilson 1990). The research is theory-generating rather than theory-testing in that the system, its use by organisations, and the theory as to its impact, are all at an early stage of development. We will now outline the methodology, before reporting on the results relating to marketing education.

A user base of 35 companies has built up, by chance mainly in South Africa. Of these, case studies were conducted on 9 organisations, primarily by means of semi-structured interviews. Qualitative research was felt to be appropriate to ensure a goal-free evaluation approach (Scriven 1972), as it could not be guaranteed that the system would not be used, give benefits or cause problems, in ways that were not anticipated by previous literature.

The organisations selected had used the system for at least six months, and were chosen for maximum variation in company size, competitive intensity and single versus multiple strategic business units. The companies covered a wide spread of industry sectors, including industrial and consumer goods, transport, engineering, research, energy, information technology and leisure, and ranged from a turnover of £20 million to multi-billion multinationals. The primary unit of analysis was the team involved in marketing planning in a strategic business unit, whether aided by a DSS or not. Interviews were held with staff in a marketing or strategic planning role, with relevant line managers and with any staff facilitating the use of the DSS. A total of 48 interviews were carried out. Further data sources were used where available,

including marketing plans and internal marketing planning manuals. In one case, a one-day planning session was observed by the researcher as a non-participant.

Glaser and Strauss' (1967) constant comparative method was used as a technique for efficient generation of theory, developing the theory after each interview or set of interviews, and actively seeking out confirming and disconfirming instances where resources allowed.

In addition, one case study was conducted by participant observation. A researcher worked with a company for 20 days to produce a marketing plan with the aid of Exmar, in exchange for full research access. In addition to the collection of documents, daily notes were made on all aspects of the work in progress. Informal interviews were noted or tape-recorded. Observations of system users were also noted. This element of participant observation in the study helps to counteract the interviews' potential weakness of relying on reported events. An action research approach to information systems has been recommended for theory formation in the application of new technologies (Wood-Harper 1985). In this case it offered in particular an opportunity to investigate the under-researched issue of the role of facilitation, but is subject to the well-known difficulties of action research. It is believed that the resulting understanding has nevertheless helped to interpret and balance the data arising from the interview-based case studies, achieving a measure of methodological triangulation (Denzin 1978).

Use was made of Glaser and Strauss' (op. cit.) coding terminology based on the concept of categories, as its modelling of more complex relationships between categories than simple cause and effect was found to aid in the representation of the complexity of the theory in this area (Turner 1981). The coding is also aiding in structuring research outputs such as this paper, and provides a ready supply of characteristic examples of the data to illustrate the theoretical points made (Strauss and Corbin 1990).

FINDINGS

The desire for greater market focus

A prerequisite for the effective use of the decision support system is either the existence of a company-wide marketing philosophy, or a perception within the organisation of the need for an increased market orientation. Many managers talked of the need to become more "market focused" or "marketing led". This perception arises from two sources. The first is a theoretical marketing standpoint, a belief in the core concepts of marketing as being central to business success. Demonstrating or using the system does not of itself generate this belief - rather, if this marketing perspective is already held, Exmar's focus on matching the organisation's offering to the customers' needs or wants is recognised and appreciated. As a marketing manager commented about meetings to introduce colleagues to Exmar: "If they say profits come from markets, they all say the good outweighs the bad [in the system]. If they haven't got that realisation and I can't sell them that realisation in a presentation, then I know I'm going to have a bad meeting".

The second source of a desire for greater market focus is an assessment that the organisation's current market orientation is not high enough. By contrast, this can be influenced by the DSS. More than one organisation recounted how they realised when they first went through an Exmar process how little they knew of their markets and competitors. But it can also be

influenced by other external sources attempting to convey "best practice", such as seminars by academics. Another common catalyst is adverse external circumstances, such as declining markets or reductions in protectionist measures that favoured the organisation.

A perception of shortage of skills or data can lead to resistances to learning. One is the fear of having weaknesses exposed. For example, a chief executive admitted, talking of segmentation: "One feels stupid because it ought to be obvious who you're selling to". Another resistance comes from being daunted by the work that will be required. As a marketing champion reported, "Exmar has horrified a lot of people about the work we've got to do, and some people have backed off", while others took the view that the system showed "what we have to fix up to get right".

This desire for greater market focus, if held by sufficiently senior managers, can lead to a drive to increase the organisation's market orientation. This may incorporate a number of aspects, including redesign of the organisation's structure, changes to staffing and remuneration policies, moves designed to influence the culture, the introduction or relaunch of marketing planning, as well as the introduction of a DSS. The system may consciously be regarded as part of the cultural change mechanism, as in a manufacturer where the human resources director took on the role of system champion and facilitator in order to spread marketing skills and attitudes and hence develop the staff.

In summary, the organisation needs to go through a fundamental learning step - the embrace of a marketing philosophy - before a DSS, or indeed paper-based marketing planning, can be introduced effectively. More attitudinal and motivational than cognitive, this is one piece of learning that cannot be acquired from the DSS, although the system may heighten awareness of how far the company falls short of the ideal. We will now consider the system's training role once this hurdle is passed.

The system as a learning aid

Once introduced, the system is typically used by cross-disciplinary groups of managers to define the marketing strategy for a business unit. Frequently, this occurs in intensive 2-3 day workshops, though in some cases an individual will develop the plan through a series of smaller meetings. A number of workshops may be required for different parts of the business, or to iterate as further information is collected.

Through participating in system-aided planning sessions, managers learn how to apply the marketing techniques it includes. This is knowledge they can apply in the future, whether aided by the system or not. A marketing director, talking of his staff, said: "The focus is now on what information they should be trying to get out of the customer - before it was volume and growth, now it's market sectors and opportunities [as well]". As another example, a manufacturer with its own retail chain was using the analyses in periodic branch reviews, although this information was only fed into the system at a higher level of aggregation.

One hiccup during this learning process has sometimes been observed. Occasionally, companies exhibit a counterproductive 'new convert effect', where managers assume that the technique they have just learned is the answer to all problems and apply it inappropriately. With experience, this imperfect learning behaviour seems to wear off, as managers gain the maturity to judge the applicability of models and frameworks to their situation.

The system also helps to teach a marketing planning process. A company introducing marketing planning gave this as a key reason for using Exmar: "Anything with a process is good for us right now". A public sector organisation put large diagrams of the process embodied by the system up on the wall in the boardroom to reinforce this learning.

One important learning effect of the system is its role in conveying what data is needed for marketing decision-making. Describing the system's impact, a chief executive reported: "We thought we were marketeers. The four P's weren't ridden roughshod over, and there was market research done. But we never had a formal appreciation of the playing field we were playing in...We had to formally accumulate this information." He and his staff clarified how his previous data gathering was not sufficiently focused. Information was known in considerable detail about individual product lines. Equally extensive was information on the market as a whole and on competitors in general. Through use of the system, he learned the value of markets or market segments as basic units of analysis in data collection, and focused his efforts on key data such as segment size, growth, share, buying factors and scores on his segment attractiveness criteria.

The impact of this awareness of data needs can be profound. The requirements for management information are clarified. Three companies reported that they were restructuring their operational databases to provide information according to their market segmentation, where previously it could only be aggregated by product line. Market research is better targetted on important markets and on the critical information required.

The learning effect from the system applies to groups as well as to individuals. Where the whole management team has been involved, managers report greater communication arising from a shared language and set of concepts. If not, the result can be isolation or frustration. For example, a director initially used the system without significant input from his staff, except to provide data. While excited by the insights he was gaining, he was also frustrated that it was not easy to share these with his sales managers. He was experimenting with ways to involve them more closely in strategy formation.

Some aspects of the marketing planning process are difficult to formalise. In some of these cases, the system simply provides a framework in which the manager can learn these intuitive skills by doing. A central example that applied to most companies was market segmentation, where the system merely showed the weaknesses of a poor one. Typical was an executive who reported that after the first two days on Exmar, his segmentation in his largest market was clearly not working: "None of it seemed right, and what's more important, none of it was measurable." He commissioned market research to redress this fundamental deficiency, and then fed the resulting data into the system to continue his planning.

In the early stages of applying the system, however, many organisations chose to obtain help with these more elusive topics, drawing on the experience of a facilitator or process consultant. They believed that this had sped the learning process in these softer areas.

It appears, then, that although the system acts as an effective learning aid for many aspects of marketing planning, there remain some tasks where the intuition of an expert remains of considerable value. We will return to this point in our conclusions.

CONCLUSIONS

We began by observing that the barriers to effective marketing planning include cognitive difficulties, and we asked whether decision support systems offered promise for overcoming these educational shortfalls. This study suggests that the answer is 'yes'. Systems can have a significant learning effect as well as helping users with the task in hand. Through the development of marketing plans with the system's help, managers are trained in the use of marketing tools and techniques, they learn about the marketing planning process, and they gain a clear vision of what data is required for marketing strategy formation. This learning by doing is organisational as well as individual, as the management team gains from improved communication through a shared concept set and a common tool.

This is not the only respect in which the project's overall research proposition, that DSS technology can improve strategic marketing planning practice, is supported by this study. The DSS examined also has a number of other impacts, that are outside the scope of this paper. These include improved plan quality and greater commitment to the plan through wide involvement in the planning process; better resource allocation; greater focus on attractive markets; concentration of marketing effort on the points of greatest leverage; and time savings compared with use of similar techniques manually.

Software cannot, however, act as a panacea. In particular, we have seen how the adoption of a marketing orientation is an essential prerequisite to the success of the DSS. This attitudinal and philosophical learning step is one where systems can play little part.

Can a system, then, replace a human process consultant? Many companies used an outside consultant as a facilitator for more intuitive tasks in the planning process, particularly in the early stages. Plenty of scope remains for humans to add value based on their experience. We believe this will always be so.

But use of a DSS has a number of advantages over consultancy without computer support. The initial training impact is likely to be better, with a rigour and standardisation enforced by the system, and with effective communication through graphical display. Less consultancy is needed on basic cognitive skills, leaving the facilitator free to deal with higher-level issues. And, crucially, the planning process and output are left behind, embodied in the system, providing continual reinforcement of the learning when the consultant has long gone.

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Critical problems in marketing planning: the potential of decision support systems

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Few companies use a comprehensive marketing planning process, despite wide agreement on the benefits to be gained. This results from cognitive, procedural, resource, organizational, cultural, informational and environmental problems. While computers in marketing are mainly used for operational tasks, research in other domains suggests that decision support systems could assist in reducing some of these problems. A research project is, therefore, under way to examine whether and how software can be used to improve strategic marketing planning practice. An initial report on findings to date is given, based on a qualitative evaluation with six organizations using a prototype system. There is some evidence that appropriate software support can increase marketing skills, encourage wider evaluation of alternatives, support wider managerial involvement in strategy formation, improve internal data flows and enhance plan quality. Provisional guidelines on the nature of such systems are presented. Future research stages are outlined.

KEYWORDS: marketing planning, decision support systems, qualitative evaluation

INTRODUCTION

Marketing planning provides a process and techniques which can deliver well-documented benefits, but these benefits are not widely obtained. To explain this, a number of barriers to effective marketing planning have been identified. Some are organizational and cultural, such as the isolation of the marketing function from the company's operations. Others are cognitive and procedural, for example, the need for marketing knowledge and skills and for a flexible approach to planning.

Research in decision support systems applied to other areas of management provides some indication that their application to marketing planning might reduce some of these barriers. There is a need to test this notion, both in terms of the feasibility of building such systems and in terms of their utility in reducing the barriers to effective marketing planning. Testing feasibility involves work both on how to apply emerging software technologies and on formalizing and simplifying the marketing planning process as a basis for computerization. This work can only be validated by the design of working software. Testing utility involves the evaluation of software by practising managers.

In this paper, we explore in depth the rationale for applying decision support technology to the definition of marketing strategy, through a review of relevant research in marketing planning and in decision support systems (the following two sections). We then give a report

on findings to date from Cranfield School of Management's research in this area, which has involved the design of a working prototype and its evaluation in six organizations (the fourth and fifth sections). Finally, we outline the research currently in progress with 35 organizations using the prototype for live planning.

MARKETING PLANNING IN THEORY AND PRACTICE

There is a wide body of broadly consistent prescriptive literature on how and why marketing plans should be developed (for example, Abell and Hammond, 1979; McDonald, 1989b; Kotler, 1991) covering the information to be collected and the process to be followed as well as appropriate analytical techniques (Meldrum *et al.*, 1987; Kotler and Armstrong, 1989; Brooksbank, 1990; McDonald, 1991).

The empirical research into marketing planning is comparatively scant. Eight significant studies have been examined (Ames, 1968; Stasch and Lanktree, 1980; Hopkins, 1981; Greenley, 1982, 1983; Cosse and Swan 1983; Hooley *et al.*, 1984; McDonald, 1984, Leppard, 1987). Half of these studies were US based and half UK based. Those by Ames (1968) and by Stasch and Lanktree (1980) were qualitative studies based on interviews. The remainder used surveys, except for McDonald (1984) and Leppard (1987) which employed both survey and case study methods.

The evidence available in these studies on marketing planning benefits (Greenley, 1987) suggests that when successfully applied, organizations can gain from the following.

- (1) Procedural benefits: planning leads to realistic and accepted objectives, it requires a high level of actionable market information and it results in control over the business
- (2) Process benefits: planning leads to higher levels of managerial motivation, greater inter-functional cooperation and a greater awareness and acceptance of change
- (3) Efficiency benefits: planning relates to general improved business success, reduces waste and duplicated activities, results in a clearer understanding of priorities to be pursued and gives less 'surprises' which lead to sporadic decision making.

