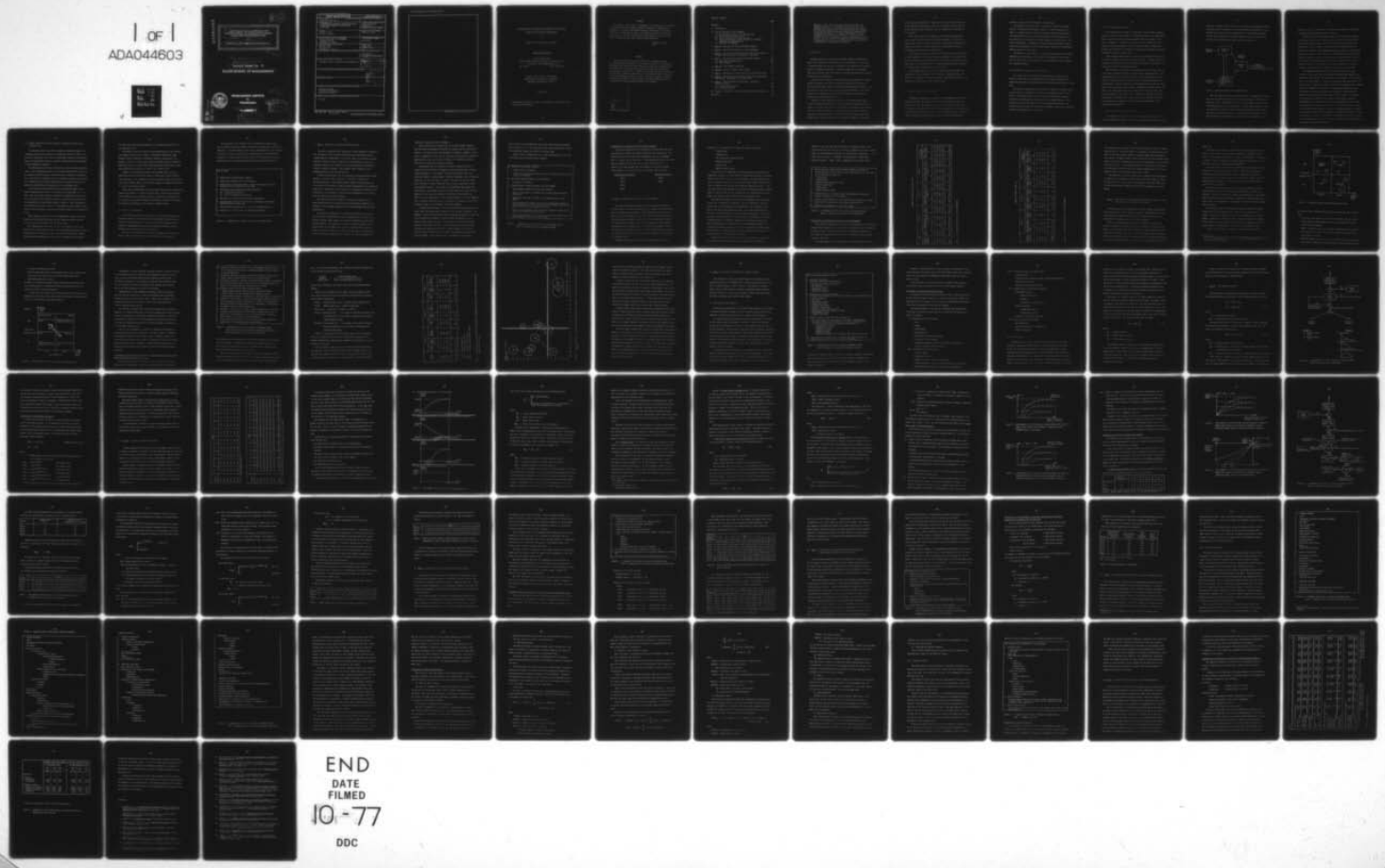
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A METHODOLOGICAL APPROACH FOR THE DEVELOPING OF STRATEGIC PLANNING IN DIVERSIFIED CORPORATIONS.

by

ARNOLDO C. HAX and NICOLAS S. MAJLUF

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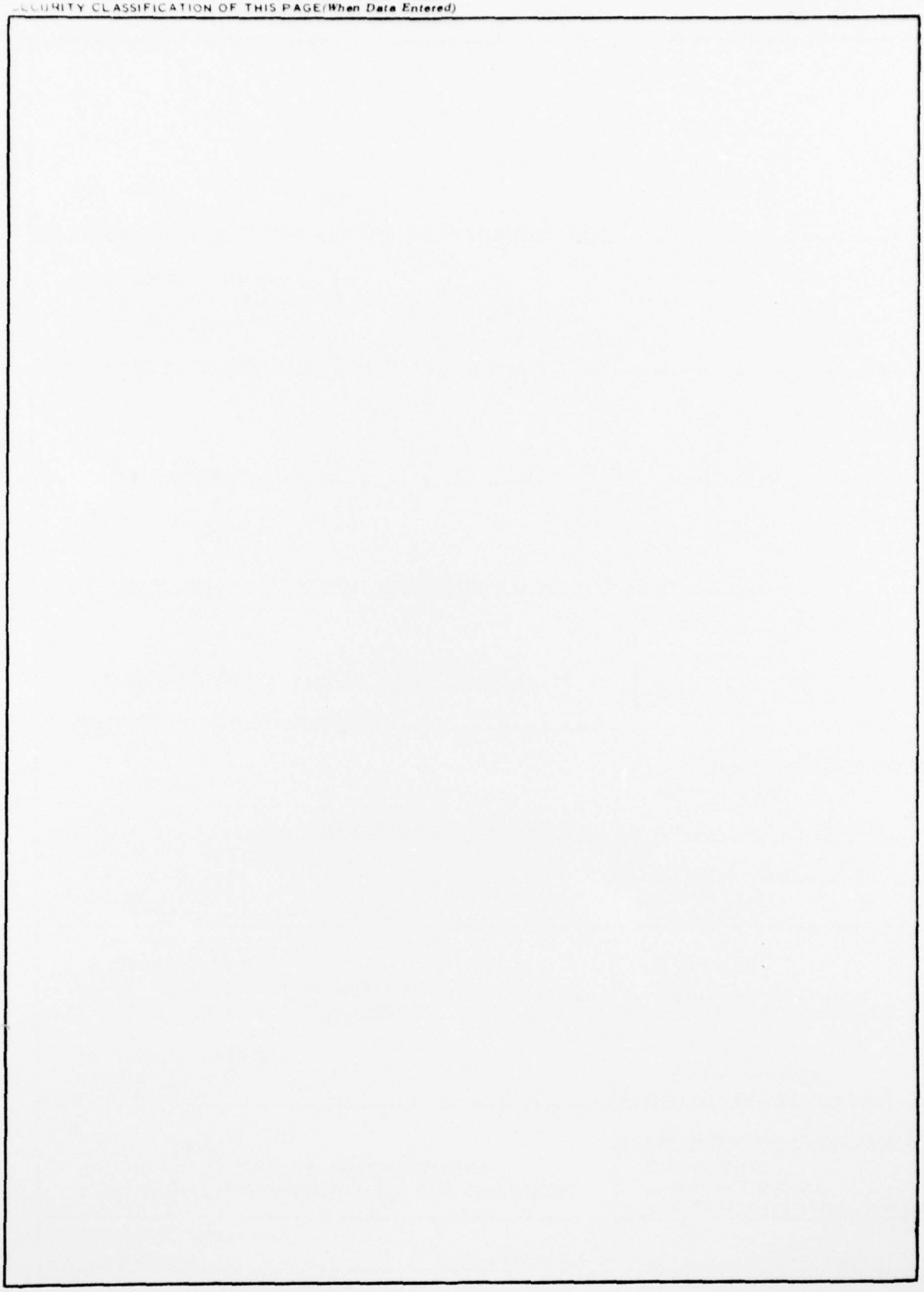
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FOREWORD

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ABSTRACT

This paper discusses an overall approach for strategic planning in a multidivisional corporation. The approach consists of a hierarchical methodology which starts by identifying opportunities for diversification and expansion of the product line, proceeds by analyzing the marketing and production consequences of a number of desirable strategic alternatives, and ends with a financial evaluation of each alternative and the selection of the most appropriate course of action. The use of models is examined throughout the process. An application of the proposed methodology for a subsidiary of a multinational corporation is presented.