In practice, however, the studies show that most companies do not follow the textbooks and do not achieve these benefits. Although 70% of companies produce marketing plans, only 10–14% are adequate when judged even in the most lenient terms by established theory (Greenley (1982, 1983) and McDonald (1984)). This can be well illustrated by the inclusion in marketing plans of key data items.

- (1) Only 59% forecast market sizes 3 years ahead (Cosse and Swan, 1983).
- (2) At the most generous estimate, only 68% split sales objectives into sales by market and 71% into sales by product (Hopkins (1981) and Greenley (1982, 1983)). Future sales were most frequently arrived at by simple projection of trends, sales force opinions and 'gut feeling'.
- (3) Sixty-three per cent included market share in Greenley's (1982, 1983) surveys and 44% at the segment level in Cosse and Swan (1983). Cosse and Swan (1983) found 49% deriving the relative market share at the product level. In Greenley's (1982) study, just one company specified market share as the most important objective.

In one study, only 14% of the marketing managers were involved in the setting of marketing objectives. Greenley (1983) found service companies to be even weaker than manufacturing companies on many criteria, having less detail on factors such as sales by product/service, sales by market and market share.

TABLE 1. Marketing planning barriers

Barriers	Research studies					
	1	2	3	4	5	6
Roles people play						
B1 Lack of chief executive/senior management involvement	*	*	*	*	-	-
B2 Lack of cross-functional involvement	*	*	*	*	-	-
B3 Lack of top management support	*	*	-	-	-	-
Cognitive						
B4 Knowledge and skills	*	-	-	-	-	*
B5 Lack of innovation/non-recognition of alternatives	-	*	*	-	-	-
Systems and procedures						
B6 Lack of care in marketing planning introduction	*	-	-	-	*	-
B7 Forecasts without documentation of intervention	*	-	*	-	-	-
B8 Inflexible application of textbook process	*	-	*	-	-	*
B9 Lack of follow-through to tactics	*	-	*	-	-	-
B10 Too much detail	*	-	*	-	-	-
Resources						
B11 Lack of time (elapsed and/or effort)	*	*	-	-	-	-
B12 Lack of money (for market research etc)	*	-	-	-	-	-
Organizational environment/culture						
B13 Organizational structure inappropriate	*	-	*	-	-	*
B14 Stage of organizational development	-	-	-	-	*	-
B15 Corporate politics	-	*	*	-	-	-
B16 Short-term oriented reward systems	*	-	-	-	-	-
B17 Culture stifling idea generation/openness	-	-	*	*	*	-
Data						
B18 Lack of information	*	*	*	*	-	*
Environmental						
B19 Difficulty of forecasting in times of turbulence and inflation	-	*	-	-	-	-

Key to studies: 1, McDonald (1984); 2, Hopkins (1981); 3, Ames (1968); 4, Stasch and Lanktree (1980); 5, Leppard (1987); 6, Hooley *et al.* (1984).

Barriers to marketing planning

Why is there such a large gap between theory and practice? A number of the studies have shed light on this, identifying problems or barriers that frequently prevent the effective adoption of marketing planning. These findings are summarized in Table 1. An asterisk indicates that the study explicitly claims to have derived the barrier or problem from empirical data, with a clearly described and plausible research method.

DECISION SUPPORT SYSTEMS IN MARKETING PLANNING

We have identified a number of problems with marketing planning in practice. Are there grounds for hoping that decision support systems (DSS) can reduce some of these? To answer this question, we will first consider the research into decision support systems applied to other domains of managerial decision making, to look for promising analogies. We will then look at how managers currently use software in this domain. Finally, we will examine the previous research that focuses specifically on decision support for marketing planning.

Why apply decision support systems to marketing planning?

We will look at each group of marketing planning barriers in Table 1, to explore whether similar problems have been reduced by DSS use in other areas of managerial activity.

Roles people play

Intuitively, this is not the most promising area for computers to offer assistance. It seems unlikely, for example, that the use of a DSS would of itself increase senior management's support for marketing planning. Relationships such as this have been more frequently hypothesized the other way round, for example, in a number of studies that have found top management's support for a DSS project to be a factor contributing to project success (Sanders and Courtney, 1985; Guimaraes *et al.*, 1992). It is nevertheless plausible that a system could indirectly increase top management support for marketing planning due to the learning effect of system use, discussed later.

Greater involvement in marketing planning from top management or from staff outside marketing could also result from a group decision support system's facilitation for group working. Experiments on groups (Nunamaker *et al.*, 1988; Pinsonneault and Kraemer, 1989) show that support for group decision making can result in greater participation among members. In the laboratory, though, members have to be present to participate: if within the organization they are not consulted at all or do not make themselves available, the computer system cannot reduce this barrier to effective planning.

Any impact of decision support on these barriers, then, is likely to be limited.

Cognitive

An early objective of decision support systems was to make management science models, little understood and little used by practising managers, more available and usable (Little, 1970). Decision support systems have been found to result in a greater depth of analysis (Pinsonneault and Kraemer, 1989), suggesting perhaps a measure of success with this objective in cases where decision support systems have been applied.

A number of marketing tools and techniques involve the graphical display of information as well as analysis, such as portfolio matrices and product lifecycle curves. Appropriate graphical display has been shown to impact decision making positively (Benbasat and Dexter, 1986; Jarvenpaa, 1989), suggesting that if a decision support system reduces the effort involved in generating the display, it will render the marketing tools more usable. But it is not just the effort involved that holds practitioners back from using graphical tools: some of the cognitive difficulties found by practitioners relate to technical aspects of the graphics, such as logarithmic scales on a portfolio matrix (McDonald, 1990b). It is plausible that computer

support could overcome these difficulties. As many decision support systems have a substantial graphical component, this is a factor, unexplored in many studies, that may contribute widely to the impact of the technology.

A related goal of decision support systems has been to encourage the consideration of more alternative solutions to a problem (Lodish, 1981). Some studies have found that system users consider more alternatives (Sainfort *et al.*, 1990), in some cases through explicit support for brainstorming (Nunamaker *et al.*, 1988). The role of the system in challenging previous perceptions is evidenced by Dickmeyer (1983), who found DSS users more likely to change their minds due to a planning exercise. Other studies, though, have not found a significant difference in the alternatives considered (Sharda *et al.*, 1988).

As well as compensating for a lack of knowledge and skills, using a decision support system may actually teach the user some of the skills he or she lacks. If a DSS helps a user to perform a task, the user may learn by example how to perform similar tasks (Little, 1970). Van Horn (1990), for instance, found this effect with a telecommunications planning DSS.

Systems and procedures

The extensive work on group decision support for planning at the University of Arizona (Nunamaker *et al.*, 1988) concentrates on support for a planning process. The researchers report that this works well whether the process is prescribed by the system designers or defined by the participants. As we discuss in the next section, this contrasts with most software currently available for marketing strategy, which concentrates on assisting with specific tools and techniques, resulting in some calls for more support for a planning process that combines the techniques together (Waalewijn and Boulan, 1990; Editorial in *International Journal of Research in Marketing* 8, 1991).

The Arizona researchers recognize the importance of text to complement numerical data in planning and claim to have achieved good results with the incorporation of suitable facilities in their DSS. This might be expected to assist with the common problem of planning forecasts being made without documentation of how they are to be achieved.

A formalized marketing planning process has for some companies proved a mixed blessing. There is perhaps a trade-off between formalization and flexibility. The Arizona research found that the larger the group, the more the participants appreciated the structure provided by the system. Little (1970), in his seminal paper that coined the term 'decision calculus' as a philosophy for building decision support systems, recognized the importance of leaving the user in control of the decision-making process, a point emphasized by Lodish (1981). Describing experience with CALLPLAN, which helped salespeople to allocate their time among accounts and prospects, Lodish (1981) wrote

Before the salesmen got their first results at the computer terminal, their initial reaction was one of caution and skepticism. However, experience with the interactive program transformed this attitude into varying levels of enthusiasm as the salesman realised that he was controlling the program, rather than it controlling him.

This contrasts with the language used by authors from the decision analysis school of decision support (Wind and Saaty, 1980) who discuss how the arguably complex and opaque analytic hierarchy process

forces them [managers] to explicate the environmental scenarios most likely to affect their business decisions . . . the discipline forced by the need to structure the problem hierarchically may help achieve consensus over the dimensions of the problem.

We speculate that this more controlling philosophy may contribute to the difficulties described by the authors in persuading managers to participate in the process they advocate. This would be consistent with recent research into sales force automation, which found that systems which were seen as 'empowering' were used much more extensively than those seen as 'controlling' (Hewson and Hewson, 1994).

Expert systems have a similar flavour in that the system often (but not always) has control of the decision-making process. There is no agreement on whether expert systems are a subset of decision support systems or a separate technology (Alter, 1977; Stabell, 1986). Luconi *et al.* (1986) distinguish expert systems, decision support systems and 'expert support systems', the distinguishing characteristic being where the control lies for 'flexible strategies' – procedures to explore and analyse the problem and possible solutions. According to their definitions, in expert systems, the control lies with the computer, while in decision support systems the user is in charge. With expert support systems, however, responsibility is shared between computer and user.

In marketing planning, many authors have called for some formalization of the planning process, but as we have seen, over-rigid processes can cause difficulty. The lesson from other research would appear to be that there needs to be some flexibility in the process supported by a computer system, with a shared responsibility for the planning process between the system and the user.

Resources

Although many case studies claim that the systems they describe save time (Alpar, 1991; Bayer and Harter, 1991), experimental results are inconsistent on this point (Pinsonneault and Kraemer, 1989). There are a number of possible explanations.

- (1) Most studies have been carried out with novice users, who are likely to be slower than experienced users at performing any given task on the computer. This explanation is cited by Sharda *et al.* (1988), who found in their experiments that DSS users took longer to begin with than those using pen and paper, but caught up after 3 weeks or so.
- (2) If systems encourage more analyses to be made, this may compensate for any time savings on each individual analysis.
- (3) The computer system may encourage users to apply techniques unthinkingly that are not appropriate, resulting in excessively detailed analysis (Rangaswamy *et al.*, 1991).

Whether decision support would save time in marketing planning, then, is an open question.

Organizational environment/culture

Analogous research is only known for one barrier in this group: that of a corporate culture which stifles idea generation and open expression of views. Nunamaker *et al.* (1988) found that system use made participants in planning sessions less likely to be unduly influenced by organizational roles and responsibilities and less likely to be intimidated by their colleagues' status. This resulted in a greater openness.

Data

Lack of information was mentioned by five of the six marketing planning studies examined in Table 1. A computer system that is internal to the company cannot, of course, generate external information that has not been collected, but it may provide a convenient central point

for the data and provide more efficient dissemination within the organization. This is rarely the focus for decision support research, as these benefits are shared with management information systems, which have been well researched (Jarvenpaa *et al.*, 1985).

Environmental

There are no known studies relating the use of a decision support system to particular environmental problems such as turbulence.

Summary

With some of the barriers to successful marketing planning, there is little reason to believe that computer systems could help and it is likely that these barriers must be reduced by other means. With many of the barriers, though, there are parallels from other domains where decision support systems have been of assistance. This suggests that it is worth investigating whether the same holds true in marketing planning.

We will now look at what software is available to support marketing planning and to what extent it is currently being used.

Use of decision support systems in marketing planning

To what extent are computers currently used to support marketing planning? Surveys indicate (Higgins and Opdebeek, 1984; Morris *et al.*, 1989; Andersen Consulting, 1989; Hirst 1991a,b; Shaw, 1994) that computerization of the marketing function has to date concentrated on the following.

- (1) The 'big four' personal productivity tools for microcomputers: spreadsheets, graphics packages, word processing and databases. These are now being supplemented by group working tools such as electronic mail
- (2) Marketing and sales productivity systems, often based on a general-purpose database management system (DBMS), which provide specific facilities such as lead tracking, order taking and mailshots (Moriarty and Swartz, 1989). These have as yet a relatively small, but increasing, penetration
- (3) Statistics packages for analysis of market research data and so on.

The facilities provided are biased towards either purely numerical or purely textual work. Most applications are routine and operational rather than strategic; forecasting is a relatively common exception. The 'semi-structured' tasks that are the preserve of decision support systems (Gorry and Scott Morton, 1971; Keen and Scott Morton, 1978) have been little addressed as yet.

It seems likely, then, that support for marketing planning is in the main restricted to the provision of some relevant information from operational systems, supplemented by the use of personal productivity tools for document creation, presentation authoring and so on.

This is confirmed by the small number of commercial products targeted at marketing planning and marketing strategy. An informal search for relevant commercial products has been carried out. Information has been obtained from advertisements in the marketing and strategic planning press, reports from management consultancies, trade body publications and discs listing marketing software published by the American marketing press. Relevant software can be categorized as follows.