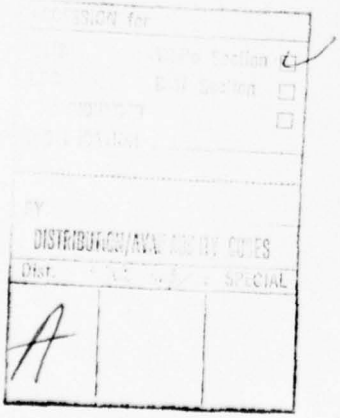


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Abstract. This paper discusses an overall approach for strategic planning in a multidivisional corporation. The approach consists of a hierarchical methodology which starts by identifying opportunities for diversification and expansion of the product line, proceeds by analyzing the marketing and production consequences of a number of desirable strategic alternatives, and ends with a financial evaluation of each alternative and the selection of the most appropriate course of action. The use of models is examined throughout the process. An application of the proposed methodology for a subsidiary of a multinational corporation is presented.

1. *Introduction*

Strategic planning is a process essentially aimed at maintaining a viable match between the organization and the environment. In the case of business firms, this process is focused in the selection of a balanced mixture of products and markets. Firms are looking for a comfortable niche that preserves their survivability even when confronted with vigorous actions taken by competitors.

Business firms consider strategic planning as the process of consolidating and improving the firm's competitive position in the market by reallocating resources from less to more profitable business ventures. In the pursuit of this end, firms will change the composition of the current product mix by adding new product-markets, expanding existing ones, or divesting from old ones (Ansoff [3]).

Except for those firms which operate in very stable markets with products having extremely long life cycles, the whole organization has to engage in the process of finding, structuring, and exploiting new ventures. There are strong incentives for business firms to push their existing capabilities towards uncovering potential investment opportunities that tnable them to cope with unexpected environmental changes, or surprising

actions taken by competitors. Firms that do not give enough attention to maintaining and exploring a portfolio of strategic options, may lag behind competitors and eventually lose the struggle for survivability in the market.

This chapter presents a framework for strategic planning geared to the needs of business firms in competitive markets. Our goal is to suggest some steps, situational parameters, and decision variables which could prove valuable to people engaged in formalizing the strategic planning process in their own organizations.

It is certainly not our intention to claim the general applicability of this framework to all firms in competitive markets. We rather think that the framework to be presented may be effective in providing concrete guidelines for the development of a strategic planning process adjusted to the particular circumstances faced by a firm.

The following section is devoted to make explicit the underlying assumptions in the framework, and to describe, in general terms, the steps to be followed. Later in the report, a more detailed analysis and application of each one of these steps is done.

2. *General Statement of the Framework*

Strategic planning can be presented as an incremental process that gradually pervades the operation of the entire organization (Hax and Majluf [11]). But, when observed at a given point in time, this process is focused on each one of the specific business units of the organization. Consequently, to characterize the strategic planning process of business firms, we need to define its business units within the organization

structure, and the area of activities of those units.

The framework to be presented is intended to provide a systematic approach at analyzing the strategic options of a given business unit. There is a higher level of corporate strategic planning, which requires the consolidation of all the strategic programs of the business units, by looking at the consequences of these programs in the portfolio of the overall corporation. Although the conceptual approach presented herein could also be applicable at the corporate level, we will not specifically address ourselves to that issue.

The purpose of this section is to present some underlying assumptions regarding the positioning of the business unit within the firm, and to list the steps that we are proposing for the developing of this framework for strategic planning.

2.1 *Hierarchical levels in the business firm*

In a first cut of the strategic planning process, only two hierarchical levels need to be distinguished in the business firm; one is called the corporate or central level, and the other the divisional or local level.

The process of defining specific options is mainly a divisional task, but the process of evaluating and selecting an alternative goes at both levels. The division will be the main source of local data on market, production, purchasing, distribution, and local economic factors. The corporation will add the impact that the proposed activities will have on other divisions, and also will assess the degree of bias due to excessive optimism or pessimism at the local level.

2.2 *The Strategic Business Unit*

At a certain point in time, the attention of the strategic planning process is directed exclusively to a well defined unit of the organization, which is given the name of strategic business unit or strategy center. This is "composed of a product or product lines with identifiable independence from other products or product lines in terms of competition, prices, substitutability of products, style-quality, and impact of product withdrawal" (Arthur D. Little [5]).

The strategic business unit is located at the divisional level, but it does not coincide necessarily with the division. A formal division in a firm may contain more than one business unit, only be a fraction of it, or even be a part of many different units.

When focusing the analysis at the divisional level, special care has to be taken to properly include the links with the corporate level. The right perspective for analyzing strategic options should blend both the local and corporate points of view in terms of well defined measures of profitability. Local profitability is determined from the cash flow foreseen at the local level, while corporate profitability should include also those costs and benefits directly accruing at the corporate level, and not being inputed at the local level. Examples are raw materials bought from another subsidiary of the corporation which is getting a profit in the transaction, or administration costs that are being borne by the corporation headquarters.

2.3 *Areas of activity in a business unit*

The strategic business unit is viewed as having three main areas of activity: marketing, logistics (production, purchasing, distribution), and

financial. Normally, these activities are conducted by departments within a division, and it constitutes a third hierarchical level within the corporation participating in the planning effort. The strategic planning process has to distinguish the options open in each one of these areas at both the divisional and corporate levels (see Figure 1).

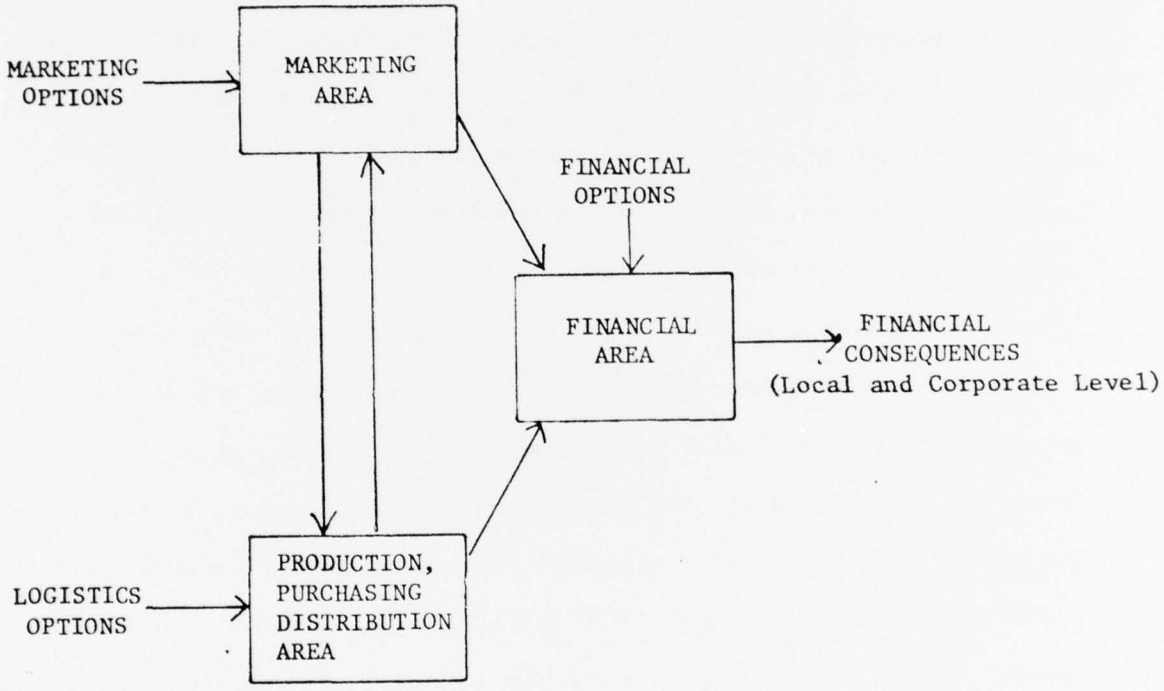


FIGURE 1. AREAS OF ACTIVITY IN A STRATEGIC UNIT

When performing a strategic planning effort, the organization usually goes into the marketing, logistic, and financial areas, in some sort of sequential order. The normal pattern is to put emphasis in the analysis of marketing options in the first place. In this stage, logistics options are considered in terms of rough engineering estimations, just to make possible a first assessment on the attractiveness of the venture. Only when confidence in the marketing projections and the goodness of the

venture are built up, the center of attention is changed to the detailed consideration of alternative logistics options