- (1) Product marketing planning software: packages aimed at product managers and looking at one product/market. PPAM from a small UK company, Lysia, is an example which was formerly marketed in the UK. Business Insight from Simcon can be regarded as in this category, as the analysis focusses on one product/market. Both have an expert systems approach, asking questions and offering advice.
- (2) Marketing planning software for multiple products and markets: targeted at marketing managers. Other than the Exmar software arising from this research, three examples have been found. SMPS from Partners in Marketing includes SWOP analysis and portfolio analysis: there is one UK user currently. Lysia's Smartplan (not thought to be marketed currently) includes competitive analysis, strategy setting and the generation of parts of a 3 year marketing plan. It is purely quantitative. Stratex from Nokia Data is a strategic marketing planning tool for small businesses: it appears to provide a tailorable framework for the construction of systems, rather than an end-user system in itself.
- (3) Corporate planning systems with a marketing dimension: targeted at corporate planners. Examples are Ansoff's ANSPLAN and Alacrity Strategy from Alacritour Inc. in Toronto. Where these incorporate a definition of multiple products/markets, the analysis typically stops at the level of market share and growth and product differentiation as a single dimension.
- (4) Marketing technique packages: these support individual marketing tools and techniques, with little or no attempt to integrate the tools or to provide a planning framework. The key benefit offered is the graphical presentation of the data to aid understanding, in some cases supplemented by advice based on the underlying theory for the technique. An example is Portfolio Planner, developed by the authors after the early work on this research project. Other commercial products of this type believed to have been influenced by the current research are named StratMar and MatMar.

There are, then, few relevant off-the-shelf products. A small proportion of companies have, however, developed bespoke systems for internal use. Some examples are listed below.

- (1) ICL developed a system (Aitken and Bintley, 1989) for use with the aid of a facilitator to enhance marketing skills as well as to develop marketing plans. The system supports tools such as perceptual maps and efficiency frontiers for pricing, providing some links between the tools by shared data, but is not a fully integrated system. Interestingly, the paper by its developers used the term 'expert system', which was not used at any point by its users or sponsors. The system certainly did not fit the technology-based definitions of expert systems, displaying information graphically and doing arithmetic rather than generating advice. It was felt to have the drawback of having been built piecemeal and not supporting a planning process. As the principal sponsor said, by contrast with Exmar, there was no 'washing line to hang the pegs [of marketing techniques] on'.
- (2) A large chemicals multinational demonstrated to the authors a system with more of an expert system flavour, which asked the user a series of questions about a product market and then generated advice, drawing on specific knowledge of the chemical industry coded into the program. Its take-up was significant, though it tended to be used once only to generate ideas in a single session.
- (3) A pharmaceuticals multinational demonstrated a marketing planning system with a lesser advice component. Guiding the user through a form-filling process, financial

information and more qualitative information was collected. While some advice was given based on portfolio theory, this was not the primary thrust of the system. For ease of analysis across business units, the system included definitions of markets and product groups specific to the company. The system was used to standardize planning across the world and to ease aggregation of country plans into a corporate plan.

In general, then, decision support systems are as yet little used to support marketing planning, though some companies are doing pioneering work with bespoke systems and commercial products are beginning to appear. The hypothesis that decision support systems could enhance marketing planning effectiveness is thus largely untested in the market-place. To what extent has it been tested by research? We will now review previous research into decision support systems for marketing planning specifically.

Previous research in DSS for marketing planning

Only one major study has been identified on decision support systems involving marketing planning: Bovich's (1987) PhD thesis, on 'Marketing management decision-making and the role of decision support systems'. This described an experiment typical of those described by Pinsonneault and Kraemer (1989) in their review of group DSS studies, though the DSS is not termed a group decision support system by Bovich (1987). Students in two groups performed a task defined by a scenario from MARKSTRAT, one group being offered use of a decision support system called FCS:EPS, a system which 'allowed its users to perform a wide range of spreadsheet, graphic, and statistical analyses'. The task included presentation of results in the form of a paper report as if to senior management, broadly covering the contents of a product marketing plan. Bovich (1987) examined the efficiency and effectiveness of the decision-making process, the decision quality and the users' confidence in the decisions they reached.

The DSS group were told to use the DSS, but only to the extent that they thought it would be useful. Both groups were trained in the relevant techniques. The DSS group had an extra hands-on training session in how to use the software. The quality of the solutions was measured by three means: by MARKSTRAT, by how close the predictions were to the MARKSTRAT model's predictions and by experts.

Bovich (1987) concluded that the users of the system had greater confidence in the solutions they proposed, but did not have greater process efficiency, as measured by solution time or greater breadth in alternative design and evaluation. Critically, DSS use had no significant effect on solution quality. There was some support for the notion that training with the DSS led to a more synthetic and forward looking perspective.

Methodological weaknesses reported by Bovich (1987) included the use of individuals rather than groups, the individuals' inexperience in system use and the study's short time scale. The study had several other limitations: students were used rather than practising managers, the presence of a facilitator for DSS users, in the form of 'an experienced DSS consultant', did not seem to be controlled for and no evidence was presented on how close the MARKSTRAT scenario was to the problems encountered by managers in the field.

This study, then, gave useful evidence of the training benefits of DSS use, which alone could justify the further investigation of DSS in the area of marketing planning. It left many questions unanswered, however. First, the software used and the task set were not specifically aimed at the generation of a marketing plan, so they were not tackling issues such as support for a marketing planning process. Second, the laboratory experiment method only shed limited

light on many factors of interest to marketing planners, such as the ability of systems to overcome communications barriers and hostile corporate cultures. Third, the study only set out to address *whether* a specific system helped with marketing planning, providing little indication of *how* the system helped and how this assistance might be improved.

We speculate that the importance of evaluating systems more broadly than on whether their costs exceed their benefits might also apply in decision support system domains other than marketing planning. The paucity of empirical research allowing for these subtleties would seem inappropriate at such an early stage in the development of computer systems, a point made by Mumford (1988) and a number of other applied IT researchers: 'we should currently be generating ideas, theories and hypotheses, rather than simply testing them, and ... anything which restricts or constrains this process is inappropriate'.

No further literature has been identified specifically concerning decision support systems for marketing planning, though other decision support systems may in practice contribute information or analyses of relevance to a marketing plan (Curry and Moutinho, 1991; Rita, 1991).

In summary, the research into the application of DSS to marketing planning shows some limited benefits but without shedding much light on what caused the benefits or how they should be extended. We will now describe the objectives of the authors' current research, which are rich enough to address these issues.

OBJECTIVES

The aim of the research is to explore the efficacy of the application of decision support systems to marketing planning. As we have seen, it is clear that at best, a system will reduce only some of the problems preventing more effective marketing planning. It is also clear that the design of a system must be appropriate to the domain. A system must also be appropriately implemented or applied to the organization: implementation issues such as user training and support, facilitation in using the system, the phasing of system introduction and top management support for the system, have been widely found to impact upon the success of the introduction of the system (Ginzberg, 1981; Montazemi, 1988). Therefore our research proposition is that an appropriately designed and implemented decision support system can improve strategic marketing planning practice.

We investigate this proposition by the development and formative evaluation of one specific system, named Exmar. This is for several reasons. Exmar has the largest known user base for a DSS in this domain, the users are accessible for research purposes, the marketing theory and design decisions underlying the system are known and changes requested by users can be built into future versions to provide an improved test bed for research.

The research proposition leads to two objectives, the first relating to the nature of the improvement to marketing planning practice and the second exploring what constitutes an appropriately designed and implemented system.

- (1) The primary research objective is to explore what benefits, if any, are gained by users of the Exmar prototype.

This includes exploring which barriers to marketing planning are reduced by the system, if any, whether system use results in any other benefits or dysfunctional effects and whether the benefits vary across organizations. The research is exploratory in that the system, its use by organizations and the research instruments used are all at an early stage of development.

- (2) The secondary research objective is to explore what aspects of the design and implementation of the system have led to these benefits and how they might be improved, in the following areas.
 - (i) Marketing planning model: how the marketing planning process and relevant marketing techniques are formalized to provide a basis for computerization.
 - (ii) Nature of the system: how the system's scope is defined, what nature of support is provided by the system and how software technologies are applied to enable this support.
 - (iii) System implementation: who uses the system and in what context, how the system is introduced into the organization and how the system is applied.
 - (iv) Development method: how the system is developed, including how requirements are defined, what development process is followed, how user interface design is approached and within what organizational and business context the development occurs.

To place this paper in context, the stages of this long-term research project are as follows.

- (1) Initial modelling: conceptual research to develop a marketing planning model as a basis for computerization.
- (2) Demonstrator development: development of an initial demonstrator system to explore ideas on the nature of support offered by the system.
- (3) Prototype development: development of a sufficiently robust prototype system to allow evaluation in the field.
- (4) First qualitative evaluation: a qualitative evaluation with six companies from different market sectors, using semi-structured interviews and user-completed reports.
- (5) Questionnaire: a survey of users exploring factors contributing to DSS success.
- (6) Second qualitative evaluation: a set of user case studies, to complement the questionnaire.
- (7) Full system specification: a third development iteration involving further modelling and system design to incorporate feedback from the evaluation exercises.

The initial modelling, demonstrator and prototype development have been documented previously (McDonald, 1990a,b; McDonald and Wilson, 1990, 1993). We will now turn to the method and results from the first qualitative evaluation. The work in progress on subsequent stages is described in the final section.

First qualitative evaluation

Marketing managers from six companies were trained in how to use the software. They then developed a marketing plan using the system within their organizations and wrote a report on their conclusions. The companies were chosen to cover a variety of market sectors and to incorporate capital, other industrial, consumer and service products. The vertical markets covered were aerospace, engineering, consumer goods, computing, banking and insurance.

The results of feedback on the prototype from users during the development process were used to define the categories under which information was to be collected. These were incorporated in a report structure that the companies were asked to follow in their reports. The report template included open-ended questions under each heading: the wording of these followed questionnaire design guidelines in avoiding bias and so on. In addition, 13 semi-structured group interviews, typically lasting 3 h, were carried out to gather

background information on the companies and their planning and to explore selected areas in more depth.

The reports received were rich and extensive. They did not all follow the report template closely, however, covering in general subsets of the report's questions. In analysing the responses, it therefore proved useful to combine as well as contrast the information gained from interviews and from the written reports, resulting in at least four full responses to most categories. The data was summarized in an evaluation summary which followed the report template's headings.

Interviewing is subject to well-known dangers, particularly when the researchers have another role for the interviewees, in this case as systems designers (MacIntyre (1978) provides a persuasive parallel in health care). The use of user-completed reports as well as interviews was intended to counteract this weakness to some extent through methodological pluralism (Gill and Johnson, 1991).

FINDINGS TO DATE

The findings are considered under the headings defined in the previous section.

Can decision support systems be used to improve strategic marketing planning practice?

The views of the six participating companies constitute a qualitative assessment of user satisfaction (O'Keefe, 1989). Five of the six companies were very positive on this point, reporting benefits as follows.

- (1) The systematic guidance through a logical process was thought to be very valuable. This ensured that key aspects of planning were covered.
- (2) The system also prompted for key data. This provided a useful central store for this data and also highlighted areas where information was required, influencing activities including market research and management information systems development.
- (3) The system provided a 'powerful visual display of key information', aiding understanding and communication.
- (4) The system 'does not necessarily pinpoint the correct action, but highlights where attention must be placed'. 'Exmar provides the "fresh pair of eyes" that are essential if planning is to be able to break the accepted truths that have been built up by the organization'.
- (5) The system 'takes the "mystique" out of using marketing tools'.

The marketers also found the evaluation exercise useful, leading to 'improved marketing strategy through involvement in process', due to new insights into the company's position and changed paper procedures.

The sixth company was more sceptical, although still sufficiently interested to wish to stay involved. They warned that as the (prototype) system stood, 'anyone able to work through the steps . . . with the limited help given . . . would have sufficient information and expertise to write a marketing plan anyway'. This company seemed substantially influenced by the 'expert systems' label that had been attached to the system, leading to expectations of a 'cleverer' system that were fed by advertising of other software. Their expectations were

nevertheless useful in generating ideas for ways in which the system could add more value, most of which have been included in the full system specification.

Several other companies thought that the 'expert systems' term raised the wrong expectations and should be dropped. One company described how their model of the system's objective had evolved from a highly proactive expert system to an electronic assistant helping the human expert to add his/her judgement. The term 'tool kit' was used by another, while a third described its role as providing a focal point for discussions on all topics of marketing planning.

In conclusion: There is some evidence, in terms of user satisfaction, that decision support systems can be used to improve strategic marketing practice.

If decision support systems can assist, how?

We consider briefly the support for the notion that system use reduces barriers to marketing planning effectiveness.

- (1) There is some support for the cognitive hypothesis that the system increases knowledge and skills in marketing planning. Several companies reported having understood the tools and techniques of marketing better and having improved paper-based procedures as a result of using the system. These included the company sceptical about use of the system itself. It is difficult however to isolate the effect of the use of the system in itself from the effects of the users' training and their involvement in the evaluation exercise.
- (2) The procedural impact of the system, in the encouragement of a plan features such as better documentation of intervention, is also supported – again, indicated by user comments as well as by changed procedures.
- (3) Lack of innovation/non-recognition of alternatives: this was impacted by the system during evaluation of the prototype software, users having reported that new insights have been gained into their companies' positions as a result. Users believed that this would also occur in normal use.
- (4) Roles people play: there is some evidence for the system impacting this, with several companies becoming more 'marketing planning friendly' with system use. If attitudes are too frozen, however, the system will not thaw them. An example is a company involved in the earlier Exmar developments, which lost interest when the marketing department was taken over by an accountant who did not consider marketing planning worth a single internal meeting to discuss the club's work. Recent changes in senior management have led to a reawakening of interest in Exmar.
- (5) Hypotheses relating to organizational barriers are as yet open. There is some indication from one company, involved in system development from an early stage, that the system's role as a catalyst for change in attitudes may have impacted positively on organizational structure.

We will now consider the lessons on the nature of the support offered by the software, using as headings the subsidiary research questions.

Scope

Focus on strategy not tactics

Marketers can and do produce budgets and monitor their performance against budgets adequately already.