Toward the end of the planning process, once the study of marketing and logistics alternatives is fairly mature, the detailed consideration of financial options captures most of the effort of the planning team. Nonetheless, at every stage of this process, the financial evaluation provides the mechanism for integrating marketing, logistics, and financial decisions in terms of a well defined set of profitability measures. Consequently, though it may be ascertained that in most practical situations the strategic process addresses these areas of attention in some sort of sequential order, all of them have to be always present for evaluation purposes, at whatever level of definition they have at a given time.

The framework being presented in this paper includes strategic variables in the three areas being identified (marketing, logistic, and financial). Nonetheless, this framework has been thought to be more helpful in the early stages of a strategic planning process, when most of the effort is put in identifying viable options in the marketing area. Logistics options are assumed to be matched to the marketing alternatives being considered, and financial decisions are adjusted to their historical pattern rather than explored their impact in full detail. For example, if the new projects under scrutiny require doing certain technical transformations in production plants, these transformations are assumed to be carried out without a deep study of the available technical options. On the financial side, capital structure and dividend policy, for example, are assumed to be given. This assumption, although appropriate for a divisional analysis, should be relaxed when performing the strategic planning at the corporate level. For a discussion of financial strategic variables, the reader is referred to Zakon [23].

2.4 *Problem definition, general approach to strategic planning, and empirical base*

It should be clear by now that the center of attention chosen is a strategic business unit located at the divisional level of a firm. The activities identified in this unit are marketing, logistic, and financial ones, but preferential attention is given to marketing in the development of this frameowrk of analysis.

The marketing options being considered are those related to modifications of the existing product mix in a strategic business unit, which can be conducted through expansion, diversification, acquisition, divestment, etc. The ability to identify the correct timing to introduce new products or to withdraw from the market existing ones will greatly determine the growth and profitability characteristics of the strategic path.

The analysis has been developed from the approaches taken by the Boston Consulting Group (BCG) [6] and Arthur D. Little (ADL) [5]. In their view, the product mix may be treated as a portfolio of options and it is the thrust of the strategic analysis to decide on the allocation of cash generated by the most mature lines of products. This consideration is certainly more valid in terms of a cash balance for the overall corporation, but its application can also give valuable insights at the divisional level.

These approaches are built on three fundamental concepts: the learning curve, the product life cycle, and the strong correlation observed between return on investment (ROI) and market share.

The learning curve shows that the cost of performing a given task decreases in a fixed percentage each time the cumulative production doubles. Learning effects, economies of scale, appropriate substitutions, product redesigns, and technological progress serve to explain the realizations

of these costs reductions (Hirschmann [12]), (Abernathy and Wayne [2]), and (Abernathy [1]).

The product life cycle calls for the identification of four development stages in the life of a product: Introduction (Embrionic, Rapid Growth), Growth (Competitive Turbulence), Maturity (Saturation), and Decline. Each one of these stages requires different kinds of managerial skills and actions, and has diverse implications for the resource allocation within the firm (Arthur D. Little [5]), (Wasson [20]).

Finally, the correlation between ROI and market share, has been reported by Project PIMS (Profit Impact of Marketing Strategy) (Buzzell, Gale, and Sultan [7]), (Shoeffler, Buzzell, and Heany [18]), and has led to the use of market share as an effective measure of strategic performance in a highly diversified company.

These three considerations have been used by BCG and ADL to graphically position the product in a matrix categorization. This idea is exploited in the framework to be presented, because it proved to be a powerful way to synthesize a good deal of marketing information, and make it available to different participants in the strategic planning process.