Focus on the product/market dimension

The very act of defining market segments and product groups and defining critical success factors for each market caused debate and fresh insights in many companies. The focus of the analysis on product markets, how customers buy in the markets, the company's performance in the markets and the competition from others, acted as a catalyst to focus minds on customers and 'break the accepted truths that have been built up by the organization'.

Keep financial information high-level but complete

Collaborating companies were very aware of the dangers of bogging down the analysis by excessive detail. There was nevertheless a desire in many companies to go beyond revenue to some representation of cost and 'profit', at least in the sense of marketing contribution.

Marketing model

Use a model integrating techniques round their common data and organized round the marketing planning process

A model was developed that integrated a number of key marketing techniques by defining a common data model on which they drew for information. The benefit of this is that information entered once by the user can be used multiply in different analyses. This reduces the effort involved, increasing the depth of analysis. Organizing round a logical data model also helps the user to understand the tools and techniques, by making transparent the inter-relationships between techniques. Tying the tools and techniques to stages in a logical process means that the user is encouraged to use appropriate tools at appropriate times, which reduces learning barriers and enables the user to concentrate on interpretation.

Represent the model on paper to enable communication and validation of the marketing theory

Diagrams were developed (McDonald, 1990a) to define a common representation around which marketers and IT specialists could communicate. It was found necessary to adapt standard systems analysis diagrams for this domain to make them more intuitive to marketers. This use of standard systems analysis techniques is not universally advocated for decision support systems, as some of the extensive 'knowledge engineering' literature for the development of expert systems shows (Hickman *et al.*, 1989). We believe, however, that the communication barriers between the 'expert' and the systems developers in the Exmar work before the author's involvement started was at least partly due to the lack of a common language. As DeMarco (1978) write in a classic systems analysis paper:

Since user and analysis have a long-standing history of failure to communicate, it is essential that their discussions be conducted over some workable negotiating instrument, something to point to as they labor to reach a common understanding. Their discussion concerns systems, both past and present, so a useful system model is the most important aid to communication.

The model itself is a research output from this study and will be described fully elsewhere. Specific contributions to marketing theory from this study are as follows.

- (1) Techniques interrelate in a surprisingly elegant and rich way. The complexity involved provides an additional hypothesis as to why the techniques are not used more in practice and provides incidentally an argument for the use of software technology as an aid.
- (2) The directional policy matrix has been developed to make it more usable and to avoid common pitfalls in its use (McDonald, 1990b). For example, a clustering of circles on top of each other, typically in the top left quadrant, was found to be frequent in practice. This has been addressed by making the strength in the market axis relative to the best of the competition (borrowing an idea from the Boston matrix), encouraging the user to spread out market attractive scores by gentle advice where necessary and automatically scaling the axes. Users do not have to concern themselves with these subtleties or with their implications such as the use of a logarithmic horizontal axis.
- (3) Provisional conclusions have been reached on the relationship between Porter's definition of 'differentiation' and the use of critical success factors to model 'strength in market', extending recent research into applying Porter's (1980) work more precisely (Speed, 1989; Sharp, 1991).

The nature of systems

Leave the user in control

This research supports the decision calculus school in the belief that the user should be left in control of decisions (Little, 1970). This implies no hidden logic and little jargon. Users should also be able to control the process they adopt in planning. The system can encourage but it should not dictate. In sessions at which the authors have been present (normally as facilitators), users have switched from one task to another, left the system to gain information, made changes to illustrate a point to a colleague and so on. This implies a free interface, almost certainly based on windowing technology, following the edict of the developers of the seminal Xerox Star interface: 'Never pre-empt the user' (Bewley *et al.*, 1983).

Guide the user through a logical planning process

Users nevertheless appreciate being guided through a logical process. This guidance is different in nature from the support for rigorous clerical processes traditionally addressed by transaction processing systems and from the totally free interface of a word processing package or a spreadsheet. The approach to this has accordingly taken some time to evolve: the demonstrator was too close to the former, the prototype to the latter and the full system specification we hope about right. We speculate that this conclusion is generalizable to a number of decision support domains.

Display information graphically to help understanding

Graphical display using marketing matrices and business graphics can in itself add value. Differing views on the same information can help the user to gain perspective and come to balanced conclusions.

Semi-structured tasks imply a need to integrate text and data

Several companies emphasized the benefits of being able to relate data to text – for example, the source of market size information, assumptions made in market size prediction, documentation of how specific increases in revenue will be achieved and so on.

'Hypertext' is a computer science research area concentrating on ideas for displaying and manipulating these mixed representations (Ritchie, 1993). This work has been drawn on for this project by use of the NoteCards hypertext system in the demonstrator (Halasz *et al.*, 1987) and the Analyst system in the prototype. This reflects our belief that tasks such as marketing planning are as much concerned with idea processing as they are with decision making, the representation of ideas being naturally made in words and pictures as well as numbers.

Explicit predictive models are not necessary in order to add value

The software has so far not attempted to incorporate predictive models where volume, market share or unit costs are dependent variables. This goes against the assumption in much DSS literature, starting with Little (1970) and continuing with much of the expert systems school, that predictive models are where computers can add value. This reflects, however, the advances in user interfaces in the last 10 years and the consequent ability of systems to add value by other means such as the effective display of information. This does not of course imply that good predictive models could not be usefully incorporated where they can be defined.

Ensure the learning curve is low

The software will not get used otherwise. Making the software easier to learn must if necessary be traded off against ease of use for experienced users.

Organizational fit*Use at any level of aggregation*

Most user group members thought the system could contribute at different levels of detail within their companies, from a corporate overview of key business sectors to in-depth studies of individual market segments. One company thought this would enable them to decentralize their planning internationally, spreading the expertise and 'best practice' of the central groups and the more sophisticated business units to weaker parts of the business.

Don't restrict use to the marketing department

Exmar has been used by chief executives, strategic planners and line managers, as well as by marketing directors and managers. Two of the collaborating managers had strategic planning titles: interestingly, this did not cause them to suggest a wider scope for the system, as the tight focus on the product/market dimension was thought to be important. The software was regarded by one company as valuable for getting line managers more involved in planning and at an earlier stage in the planning process.

Don't restrict the mode of use more than necessary

Software should allow for a variety of contexts: performing specific analyses rather than developing a complete plan, developing a plan over a number of sessions, leaving the system to collect further information or perform other tasks, data entry by clerical staff and so on.

All of these have been requested by managers. Software making more idealistic assumptions about planning (such as the chemical company's in-house software reviewed earlier) will not be used as an integral part of the planning process.

The software built during this study has run on a single personal computer (PC), though in practice it is often used with a cluster of users round a screen or displaying the screen on to the wall with an overhead projector. The PC revolution has in part been caused by the added sense of control users have over their own computer (Morris *et al.*, 1989). Enabling users to exchange plans readily on a floppy disk has so far proved adequate and there has been little pressure to extend the system to a multi user client-server architecture, though no firm conclusions can be drawn on this point.

Development method

Use prototyping

Our experience supports the argument (Keen, 1980; Iivari and Karjalainen, 1989) that new areas of application in decision support systems should be prototyped.

Development should be 'expert driven' as well as 'user driven'

While the initial model was developed in close cooperation with a domain expert (one of the authors), in much of the prototype software development the expert was less involved, the software engineer (the other author) relying on feedback from potential users, in line with conventional systems analysis theory. The problem with this approach is that in a domain where management practice does not reflect the best of prescriptive theory, users don't know what they want – or in some cases, they know what they want but don't know the marketing formalisms to get it. The result is that the prototype is less easy to use than it could have been. To this extent, we dispute the implementation process writers' assumption (Keen, 1980) that the objective of development is purely to produce a system that the users will use. Users may need to be gently steered in a specific direction, as advocated by the 'decision research' school (Stabell, 1986).

Ensure the software is tailorable and adaptable

Management theory changes with time, as do companies' procedures, information flows and people. Software must therefore be capable of being adapted with time or being tailored to a specific company – by programmers or preferably by users. A number of users confirmed that the introduction of marketing planning may involve compromises. Even if the will is there, it may simply be impossible to set up the necessary information flows quickly. One company expected to wait for years for some of the information requested by Exmar. There may also be cases where the general textbook theory does not apply to a specific company. A case in point is modelling in the financial services sector of the variables leading to revenue in a product/market, traditionally 'price' and 'volume'. Object-oriented programming is claimed to aid considerably in ensuring that software is flexible and adaptable, largely through the ease of software re-use due to the inheritance concept (Deutsch, 1989; Lazarev, 1991). Our experience supports this.

CONCLUSIONS AND FURTHER RESEARCH

The evaluation reported here has provided valuable guidance on what the features of a marketing planning system should be in terms of scope, the underlying model of marketing planning, user interface style and so on, in order to best assist with marketing planning. This is guiding the further software development that is in progress.

The evaluation has produced evidence that software can lower some of the barriers to marketing planning, particularly inadequate marketing knowledge and skills, poor documentation of the interventions that will be made, lack of innovation and non-recognition of alternatives, inadequate senior management involvement in the process of strategy formation and poor cross-functional communication. Software can also clarify information requirements, leading to better-targeted market research and clear requirements for internal information systems.

This evidence is, however, tentative. The participants were using the system for evaluation purposes and over a relatively short period of 3 months. This suggests further evaluation work with 'live' users as a matter of priority.

Further research stages are under way that explore the experience of organizations who have been using the prototype system for up to 3 years.

- (1) A questionnaire is being circulated to the 35 companies using the prototype system, who are mostly by chance in South Africa. The questionnaire is based on a theoretical framework for research in decision support systems for marketing planning, which has been derived by integrating previous IT/DSS research (e.g. Ives *et al.*, 1980; Sanders and Courtney, 1985; Snitkin and King, 1986; Money *et al.*, 1988) with the barriers to marketing planning described earlier. The objectives are to validate and refine instruments for the measurement of system success and benefits, as a contribution to future research and as a first step in questionnaire analysis; to examine implementation factors affecting system success, such as user training and support and top management support for the system; and to provide some indications of system success.
- (2) Case studies are being conducted on ten companies, primarily by semi-structured interviews, using Glaser and Strauss' (1967) grounded theory approach to theory generation and representation. Whereas the questionnaire is testing hypotheses that can be defined at this stage, these case studies are extending the theory itself through a goal-free evaluation approach (Scriven, 1972).

We are still some distance, then, from conclusive evidence on the impact of software in marketing planning. But although it is clear that software systems could never be a panacea, there is much to encourage us that IT can contribute strongly to this vital field of managerial practice.

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**COMPUTER AIDED MARKETING PLANNING: THE EXPERIENCE OF EARLY
ADOPTERS**

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COMPUTER AIDED MARKETING PLANNING: THE EXPERIENCE OF EARLY ADOPTERS

ABSTRACT

Previous research with users of a decision support system for marketing planning generated a number of potential benefits and success factors for achieving them. Using a multiple-case study design, these were tested in four organisations using a range of systems, to assess the extent to which the previous results could be generalised. Benefits supported by the study were that systems can: aid in the use of marketing tools through automated calculations, graphics and guidance; facilitate group planning through support for fast iteration; aid the integration of cross-functional and multiple-level analyses; and form the repository for live electronic plans from which annual plans are a snapshot. Success factors supported were top management support, sufficiently wide team definition, a system that is seen as empowering rather than controlling, and definition of appropriate planning units. The study confirms the potential of software for reducing some of the barriers to effective marketing planning practice. Further research is needed to examine the areas where this study was inconclusive.

BIOGRAPHY

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Hugh Wilson is undertaking a doctorate at Cranfield School of Management, where he has published several papers on software for marketing. He has 10 years' software development experience working for Logica, IBM, NCR and Artificial Intelligence Limited, and specialising in decision support, graphical user interfaces, object orientation and database technology. He has a mathematics degree from Oxford and a computer science postgraduate degree from Cambridge.

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The authors were co-editors of a recent report on the opportunities for leading-edge computer technology in marketing.

COMPUTER AIDED MARKETING PLANNING: THE EXPERIENCE OF EARLY ADOPTERS

INTRODUCTION

In Armstrong and Brodie's (1994a and 1994b) challenging and much-discussed experiment on the BCG matrix, subjects were asked to make a hypothetical investment decision in which investing in the BCG 'star' would be less profitable than investing in the 'dog'. Subjects exposed to the BCG matrix were more likely to choose the less profitable investment.

Whether or not one regards the experiment as an "elaborate tautology", given the way in which the hypothetical situation was defined (Wensley 1994a), it highlights a number of points on the nature of marketing theory and its dissemination - most obviously that marketing theory needs evaluation and validation, and that marketing educators have a responsibility to convey adequately the potential weaknesses of structures, frameworks, individual tools and methodologies.

This paper concerns the effective application of existing theory by managers developing marketing plans in the field, rather than the definition and development of that theory. But, reflecting on what Armstrong and Brodie's experiment did *not* examine, several important aspects of the relationship between marketing theory and practice seem to be highlighted:

- 1) *Complexity of analysis*. Much planning occurs within the context of considerable uncertainty, in which the power of precise financial techniques is not available. In this situation, individual marketing tools may be tried as a simplifying heuristic. But to counter individual tool weaknesses, the use of several complementary tools may be necessary (McDonald 1990), as well as the use of more complex versions such as the multi-factor elaborations of the BCG matrix. Even when exact data is available, similar issues of managing complexity arise in applying the financial analyses, which are also poorly understood (Armstrong and Brodie 1994a).
- 2) *Group planning*. As 'right' answers are in short supply, decision-making is frequently the result of a group process in which tools act as communication devices as much as decision-making aids (Bowman 1991).
- 3) *The live marketing model*. Planning may be ad-hoc or continuous rather than occurring in formal annual processes (Bailey and Johnson 1994). The potential of marketing tools may be as much to facilitate a commonly-held and evolving cognitive map (Langfield-Smith 1992) as to aid in particular decisions.