2.5 *Steps in the framework*

A set of simple tools and models form the core of this framework for strategic planning. More sophisticated and flexible representations can certainly be more adequate, but chances to fail in providing a simple language of communication and interaction among the different parties involved are increased with more complex rules.

The steps of the framework for strategic planning are indicated in Figure 2 and are analyzed in the following sections of this paper.

All the steps in the framework will be presented in general terms, and illustrated by using an example taken from a very specific professional experience. All names and data used in this illustration have been completely altered, in order to preserve the confidentiality of the information. Nontheless, the qualitative characteristics of the applications have been maintained, and the salient methodological features have been stressed.

List of Steps:

1. Definition of Product-Market Segments.
2. Quantitative Analysis of Past Performance.
3. Positioning of the Product-Market segments with respect to their Life-Cycle and the Portfolio of the firm
4. Qualitative and Quantitative Marketing Analysis
   - 4a. Total Market Projection
   - 4b. The Set of Market Share Options
5. Definition of a Base Case and its Sales Projections.
6. Determination of Physical Facilities and Investment Requirements Associated with the Base Case.
7. Financial Model Specification. The Set of Financial Options.
8. Evaluation of the Base Case and Sensitivity Analysis.

FIGURE 2. A FRAMEWORK FOR STRATEGIC PLANNING IN BUSINESS FIRMS

3. *Step 1: Definition of Production-Market Segments*

In order to begin with the application of this framework of analysis, the realization of the strategic planning process should have certain minimum degree of advancement. At the very least, the attention of upper executives should be aroused (ignition of the strategic process), the strategic business unit recognized, and its basic options formulated in terms of a general strategy. (For example, place X appears to be a promising market for our product-line Y).

Initial considerations, and the information already available should provide a sufficient base to generate a taxonomy of existing and new product-markets. These product-market segments thus generated are at the core of the process, because strategic alternatives in the marketing side will be formulated as the inclusion of new segments (diversification, acquisition), the exclusion of existing ones (divestment), or the expansion or reduction of existing segments.

The first step in this framework of analysis corresponds to the formal identification of existing and new product-market segments to be included in the strategic planning process for exploring their potential profitability.

Some degree of ambiguity in the definition of markets for products that are partial substitutes will arise inevitably, but an effort has to be made to define these segments as products in mutually exclusive competitive markets. The standard industrial codes may be helpful in the identification of the market (for example, see Rumelt [17]), but some judgment should be exercised to choose the proper level of aggregation in the definition of product-market segments, in order to maintain the

condition of mutually exclusive segments.

Good indications for defining the set of product-market segments may stem from the geographical location of markets, and the distribution network. By using the pair product-market to identify a segment, we have tried to emphasize the fact that the same physical product in a different geographical market, may well be considered as a completely different entity for the purpose of strategic planning.

The potential uses of a product are also an important factor to consider in the definition of segments, because they may help to resolve certain ambiguities. For example, baking soda may serve three very different purposes: cooking powder, toothpaste ingredient, and refrigerator deodorant. On the other hand, the need to contain beer and soft drinks may be satisfied in three different ways: tin cans, disposable bottles, and returnable bottles. These kinds of considerations may suggest the convenience of classifying a specific product under two or more different segments, if the uses that consumers are giving to that product are oriented to the satisfaction of very different needs. It is also suggested that on certain occasions it may be convenient to consider two physically different products as participants in the same segment.

If product-market segments are not properly defined, important information about the product may be disguised from the view of analysts. For example, a firm in the diet-drink market using only saccharine as sweetener for its products, may reach the conclusion that the market is in the maturity stage, while, in fact, it may plunge to 0 if this artificial sweetener is banned by the FDA. In general terms, it can be said that technological changes may precipitate certain products of a firm into the decay stage, though the generic market in which they participate may still be rising. In the example above, the market for diet drinks

may be rising, but the market for diet drinks sweetened with saccharine may be forced to 0. In the watch market, the total market may be rising, but traditional watches are clearly in a decay stage.