These issues add other dimensions of complexity to the issue of how best to support managers in translating theory into practice. This paper considers one particular line of attack: the potential of decision support systems for marketing planning. We examine whether systems can help to manage the complexity of marketing tools, whether group planning is thereby facilitated, and whether software can support the maintenance of a continuously-updated marketing model of the business.

Building on earlier studies, we research the experience of early adopters of software in this area, through four case studies. The Background section examines the grounds for applying software to marketing planning. Objectives and Research Method sections are followed by a Case Descriptions section which provides abbreviated accounts of the four cases. The Integration of Findings section summarises the evidence against hypothesised benefits and success factors for achieving them. The final sections provide a summary and suggestions for the way ahead.

BACKGROUND

Although there is a wide body of broadly consistent prescriptive literature on how and why marketing plans should be developed (eg Abell and Hammond 1979; McDonald 1995), the empirical research into marketing planning is comparatively scant (Greenley 1987). The few relevant studies suggest that when successfully applied, organisations gain a more market-focused orientation, a greater preparedness to meet change, an improved marketing strategy, and enhanced commitment to the strategy through improved communication and wider involvement in the planning process (McDonald 1984).

In practice, however, most companies do not follow the textbooks, and do not achieve these benefits. Although 70% of companies produce marketing plans, only 10-14% are adequate when judged even in the most lenient terms by established theory (Greenley 1982 and 1983; McDonald 1984). A number of the studies have shed light on why there is such a large gap between theory and practice, identifying barriers that frequently prevent effective marketing planning (Hopkins 1981; Ames 1968; Stasch and Lanktree 1980; McDonald 1984; Leppard 1987; Hooley et al 1984). The barriers can be grouped into six areas:

- *Roles people play.* Senior management's support for marketing planning and participation in the process seem to be essential, as is adequate cross-functional involvement.
- *Cognitive.* Some organisations are hampered by inadequate knowledge and skills, or by a lack of innovation and a non-recognition of alternative strategies.
- *Systems and procedures.* These may be inappropriate in areas such as the manner in which marketing planning is introduced, inflexible application of a "textbook" process to an organisation, and the provision for following through marketing strategies to tactics.
- *Resources.* Planning can fail due to a shortage of adequate time, money or other resources.
- *Organisational environment/culture.* The organisation's structure or short-term reward systems may mitigate against successful planning. The culture may stifle idea generation or openness, or may reduce planning activities to an internal, political operation.
- *Data.* Shortage of the relevant information can render planning meaningless.

Are there grounds for hoping that decision support systems (DSS) can reduce some of these problems with marketing planning in practice? Surveys indicate (Morris et al 1989, Shaw 1994) that computerisation of the marketing function has to date concentrated on operational rather than strategic applications. Support for marketing planning is in the main restricted to the provision of some relevant information from operational systems, supplemented by the use of personal productivity tools for document creation, presentation authoring and so on. This picture is confirmed by the small number and penetration of commercial products targeted at marketing planning and marketing strategy, and the similarly small number of bespoke systems developed by organisations for internal use.

The notion that decision support systems could remove some of the barriers to effective marketing planning is thus largely unexplored in the market-place. To investigate whether it is a fundamentally plausible hypothesis, we consider briefly each group of marketing planning barriers, to see whether similar problems have been reduced by DSS use in other areas of managerial activity.

- *Roles people play:* Use of group decision support systems can lead to greater participation among members of a group (Pinsonneault and Kraemer 1989), suggesting that a wider involvement in marketing planning could result.

- *Cognitive*: Decision support systems have in some cases led to a greater depth of analysis and consideration of a wider range of alternatives (Sainfort et al 1990; Dickmeyer 1983). Systems may also have a teaching role (Little 1970, Van Horn 1990).
- *Systems and procedures*: Decision support systems can be helpful in structuring group planning exercises (Nunamaker et al 1988). In this domain, there would need to be some flexibility in the process supported by the system, with a shared responsibility for the planning process between the system and the user (Luconi et al 1986).
- *Resources*: Although many case studies claim that the systems they describe save time (Bayer et al 1991; Alpar 1991), experimental results are inconsistent on this point (Pinsonneault and Kraemer 1989).
- *Organisational environment/culture*: Nunamaker et al (1988) found that system use made participants in planning sessions less restrained in their dialogue by organisational roles and responsibilities, and less likely to be intimidated by their colleagues' status. This resulted in a greater openness.
- *Data*: The role of computer systems in providing a convenient central point for data and allowing more efficient dissemination is well researched (Jarvenpaa 1985), though an internal system will not of itself generate external information.

With some of the barriers to successful marketing planning, then, there is little reason to believe that computer systems could help, and it is likely that these barriers must be reduced by other means. In other cases, however, there are parallels from other domains where decision support systems have been of assistance. This suggests that it is worth investigating whether the same holds true in marketing planning.

Cranfield's previous research

Cranfield's research to date has concentrated on the development (McDonald and Wilson 1990) and exploratory evaluation (McDonald and Wilson 1993; Wilson and McDonald 1994) of a system named EXMAR. The development of a prototype system was sponsored by ten British companies in a DTI club, who then used the system on a trial basis. By 1993, the prototype was in use in 35 companies in South Africa, who had purchased copies from the previous owners of the system, despite the fact that it was developed for research purposes and not intended for sale. This provided the opportunity to investigate how companies fared in applying the system to live marketing planning. An exploratory evaluation was carried out by means of ten interview-based case studies and a small scale survey.

This exploratory study suggested a number of benefits which appear to be gained by some companies from using the system, and a number of factors influencing whether a company received these benefits. These are summarised in the first columns of Table 1 and Table 2. As the benefits were derived inductively using a goal-free evaluation approach (Scriven 1972), their relationship with the marketing planning barriers we have examined is a loose one. Table 1 nevertheless groups the benefits according to the barrier group most likely to be impacted by the benefit.

RESEARCH OBJECTIVES

The previous research was limited by being restricted to one particular system. The research reported here addresses this through a study of four companies using different systems in the UK, to establish the extent to which the previous results can be generalised.

Our research proposition is that an appropriately designed and implemented decision support system can improve marketing planning practice. This leads to two objectives, the first

relating to the nature of the improvement to marketing planning practice, the second to exploring how these improvements are best to be gained.

1. *To establish what benefits, if any, are gained by users of DSS for marketing planning.* This includes which barriers to marketing planning are reduced by systems, if any, and whether system use results in any other benefits or dysfunctional effects. The hypothesised benefits arising from the previous research are summarised in the first column of Table 1.

2. *To examine what aspects of the design and implementation of the systems have led to these benefits, and how they might be improved, in the areas of:*

- *System implementation:* Who uses the system, and in what context; how the system is introduced into the organisation; how the system is applied
- *Development method:* How the system is developed, including how requirements are defined and what development process is followed.

A summarised list of hypothesised factors contributing to achievement of benefits is given in the first column of Table 2.

RESEARCH METHOD

Overview

A multiple-case study design was used (Yin 1984). In-depth case studies were conducted on four organisations using a variety of systems. This approach allowed the research both to test the extent to which previous results could be generalised, and to suggest how hypotheses could be modified where the hypotheses did not fit the data, through the depth of data gathered.

The logic for such an approach has been expounded under the heading of analytic induction (Manning 1982, Gill and Johnson 1991), whereby the hypotheses are assessed for each case in turn. Where a hypothesis does not fit the facts, the hypothesis is reformulated, or its range of applicability is limited to exclude those cases that defy explanation. The next case is then considered against the revised hypotheses (Denzin 1970). For the purpose of brevity in this paper, however, the data for all cases is presented here in terms of its match to the initial hypotheses, with a discussion of where hypotheses are supported, and if not, how they might be modified.

Case selection and data collection

The systems studied provided marketing planning support for multiple products and markets, including support for analysis tools such as portfolio matrices, support for “what-if” modelling of the impact of marketing strategies, and in one case, direct assistance with production of a marketing plan document. Other categories of software of relevance to marketing planning listed in Wilson and McDonald (1994) were omitted: these can be summarised as product marketing planning software, aimed at product managers and analysing one product-market; corporate planning systems with a marketing dimension; and individual marketing technique packages, that support individual tools and techniques with little or no attempt to integrate the tools or to provide a planning framework.

The organisations selected had used a system for at least six months. Three organisations used bespoke systems developed internally or commissioned for their own use, while the fourth used the EXMAR system, in conjunction with bespoke software for econometric modelling. The sample included a mix of successful and unsuccessful applications of DSS technology (one case arguably providing both), providing a combination of enumerative induction - looking for the number and variety of instances going in the same direction - and eliminative induction - looking to bound the generality of conclusions by testing against

alternatives (Miles and Huberman 1994). Bloor (1978) similarly argued that there is a need to examine cases where the phenomenon (here, benefits from DSS technology) does not occur, in order to check that the presumed causes (here, an appropriate system plus various success factors) are necessary and sufficient.

The primary unit of analysis is the team involved in marketing planning in a strategic business unit, whether aided by a DSS or not. Within this team, interviews were therefore held with staff in a marketing or strategic planning role, with relevant line managers and with any staff facilitating the use of the DSS. A total of 14 interviews were carried out, ranging from one to three hours. Further data sources were used where available, including marketing plans and internal marketing planning manuals.

In addition, one case study (case D) included participant observation as well as formal interviews. A researcher worked with the company for seven days to act as trainer and facilitator. In addition to the collection of documents, notes were made on all aspects of the work in progress. This element of participant observation in the study helped to counteract the interviews' potential weakness of relying on reported events. An action research approach to information systems has been recommended for research into the application of new technologies (Wood-Harper 1985). It is subject, however, to the well-known difficulties of action research. It is believed that the resulting understanding has nevertheless helped to interpret and balance the data arising from the interviews, achieving a measure of methodological triangulation (Denzin 1978).

Data analysis

The interviews were tape-recorded and transcribed, then annotated for the match against the hypothesised benefits and success factors, occasions where the respondent appeared to have been influenced in their response by the interviewer, and a variety of other observations. Case descriptions were drawn up to summarise the impact of the system in each case, without reference to the hypotheses - these are summarised in the next section, to provide an overview of each case. Tables were then drawn up for each case summarising the evidence against the hypotheses, including relevant quotations, and where appropriate, noting how the hypotheses might require modification. These tables have been compressed into the summary tables 1 and 2.

Particular attention was paid to plausible rival hypotheses (Campbell 1984). These include:

- That a benefit is caused by the introduction of the marketing planning process or tools that are incorporated into the system, rather than by the system itself
- That a benefit is caused by the presence and actions of a facilitator, rather than by the system
- That benefits in second and subsequent uses of the system are attributable to the learning impact of using the system on the first occasion, and would equally well be received in the absence of the system.

Evidence was sought to rule out these rival hypotheses - for example, by comparing planning exercises conducted with system support with previous or subsequent exercises conducted without it, but where a similar paper-based process and/or a facilitator were used. Where the rival hypothesis was also consistent with the data, the case was regarded as inconclusive on the benefit in question, even if the interviewees were of the opinion that the system had caused the benefit.

CASE DESCRIPTIONS

This section provides an overview of each of the four cases. The cases are combined and assessed against the hypothesised benefits and success factors in the following section. In a paper of this kind, it is obviously not possible to report all the data collected. Whilst the case overviews below are inevitably selective, the analysis summarised in the next section, and the conclusions reached, draw on the complete data collected over the nine-month study.

Case A: R&D in a pharmaceuticals company

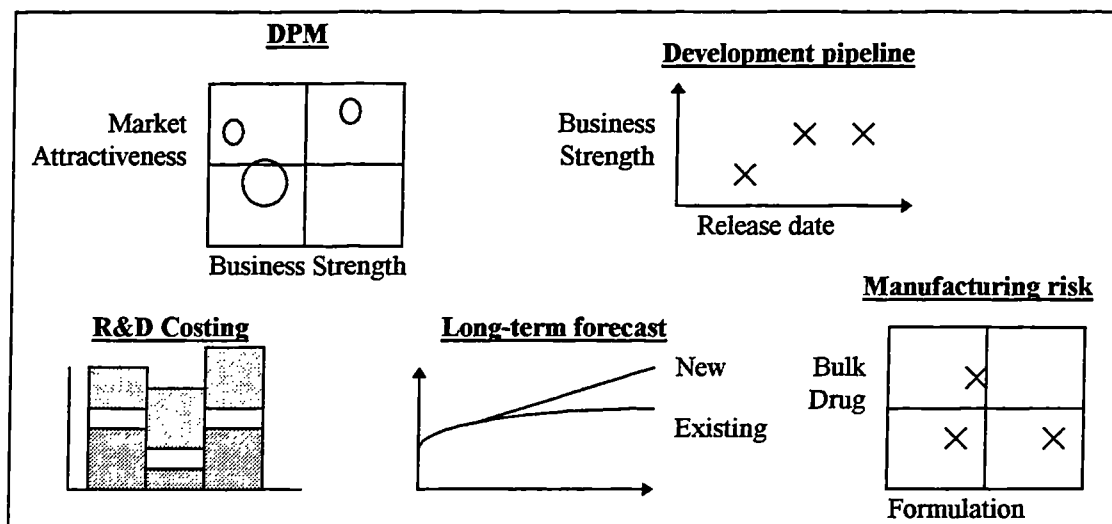
The attrition rate of new product developments in the pharmaceutical industry is high, development timescales are long and the R&D investment in a single product can be very large. Not surprisingly, the international marketing group of this pharmaceuticals multinational has changed its focus quite dramatically over the last few years, from concentrating on promotions and sales support for existing products, to spending much of its effort on providing a commercial input to research and development.