Figure 3 gives a summarized view of some considerations to be noted in the definition of product-market segments.

a. Existing Product-Market Segments

- Identification of Segments
- Criteria for aggregation (dependent upon the analysis level and the uses of the product)

b. New Product Market-Segments Being Considered

- Definition of Segments

c. Identification of Competing Market for Each Segment

- Product-Market Segments are mutually exclusive
- There is some degree of ambiguity for products that are partial substitutes
- Industrial codes may be helpful in the identification of the market
- The product-market combination may be the appropriate definition of the competitive market, particularly for a product being distributed in more than one geographic location.
- The uses of the product (satisfaction of consumer's needs) are the clue for the marketing identification
- The competing market for a product may be more restrictive than the generic market in which it is classified.

FIGURE 3. A FRAMEWORK FOR STRATEGIC PLANNING IN BUSINESS FIRMS - STEP 1: DEFINITION OF PRODUCT-MARKET SEGMENTS

Illustration of definition of product-market segments

In the case being used as an illustration, the SIC codes were used as guidelines to define the competitive markets for each product. The definition process went gradually converging to the list of segments that is finally used in the study. In the exposition of this case, only four old segments and two new ones are used, because that is enough to give some insight into the richness of the real situation. These segments are identified with the following short-cut names:

Existing product-markets	New product-markets
Old-A	New-A
Old-B	New-B
Old-C	
Old-D	

4. *Step 2: Quantitative Analysis of Past Performance*

Once the product-market segments have been properly identified, the next step is to start the preparation of a reduced (but significant) piece of quantitative information. This information should provide a small set of key variables for evaluating the historical performance of the existing product-market segments. The idea underlying this effort is to make a direct, simple, and relevant assessment of the strengths and weaknesses of the organization to be shared by everybody. This is an important step toward establishing a common information base to hold the contribution that different people will be doing in the elaboration of a strategic plan.

Important parameters may vary wildly in different cases, but a

minimum set of observations for compettive firms is given by:

- Total Market
- Company Sales
- Most Important Competitor Sales
- Market Growth Rate
- Market Share
- Relative Market Share.

This set has been suggested by the BCG approach for evaluating the competitive strength of a firm holding a diversified portfolio of products, which is later used in Step 3 of this framework. An interesting measure that is included in this set is the relative market share, defined as the ratio of company sales over the most important competitor's sales. This is in line with certain empirical observations showing that relative market share is a better proxy for the solidness of the firm's position in the market than absolute market share (The Conference Board [8]).

Profitability measures of each one of the segments are not included in this set of variables. Certainly, it may be desirable to add here, profit, ROI, or other measures of profitability. The problem is that, most of the time, these are measures hard to get from competitors with the level of detail required to make meaningful comparisons. Since sales are more easily available, they are being used as an imperfect substitute of profitability. It should be emphasized that, despite ignoring the direct consideration of profitability in this preliminary analysis (it is captured indirectly in sales, and in the two measures of market share), profitability is a central criterion in the final decision, because it is the objective of the financial evaluation.

Generally speaking, the second step in this framework is started by selecting the most suitable quantitative parameters to position the

product in its life-cycle and in the firm's portfolio, which in this case has been made with the set of variables suggested by the BCG approach. Then, the corresponding information is collected for an adequate number of years (three to five, for example), and organized in a small number of tables and graphs. Figure 4 gives a summarized view of these steps.

a. Select the most suitable quantitative parameters to assess the product position in its life-cycle and in the portfolio of the firm. In the BCG approach these are:
   - Total Market
   - Company Sales
   - Most Important Competitor Sales
   - Market Growth Rate
   - Market Share
   - Relative Market Share

b. Maintain the set of variables under consideration as reduced as possible (identify the key variables).

c. Collect this information for the past three to five years (or other period which is considered to be adequate and feasible).

d. Organize the information in tables and graphs.

FIGURE 4. A FRAMEWORK FOR STRATEGIC PLANNING IN BUSINESS FIRMS - STEP 2: QUANTITATIVE ANALYSIS OF PAST PERFORMANCE

Illustration of Quantitative Analysis of Past Performance

The information suggested above was in fact collected for the existing product-market segments in the case being illustrated, and it is presented in Tables 1 and 2. An effort was made to get similar information for most important competitors, but no data were available at the time the study was conducted.