The R&D portfolio is overseen by a board level NPD committee, which holds a two-day review twice a year. Until recently, the committee was comprised mainly of senior technical staff. Then the international marketing group was given a seat at the table. This forced them to consider carefully how best to represent their views on the main issues in each therapy area from a marketing perspective. After some investigation, the marketing group decided the directional policy matrix was the appropriate focus to their input to the committee.

Initially the use of the DPM was prototyped on paper, with basic software support using a spreadsheet. A consultant experienced in use of the DPM was enlisted to help refine the methodology. The local company serving the largest market, the USA, was closely involved in defining factors and weights. Scoring criteria were defined to standardise the scoring.

A software system was then developed to automate the use of the tool, performing calculations and displaying the matrix. The system also integrated this market-focused summary with various other charts providing technical and financial perspectives, providing an integrated portfolio planning system for the NPD committee. These included a 'development pipeline' chart of the projected release date of new products against their anticipated business strength; an R&D costing system to facilitate budgeting and control; a long-term forecast for existing and new products; and a chart summarising manufacturing risk under the two dimensions of the risks in successfully formulating the drug, and the risks involved in moving from the laboratory to bulk drug production. These are shown in Figure 1.

Figure 1. R&D Portfolio Planning System



After two and a half years of development and use, the marketing managers were in a position to reflect on the system's utility, aided by an internal survey of those in receipt of its outputs. One impact of the system was greater consensus. The strategic planning manager said: "The portfolio review is more formalised in that we get transatlantic cross-functional teams together to put the final version in a form that we are happy with. The teams do their bit first. They come to a meeting with an agreed view so you don't get the usual internecine bickering." Could this collection of data as an input to the DPM not be done equally well on paper? "We did a Delphi exercise for the factor weights. It was a successful way of gaining consensus and defending the weights that resulted. Factor scoring, however, is difficult without the benefit of a facilitator. For that, you really need something that's instant and on-line." This was partly because the system made life easier for the facilitator: "The beauty of that is that you do it once. I've done it on paper and it's tough - you come back with mounds of paper." But it was also because with software support, ideas were explored as they occurred, either before the meeting or during it, and managers would build confidence in the model as they saw how their views would influence the matrix.

Another advantage of software support was in moving away from one-off planning towards the concept of a continuously updated marketing model of the new product portfolio. Whenever and wherever a planning exercise was held for a part of the portfolio, the updated data could be consolidated into the central system's database. Before each review, a snapshot would be taken, allowing the model to be modified freely in response to the discussion within the review session. This building of the model over time could also apply to qualitative data. Previously, "we were making decisions but we weren't recording how we made them or the assumptions behind them. Our corporate memory was zero". The software prompted for words along with numeric data, to record the rationale for the numbers entered. The prompting for data also resulted in data collection activities, which over time were improving the quality of the model. A market research manager reported that the company had joined a syndicated study collecting information on a range of disease areas, as an input to the DPM.

The international marketing team had worked hard to obtain the commitment of the organisation's managers in its major countries, through involving them in the development process and the data input. As well as the benefits that might be gained by the countries themselves, this was necessary in order to obtain good quality data - "It's not the culture of this company to insist - and anyway you can't, truthfully." An exception, in the view of one manager at least, was Japan, where "the culture is such that if someone at HQ says we want you to do this, they do." For providing inputs to the DPM, therefore, they were regarded as the first and most effective organisation. The notion that the quality of Japanese input was less dependent on their conviction of the value of the exercise than that for other countries was not, however, corroborated by interviews with Japanese managers.

Case B: Marketing planning in an animal health company

One of the world's leading animal health companies had grown by acquisition. A regional managing director from one taken-over company was appointed as Vice-President responsible for marketing strategy. He and his European marketing manager, also new to the organisation, wanted to broaden the organisation's understanding of marketing and coordinate the knowledge of the customer base. Their first move was to ask a consultancy to audit the company's marketing. The result was a set of marketing planning procedures, and a project to develop a software system to automate some of the planning.

The software was developed over a few months in time for the next planning cycle. The system incorporated a hierarchy of regions, countries, markets and segments. Within these units of analysis, the system prompted for data on market size and sales, customer-facing and competitor-facing success factors per market, needs and opportunities, looking ten years ahead. The system performed calculations, aggregating data from the segment level to market, country and regional levels, and included a version of the GE/McKinsey matrix, although the graphics were limited to allocating markets to one of nine cells.

Within a few more months, the software was delivered to twenty-eight countries, and data was collected and consolidated centrally. This was a painful process for the data providers: "The software that was developed had a tremendous number of bugs in it. It was an absolute nightmare. We were persecuted by the countries saying this isn't working."

Nevertheless, for the central planners, "we used that information to build up a very nice picture. For the first time ever we found out where we were going. We had a much better sense of needs, we had a much better sense of who our customer was. And we started to see what our priorities would be. From that point of view strategists in the company were very happy that we had succeeded." For the countries, though, working with such flawed software "was like having a bad illness, and we hope it doesn't come back."

The strategic marketing team, however, were never able to revise the software to remove its bugs. Within weeks of the completion of the initial planning exercise, a major consultancy was appointed to undertake a full strategic review of the organisation. Two of the marketing managers who had been closely involved with the system were seconded to the consultancy's team to assist with the review. The GE/McKinsey matrix was just what the consultancy had in mind. The market and product hierarchies that had been laboriously defined for the computer system formed an appropriate starting-point, providing a view of the organisation which was perceived to have saved much time. The data itself was collected again on paper. According to a marketing manager, though, the consultants did not look at the software for unknown reasons, despite the re-use of much of the thinking behind it. The consultants were not, however, interviewed to explore their version of events.

At any rate, two years on, significant reductions had been made in the workforce, and the system had not been used again. The global strategy team felt that several lessons had been learnt, and had modified their approach accordingly. Apart from using software before it had been properly debugged - the software having been developed in short timescales and on a very limited budget - a mistake had been made in providing so little assistance and feedback to the country managers who provided information. "We never really had time to do any follow-up work. We just kept going back for more information, and we were just continuing to ask questions rather than provide answers." There had also been insufficient training and facilitation for users of the system, and the software itself did not maximise the value that could be given to the data providers, providing in particular limited graphical display.

The European marketing manager, now promoted to director level, now acted as the facilitator for team-based strategy formation exercises, each focusing on one product-market. The managers with whom he dealt were now not seen as providers of information, but rather as providers of ideas and thinking. He had not tried to use the software again. He was just in the process of putting the data collected during the strategic review into an off-the-shelf executive information system, and asking managers to update it. Although this did not include marketing analyses such as portfolio matrices, it had the advantages relative to the bespoke system of being reliable, easy to use and flexible, and he felt he could fill in the marketing gaps himself through his facilitation. It was also based on Microsoft Windows, allowing integration with other packages. Although he would have liked a system to produce further graphical presentations of some of the relevant information, such as the trade-off between the size of the

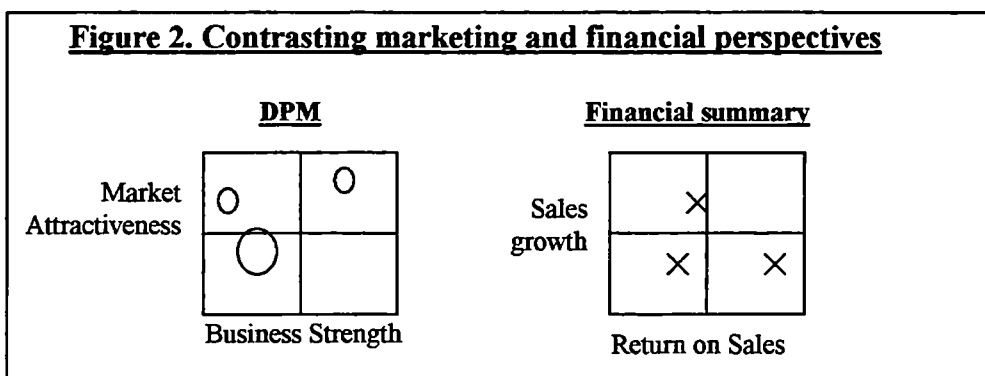
opportunity for a new treatment and the time period to bring it to market, it was easier to set up the executive information system from scratch than to endeavour to fix and enhance the bespoke system.

This manager who had been involved in the project from the system's conception summarised its history succinctly. "The concept was fantastic, the execution was diabolical and the follow-through was non-existent."

Case C: International operations of a pharmaceutical company

The Director, International Operations of this pharmaceutical company was responsible for sales into over 100 countries outside Europe, North America and Japan. He wanted a means to provide a rational basis for resource allocation between countries, based on a shared model of future market potential. "It came about because I was very concerned about the allocation of resources in marketing, which I felt were always massively orientated towards historical practice, with executives in general tending to do a bit more of what they had done before." Having travelled very extensively over the years, "I was able to compare mentally what we were doing in South Korea with what we were doing in Argentina. But that was an individual, personalised thing..What I was seeking to achieve was at the very least a common way of looking at key aspects of the business on the part of the senior management team as a whole."

A marketing consultancy recommended the use of the Directional Policy Matrix for this purpose, and developed a system to automate its use. The system prompted for scores for each country on a set of common critical success factors and market attractiveness factors. These factors gave the Operations Director the forward orientation he wanted. "In choosing the factors and weightings you could put far more emphasis on the future development of the market than the historical development - the way that price controls were going in a territory, the way that intellectual property was going, the likely future movements of per capital income, and so on." Rigorous scoring criteria were developed to ensure that scores for each market were made on the same basis. Reasons for the score, sources of data and other notes could be recorded in words. A matrix could then be displayed for a region of the world, or any other selection of countries, for any year. Scenarios could be created with differing scores. A financial matrix provided a contrasting view, showing each country in terms of the company's key objectives of return on sales and compound annual growth rate. A set of paper-based planning procedures complemented the system by prompting for other marketing planning information, as shown in Figure 2.



Following demonstration of the prototype version of the system, the software was distributed to coincide with the planning cycle, and regional managers were asked to fill in the data. Diskettes were sent back to Head Office, where the system automatically combined them

together into an integrated database from which any countries could be selected for comparison.

The Operations Director then used the system in meetings of his senior management team when particular issues or areas were discussed. "The use of software, with its ability to handle multi-component analysis very quickly, which managers aren't always good at, enabled them to see the business in different ways, and to ask questions on a what-if basis that could be instantly inputted and shown. And they could say 'I don't think that factor is weighted correctly', and they could change the scoring and see what happened to the overall competitive market trends, and just get the feeling of what was important. This, I think, really did change people's minds, because they could see the impact of doing things differently on likely results five years out much more easily than they could before."

In his view, the result was a "consistent vision and a shared understanding of what's important. So when you had £100m to go around and you needed £500m what everybody wanted to do, it made those conversations much more sensible." A useful side-effect was enhanced credibility: "Here was a way of demonstrating unequivocally the professionalism with which future markets were being assessed, and therefore aiding the credibility of those operations, so I had less difficulty in getting the overall funding allocation that I wanted."

In retrospect, the process of system development and implementation was not entirely smooth, however. The consultancy and the company agreed that mistakes had been made. The first problem was that the prototyping approach to systems development resulted in a first version that, while functionally well-matched to the company's needs, was slow and unreliable. The consultancy were "extremely good, I must say, at following it up", and a system rewrite corrected these problems, but not until the regional and country managers had battled with software bugs in the first year, at some cost to the system's reputation. Did the consultancy think the software had been rolled out too soon? "It might have been. The problem was that we were driven by the planning cycle. The company was facing urgent investment decisions." Some steps had been taken to lighten the burden on operating managers: the data was now updated by an HQ staff member, who requested information as necessary from the relevant country, while the accompanying paper planning procedures had been slimmed down from their initial detail, regarded with hindsight as "too great and irrelevant".

The second, related problem related to gaining prior commitment to the system's philosophy from operational managers. The consultant reported: "We achieved the first goal of any of these sorts of innovations, which was that we got the top management buy-in. But we probably underestimated the importance of *senior* management buy-in. And we probably with hindsight should have spent more time - we spent a lot of time but it still wasn't enough - with senior management, on making sure they understood why strategic marketing planning was necessary, what were the key issues involved in strategic marketing planning, and why the DPM was an appropriate tool, and the implications of it being computerised. Because it became very clear that actually, even senior management understand relatively little about the broader aspects of strategic planning outside their own immediate areas of responsibility. I don't think we ever got into the hearts, minds and souls of the operating managers. That's the most concerning thing. Perhaps it takes longer." The result was varying degrees of enthusiasm and system use depending on the managers concerned.

Although the system's regional success was patchy, then, its utility centrally was clear. While some said that the software saved time due to automated calculations, ease of iteration and so on, could it not be argued that the time it took to deal with software development and use outweighed these savings? The International Director, who had by this stage also taken on the world-wide marketing responsibility for the Group, said: "I have no patience at all for the

second view. What that tells me is that they are not dealing with very complicated markets. If you've got, as in my case, over 100 markets, with huge product ranges, multi pricing, multi currencies, multi differentials in growth or decline rates, apart from all the other factors that we've got in there of a political or economic nature, there's no way you are going to be able to handle that in a pen-driven way. And the second point I would make is that you only need one flash of illumination out of a what-if simulation to be worth all the time that you've spent. Furthermore, all you needed was one solid agreement on the part of the key regional managers to really do differently as a result of considering what factors really mattered, and you're miles ahead."

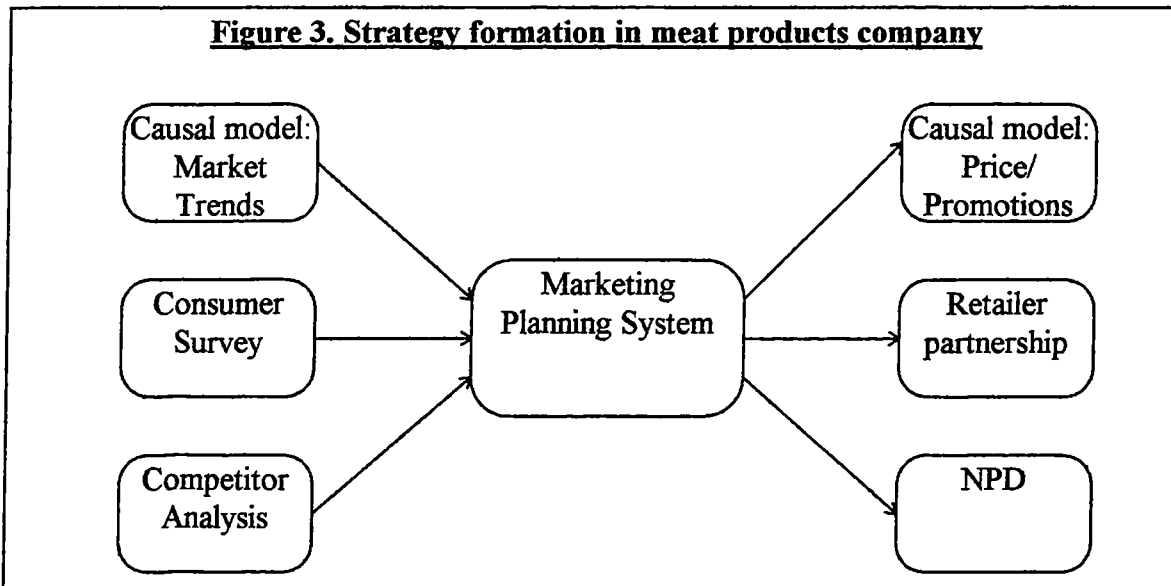
Case D: strategy formation in a meat products company

"Most companies talk about the re-organisation they had. We have one every eighteen months, so it's very hard to look at what's happening in the business." This financial controller was explaining some of the background to a marketing planning exercise that was still in progress. Although the organisation essentially sold meat sourced from one animal in one country, it had until recently operated as four trading divisions, for fresh meat, cooked meat, canned meat and other products. Each division had its own sales force and its own strategy. Now the divisions had been combined, and the new management team felt the need to revisit the priorities for the business. In the financial controller's view, "Part of the problem in the past has been sub-optimisation - four organisations going away and optimising themselves, not necessarily to the benefit of the business as a whole." The need for priorities also applied to the marketing team specifically. The small team had acquired extra responsibilities with no major change to their resources.

A funding offer from the government of the country supplying the meat provided the opportunity to obtain some external consultancy. The resulting project began with econometric modelling for some of the key markets. The factors driving market size and market share were explored through modelling of the last few years' data. The modelling found the sensitivity of size and share to variables such as price, promotions, advertising, consumer spending and adverse health publicity - this last measured by the number of government press releases concerning BSE.

The company then sought a means of integrating the data that had been gathered as a basis for strategy definition. The consultant suggested using the EXMAR marketing planning system for this purpose. The marketing team went through the system's initial stages of defining products and markets, conducting an audit of the current situation, and forecasting what the situation would be at the end of the planning period on current trends, if no remedial action was taken. The work focused on SWOT analysis and the Directional Policy Matrix, building up a current picture and a forecast picture. Although information was taken from all available sources, including the econometric models, competitor analysis, and consumer survey data, their integration was achieved by judgement and consensus. See Figure 3.

Figure 3. Strategy formation in meat products company



Over most of a day's meeting, the board then reviewed and refined this initial model, to check particularly on areas where the marketing team had less experience. As the staff who knew how to operate the system were not available, however, this exercise was conducted by hand-writing on OHP slides, which had been prepared from data taken from the system.

The next step would be to define marketing objectives and strategies where the forecast scenario was not acceptable. It was intended that the marketing team would draft these, based on overall guidance from the board. Some initial work had already been done using the system. The marketing director anticipated that the resulting plan would be more believable and acceptable as a result of the board's involvement in the earlier stages. "Because of the work that's been done with the rest of the members of the team, they will have the confidence that whatever strategy that we come with will be a realistic one." The planning work had already had some operational impacts, resulting for example in a price increase in one area.

For the marketing director, a key advantage of the process that was being followed was the involvement of the whole management team. "The problem with the written plan is that it becomes the ownership of the marketing department, and we have to hope that everyone else in the company would read the marketing plan. My concern is that it wouldn't always get read by other parts of the company. Where the models have helped is that we have actually used them in conjunction with all members of the management team. So the managing director is involved, the production director is involved, NPD is involved and so on. I think it unlikely that that would have happened with our old system of us sitting down and writing."

The same manual process could be followed without software assistance, however, and indeed the board reviewed some data without the system. Regarding whether the software made any difference, one manager cited the educational value of the instant graphical display incorporated into the system. "If you see the computer one first, you can understand the paper one afterwards. But if you try to do it the other way round, it's conceptually much harder. The MD has an MBA, as I do, but the rest of the team may not have seen it in concept, or they have seen Boston but not the DPM, so it's quite hard to work from the numbers upwards. It's much easier to work backwards from the pictures." The marketing director also felt that while the board's review of factor scores had not suffered excessively from the lack of software support, this support would be important for strategy definition. "Having worked manually through current and forecast figures, I can definitely see the value of the computer to go on and look at strategy. Because it would be impossible - we'd constantly have to break the meeting for one person to do the manual work. Whereas with a computer, if we said, 'let's

invest £100,000 in another variety packing machine - what effect will that have?', you would see it then and there."

Having worked with the hard data of an econometric model, did the managers not feel that the judgemental modelling of analyses such as the DPM was flawed by its subjectivity? The marketing director argued that the numbers entered, although judgemental, were based a wealth of external data brought to the table by the management team, which was combined through discussion. The marketing manager concurred: "But that's the way people manage companies. At the end of the day all decision making is based around a team of people. So if you can do something to make that more focused and more effective in terms of everybody looking at things in the same way and considering the same parameters, there's a lot of value."

INTEGRATION OF FINDINGS

Benefits

As we have discussed, the authors' previous research generated a number of hypothesised benefits that may be gained by users of decision support systems for marketing planning. Table 1 summarises the extent to which the four case studies support these hypotheses. The benefits are grouped according to the group of marketing planning barriers most likely to be impacted by the benefit.

Key to Table 1

+ , ++	The benefit has occurred in this case. ++ indicates clear evidence, + indicates some indication. Factors used in assessing include consistency of story from different interviewees; the substantiation of interviewees' perception of a benefit with narration of specific incidents; corroboration from observation or documentary evidence; the plausibility of rival hypotheses
- , --	Dysfunctional effect on benefit area, where the system has made the relevant variable worse. -- Indicates clear evidence, - indicates some indication. Allocation as for + and ++.
x	No effect on benefit area despite conditions where the benefit has an opportunity to be present (eg, for group planning benefits, the planning has been done by a group).
SF	No effect on benefit area - attributable to known success factors being absent
NA	Benefit area does not apply (eg group planning benefits where system used by individual)
DK	Insufficient data to assess. Reasons include inadequate exploration of issue in interviews; inconclusive replies; the system impact cannot be separated from other possible causes

Table 1. Support for hypothesised benefits

Benefit	Case A	Case B	Case C	Case D
<i>Roles people play</i> Support group planning, focusing debate & improving consensus	++ Consensus building is helped by the on-line exploration of ideas	NA Not used by group	++ Live what-if's gave "a consistent vision and a shared understanding"	+ Without system, "discussion gets pulled in every conceivable angle"
Ease integration of functional perspectives	++ System integrates R&D, financial, marketing info	DK No integration tried as far as is known	++ Integrates finance, mkting.	DK No attempt to integrate known as yet
<i>Cognitive</i> Support use of marketing tools through calculations, graphical display, guidance on use	++ Tool use better than on paper. Technique interrelationships also managed	+ Aided central strategists in combining data from many managers in DPM analysis etc	++ Paper use of tools viewed as impractical: previous company experience cited	+ Tools can be used on paper, but computer preferred for ease, particularly in strategy defn.
Aid individual and group learning about marketing planning	DK An aim, at least. Mktg mgr: "Real use is culture change"	x Champion claimed no learning occurred - lack of facilitator?	DK Aim of "transfer of best practice" but hard to assess	+ Claimed to help with understanding of tools
<i>Systems/procedures</i> Enable live mkting model with periodic snapshots for plans	++ System updated periodically for NPD reviews	SF Software quality prevented any reuse	+ Ad-hoc exercises started with last available plan	NA Not in use for long enough to apply
Manage complexity of multi-level plans	NA System used at one level	++ Consolidation gave "view of world"	++ Assisted cross-SBU resource alloc.	DK Two levels, system's role unclear
Improve plan justification, credibility and confidence	+ Greater consensus said to increase credibility of outputs	DK Strategists' credibility with consultants may have been helped	+ Use of system of itself improved credibility of planning outputs	DK Confidence prob improved, but could be process rather than system
Structure the planning process	NA System doesn't include explicit process	+ and - Encouraged prod/mkt defns, but structure could hamper creativity	NA System organised round specific tools rather than an explicit process	+ "It helps having some framework" so this year's planning "more structured"
<i>Resources</i> Save time, particularly on revisions	+ Comments included time savings for facilitator	SF Software quality poor, so hard to use. No revisions	+ Clear belief time saved. Limited basis for comparison	DK Mainly anticipated rather than realised savings
<i>Organisational environment/culture</i> Increase marketing planning confidence and enthusiasm	DK Little direct comment	SF View stated that better system would help confidence	DK Little direct evidence	+ Mktng dir: "It's also quite motivating"
<i>Data</i> Identify critical data requirements, improving accuracy, availability	+ Market research commissioned; qualitative data more available	+ "Highlighted tremendous deficiencies in data". But paper manual might have too	DK Little direct comment	DK Data gathering happening anyway. System not known to have caused more

Benefits supported by cases

Within this group of benefits, at least one case provided clear support for the benefit, while no case provided contradictory evidence.

Support use of marketing tools. Systems can aid in the use of marketing tools such as portfolio matrices through automated calculations, graphical display and on-line guidance on the tools' inputs, assumptions and interpretation. In cases A and C, a comparison with previous paper-based planning strengthened the evidence. Case D, where system use is at an earlier stage, was less clear-cut, suggesting that while tools can be used on paper, this is more difficult, particularly when iteration is at a premium.

Support group planning. With the exception of case B, where the system was not used by a group, the systems facilitated collaborative planning workshops through the support for fast iteration, and through providing a common focus and agenda for the meeting.

Enable live marketing model. Cases A and C confirmed the notion that a system can form the repository for "live" electronic plans, updated periodically, from which annual snapshots are taken for formal presentation. This vision, representing a significant change from paper-based planning, is not as yet fully realised in any of the organisations studied, however.

Ease integration of functional perspectives. The hypothesis that the electronic format can assist the integration of marketing models with data from other functions was supported by cases A and C. The other cases provided no evidence on this issue.

Manage the complexity of multiple-level planning. In cases B and C, the system assisted with multiple levels of planning, through consolidation of data and, in case C, through the provision of facilities to cut the data in different ways according to the analysis required. While case D involved two planning levels, there was no clear reason to suppose that the system's role in managing the limited complexity involved was an important one.

Benefits with limited support

Within this group, while the research is consistent with the hypothesised benefit, rival hypotheses cannot be ruled out. Often this is because of the difficulty of isolating the effect of the system from the effect of the process that is frequently introduced simultaneously.

Improve plan justification, credibility and confidence. Managers in cases A and C felt the system had improved the credibility of the resulting strategies, partly as a result of greater consensus, and partly because the use of a system, perhaps irrationally, gave an impression of professionalism and thoroughness. Cases B and D were inconclusive.

Save time, particularly on revisions. In case A, time savings were cited for the facilitator. In case C, the volume of work involved in analyses without computer support was cited as impractical. In case B, the degree of unreliability and poor training may account for the absence of reported time savings.

Identify critical data requirements. Although two cases (A and B) discussed data gathering as a result of system use, it is difficult to be sure whether this would have equally occurred with equivalent paper-based procedures.

Increase marketing planning confidence and enthusiasm. There were some comments in case D indicating a greater enthusiasm for marketing planning resulting from the sense of progress when inputs could be quickly viewed graphically. In case B, this benefit was expected from systems but not gained from the flawed system developed.

Benefits with mixed support

Here, the hypothesis may need revision, as the evidence from the cases is mixed.

Aid individual and group learning about marketing planning. The spread of “best practice” was a system objective in three of the cases (A, C and D). However, only in case D was evidence available of specific areas in which the system had had a learning impact. In case B, where the system was used without facilitation, the system champion felt that no learning had occurred. This suggests firstly that one learning step, the commitment to the importance of marketing planning, is not achieved by the system itself (see Success Factors below), and secondly that the presence of a facilitator may be crucial for gaining learning benefits. If so, future research will need to assess more conclusively whether the combination of facilitator and system is more effective for teaching than the facilitator alone.

Structure the planning process. In case B, although the structure encouraged organisation-wide market definitions, there was some feeling that the system could hamper creativity: “One of the disadvantages of starting with a computer or even with a paper-based system is that...you are saying ‘I want you to confine your thinking within this boundary’ ”. This emphasises the success factor of “flexibility in planning processes”, discussed below. It opens the possibility, however, that although the same dangers apply to paper-based systems, the presence of a computer may exacerbate the danger of blindly following the analyses recommended without stepping outside them where relevant.

Factors affecting success

Table 2 summarises the extent to which the case studies support the hypothesised success factors for successful application of decision support systems in this domain. The factors are ordered in approximate order of support for the hypothesis, starting with the most strongly supported hypothesis.

Each entry begins with two ratings, separated by a “/”. The first indicates to what extent the factor is present in the case, from one to three stars. The second indicates whether the case supports the hypothesis that the factor is influential in determining system utility, on a similar scale to that used in Table 1. For example, “*/++” for Training would indicate that training was poor, and the case evidence suggested that this was a factor in the utility of the system. See the key for further details.

Success factors supported by cases

Within this group of factors, at least one case provided clear support for the factor’s influence on the system’s success, while no case provided contradictory evidence.

Presence of system champion and sponsor. The changes in sponsorship are illuminating. In case B, the system ceased being used when its sponsor left the company - though the system’s poor robustness may have been an equally important factor. A sideways move of the sponsor in case C reduced the system’s use in his previous area of responsibility.

Sufficiently wide team definition. In case B and parts of case C, users were seen as data providers and did not use the system in a team context. Their enthusiasm contrasted sharply with other parts of case C, and cases A and D, who used the system in inter-disciplinary teams, and stressed group benefits.

Table 2. Support for hypothesised success factors

Success factor	Case A	Case B	Case C	Case D
Presence of system champion & sponsor	**/+ Championed middle mgt level, sponsored director	**/+ When sponsor went, use stopped (though other factors)	**/+ Champ. in HQ where more impact; move reduced use	**/+ Champ.=fin controller/mkt mgr, sponsor = mkt dir.
Sufficiently wide team definition	***/+ Cross-function teams scoring	*/+ Opportunity lost for local initiatives	**/+ Team use in HQ probably helped its greater success	***/+ Used in teams (marketing/board). Group ben's stressed
System perceived as empowering rather than controlling	***/+ Although some control, matched by effort to gain buy-in	*/+ No attempt at user buy-in made, so little commitment	**/+ Regional users didn't feel empowered so poor data	***/o No enforced use. Can't really deduce importance
Appropriate planning units	**/+ Finance/mkting mismatch of prod-mkt defns a problem	**/+ Rare cases where poor "caused horrendous problem"	***/o Planning units (zones/countries) easily defined	***/o No problems observed
Market orientation, or perception of need for it	**/+ System followed greater role for marketing in NPD	*/+ Limited funding perhaps related to market focus	**/o Degree of syst. acceptance explained by other factors	**/+ Perceived need for better data/procedures prob helped
Adequate training	***/o Facilitators do most system use	*/+ Even UK trainer inadequately trained	*/+ Limited training in regions may have hindered results	**/o Ease of use better explanation for limits to use
Garbage in, garbage out: avoiding manipulation	***/+ Rigorous scoring criteria avoid manipulation	DK/DK	**/+ Scoring criteria designed to avoid manipulation	DK/DK No indications that manipulation a problem
Flexibility in planning processes	DK/DK No signs of insufficient flexibility	*/+ Need to allow creative thinking strongly felt	**/+ Initial rigid procedures harmed exercise reputation	***/o Concentrated on system's formal models - no problem
Absence of excessive short-term pressures	DK/DK No indications that this a problem	**/o No evidence that this a significant factor	**/+ Time an issue in rushed first release	**/+ After restructure, system went on "back burner"
Development should be "expert driven" as well as "user driven"	***/o Input from expert - difficult to assess impact	**/+ Expert might have prevented theoretical flaws	***/+ Experienced consultant specified - spec right 1st time	***/o Expert & user driven but no basis for comparison
Use prototyping or otherwise allow for iteration	**/- Parts prototyped -rest effective despite lack of iteration	*/+ Iteration would probably have helped reduce bugs	*/+ Iteration not planned for but proved necessary	**/+ Limitations of proto system prob reduced system use
Adequate facilitation	***/o Facilitators always used. No direct comparisons	*/+ Link with lack of learning impact seems likely	*/- HQ use OK without. MktDir could be called facilitator	**/o Board exercise unfacilitated (though system not used)
Coordination of system use with planning cycle	***/+ Use outside NPD reviews not taken off to date	**/o Used in planning cycle; can't assess importance	**/- Ad-hoc use effective, as directors involved	**/+ First use outside cycle-prob a factor in lower impact
System utility	High	Low	High as HQ tool, medium in regions	Medium to date

Key to Table 2

RATING OF PRESENCE OF FACTOR	
*, **, ***	The extent to which the factor is present in the case. *** indicates the factor is fully present, * indicates that it is not present. Eg: * indicates poor training, *** indicates thorough training.
DK	The data is insufficient to rate the case on the factor.
RATING OF INFLUENCE OF FACTOR	
+, ++	Case supports hypothesis that the factor is influential in determining system utility. ++ indicates clear evidence, + indicates some indication. This will normally be because of evidence that: <ol style="list-style-type: none"> 1. where the factor is fully or partially absent, benefits are reduced or absent 2. where the factor is present, benefits are present, or there is some more plausible reason for their absence 3. a plausible causal explanation links the factor to the benefits obtained. Factors used in assessing as for Table 1.
-, --	The factor is not influential in determining system utility. -- indicates clear evidence, - indicates some indication. Normally due to evidence that one of the three statements above does not hold.
o	While there is no or insufficient indication that the factor is influential in determining system utility, there is equally no or insufficient indication that it is not.
DK	Insufficient data to assess. Reasons include inadequate exploration of the issue in interviews; inconclusive replies to questions in interviews; the impact on benefits obtained cannot be separated from other possible causes.

Success factors supported by cases (continued)

System perceived as empowering. A related flaw in case B and regional users in case C was that users did not all feel involved or empowered. By contrast, managers in case A talked of “buy-in” from users. Case A showed that control can still be exercised provided it is accompanied by efforts to obtain user commitment.

Appropriate planning units. No case had consistent problems with inappropriate definition of products and markets, but where isolated problems occurred (A and B), they significantly reduced the value of part or the whole of the system for relevant users.

Success factors with limited support

Within this group, while the research is consistent with the hypothesised success factor, rival hypotheses cannot be ruled out. Often this is because of the difficulty of isolating the effect of the factor from the effect of other possible success factors that may have caused the success or otherwise of the system.

A market orientation, or at least the perception of a need for it. In all cases, the system was introduced as part of a process designed to increase market orientation. The limited funding in case B may have reflected a lack of wider support for this process in the company.

Adequate training Training was cited as a difficulty in cases B and C. Although it may have been a limiting factor in case D, weaknesses in the user interface design of the prototype are probably a better explanation.

Garbage in, garbage out: avoiding manipulation. The need to avoid manipulation of outputs in systems based on management judgement was recognised in cases A and C, where rigorous scoring criteria were used to reduce the subjectivity of inputs.

Flexibility in planning processes. The danger that a marketing planning system, whether computerised or paper-based, could hamper creativity was expressed in case B. Perhaps the lack of a facilitator was one factor in this, as one role of facilitators found in previous research was to broaden out the discussion where the formalisms contained in the system were not

appropriate to the topic in question. In case C, initially excessively rigid planning procedures were usefully loosened.

Absence of excessive short-term pressures One factor causing the flawed first release in case C was the urgent need to take decisions. In case D, system use went on the “back burner” for a time following a restructure: “the debris is now beginning to settle”.

“Expert-driven” as well as “user-driven” development Some respects in which the system in case B did not match marketing theory may have been prevented by greater involvement from external experts. By contrast, case C’s external input ensured a specification that was “right first time” - though the implementation took longer to get right.

Success factors with mixed support

Here, the hypothesis may need revision, as the evidence from the cases is mixed.

Use prototyping or otherwise allow for iteration Case A provided the first example that has been seen of a successful development without the need for iteration - parts of the system being developed in one cycle. However, some of the most complex parts (involving portfolio matrices) were developed with more iteration. Other cases supported the success factor. This suggests that while this factor forms a sensible heuristic in bespoke developments, it is not necessarily essential.

Adequate facilitation Successful use without a separate facilitator in case C provides a counter-example, the marketing director both running the session and putting forward a particular view on the session’s substance. The difficulties that remote users had in case B suggest that the presence of an experienced user, at least, is important, even if that of an impartial facilitator is optional.

Co-ordination of system use with planning cycle. Although use within the planning cycle appeared more influential in cases A and D, the opposite applied in case C, where director involvement ensured that ad-hoc use was still effective. Clearly, then, this factor depends on circumstances, including the nature of the ad-hoc use, and the role of formal planning in the organisation.

SUMMARY

Benefits of systems

The cases support the researchers’ previous results with respect to several benefits that can be obtained from marketing planning systems. Systems can aid in the use of marketing tools through automated calculations, graphical display and guidance; the support for fast iteration can facilitate group planning; and the electronic format eases the integration of cross-functional analyses and assists with multi-level planning, as well as supporting moves towards more continuous planning based on a live marketing model of the business. The cases are inconclusive on several other hypothesised benefits: time savings, identification of data requirements, and the impact on softer factors such as marketing planning confidence. While learning benefits are a common aim, they are not always achieved, suggesting that learning may depend on the presence of a facilitator. The structuring of the planning process can be a benefit, but is subject to the danger of hampering creativity, which must be countered through a flexible approach, a point which applies equally to paper-based systems (McDonald 1984; Hooley et al 1984).

These benefits can help to reduce some of the marketing planning barriers we identified at the start of this paper. “What-if” features and the incorporation of cross-functional models can facilitate the involvement of widely-defined cross-functional teams and the board, while the

support for marketing tools can reduce the level of knowledge and skills required. Support for multi-level plans and maintenance of a 'live', continuously updated model enable approaches to planning that may be better attuned to the requirements of some organisations. Other barriers must be addressed by other means, however, including cultural problems, while systems are likely to make at most a limited impact on resource and data constraints.

Factors affecting successful implementation

Success factors supported are:

- Backing from a system champion and sponsor. This supports other DSS research that has found top management support to be an important factor (Guimaraes et al 1992)
- Sufficiently wide team definition. This supports marketing planning research, where its absence has been identified as a barrier to effective planning (Hopkins 1981; Stasch and Lanktree 1980; McDonald 1984)
- A system that is seen as empowering rather than controlling by its users. The decision calculus school of DSS development has long argued (Little 1970, Lodish 1981) that systems should leave the user in control of decisions, encouraging but not dictating. This research suggests that the same applies to the manner in which the system is implemented. Similar findings have recently been reported in a study of sales and marketing databases (Hewson and Hewson 1994).
- The definition of appropriate planning units. The definition of business units, product groups and market segments are key inputs into the systems studied, and when inappropriate, nullify the benefits. Given the well-known difficulties of market segmentation (Wensley 1994b; McDonald and Dunbar 1995), definitions should not be hard-coded into systems, and careful segmentation forms an important precursor to system implementation.

The support for a number of other hypothesised success factors was inconclusive or mixed.

THE WAY AHEAD

This study has confirmed that while systems and their application remain at an early stage, the promise of software support for marketing planning is not restricted to the single system studied previously. As systems are developed and more widely used, further research will be able to assess those potential benefits and success factors where this study has been inconclusive. A case research strategy will remain appropriate in this formative area containing "sticky, practice-based problems where the experiences of the actors are important and the context of action is critical" (Bonoma 1983). As the relevant variables become clearer, an experimental approach will become more feasible, though subject to considerable problems in ecological validity, particularly in the effects of systems on the dynamics of groups (Pinsonneault and Kraemer 1989).

In the meantime, the experience of the early adopters suggests that it is not too soon for practitioners to apply DSS technology to this domain. Early adopters are gaining assistance with key issues facing the marketing function such as: how to manage the complexity of analysing multiple product-markets with multiple marketing techniques in situations of uncertainty; how best to move planning out of the hands of specialists and into cross-functional teams; and how to support live planning that can respond efficiently to internal or external changes without the constraints of the annual planning cycle.

Those considering software development or implementation would be well advised to study the success factors we have identified carefully. To avoid those pitfalls relating to the software itself, such as ease of use, packaged systems are worth considering, though bespoke development can also be successful if the possible need for more than one development iteration, and the need for close expert and user involvement in development, are borne in mind. While a full discussion of the system features that led to the identified benefits is outside the scope of this paper, guidelines are emerging for software developers (Wilson and McDonald 1994). These include the need to integrate text and data, reflecting the “semi-structured” nature of marketing planning (Ritchie 1993); the integration of marketing techniques around common data, to exploit technique interrelationships (McDonald 1990); the inclusion of graphics to help understanding, not just advice based on the underlying theory (Jarvenpaa 1989); and the importance of ease of use and system transparency (Little 1970) if the system is to be accepted by senior managers who use the system only occasionally.

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