The time spanned by this information is the three years previous to

Summary of Market Data (000's US$)

Year -4		Year -3			Year -2			Year -1			Year -0 (Estimated)	
Product Market Segments	Total Market	Company Sales	Most Imp. Competitor Sales	Total Market	Company Sales	Most Imp. Competitor Sales	Total Market	Company Sales	Most Imp. Competitor Sales	Total Market	Company Sales	Total Market
Old-A	46,140	891	5,091	56,000	1,464	7,000	76,360	2,036	10,818	101,820	2,545	127,280
Old-B	20,640	682	2,364	26,090	945	2,818	33,820	1,064	3,273	40,910	1,182	47,270
Old-C	76,730	1,345	8,364	84,730	1,909	6,909	112,730	1,818	6,364	129,640	2,327	155,090
Old-D	206,050	2,750	4,545	229,320	3,054	5,455	277,730	3,364	6,818	305,770	3,364	336,360
TOTAL	349,560	5,668	20,364	396,140	7,372	22,182	500,640	8,282	27,273	578,140	9,418	666,000

TABLE 1. QUANTITATIVE ANALYSIS OF PAST PERFORMANCE

Summary of Market Data (%)

Product Market Segments	Year -3			Year -2			Year -1			Year -0 (Estimated)	
	Market Growth Rate	Market Share	Relative Market Share	Market Growth Rate	Market Share	Relative Market Share	Market Growth Rate	Market Share	Relative Market Share	Market Growth Rate	Market Share
Old-A	21.4	1.6	18	36.4	1.9	21	33.3	2.0	19	25.0	2.0
Old-B	26.4	2.6	29	29.6	2.8	34	21.0	2.6	32	15.5	2.5
Old-C	10.4	1.6	16	33.0	1.7	28	15.0	1.4	29	19.6	1.5
Old-D	11.3	1.2	61	21.1	1.1	56	10.1	1.1	49	10.0	1.0
AVERAGE (%)	13.3	1.43	28	26.4	1.47	33	15.5	1.43	30	15.2	1.4

TABLE 2. QUANTITATIVE ANALYSIS OF PAST PERFORMANCE

the realization of the study, and the estimated data for that year (designated as year 0). The total market is estimated to be almost $670 million with a 15.2% annual growth, which is certainly higher than the growth of the economy. The market share is only around 1.4%, but the relative market share is around 30%, showing that the leader in the market is not capturing more than 5% of it. A more extreme example of this peculiar circumstance is illustrated by product Old-D, that despite capturing only 1.1% of the market in Year -1, its relative market share is 49%.

This behavior of the data illustrates in a neat way the high degree of dispersion in the market, partly caused by the large number of firms attracted into it. At the time of realization of the study, there were at least 60 firms with a small but significant percentage of the total market.

5. *Step 3: Positioning of Product-Market Segments with Respect to Their Life-Cycle and the Portfolio of the Firm*

The most basic worry of competitive firms is to keep in mind always the characteristics of their product portfolio. The position of a firm in the market will depend drastically on its ability to exploit new opportunities attainable with the available resources.

Step 2 of this framework stood for the collection of basic data needed to summarize the characteristics of the firm in a few tables and graphs. An essential result of that work has to be the assessment of the competitive strength of the firm. In this assessment, market parameters, product characteristics, and firm variables have to be skillfully related, to show the internal and external perspective of the product portfolio in

simple way.

This step will introduce a matrix categorization popularized by BCG, because it has proved to be a valuable instrument to synthesize graphically a lot of market information in a single representation. Afterwards, an effort is made to abstract from the BCG approach what seems to be the conceptual parameters underlying their proposal.*

The kind of graph used by BCG to condense the characteristics of the portfolio of the firm is shown in Figure 5. Each circle corresponds to a different product market segment, and the parameters in the X and Y axis used to fix the center of this circle are relative market share and market growth respectively. The area of the circle is proportional to total sales of the product.

The vertical line in the middle of the graph is drawn to differentiate products in which the firm is leader and products in which it is follower. Because of the relative market share definition, a value greatr than 1 implies that the most important competitor's sales are below the firm's sales for that product. The opposite is true if the relative market share is below 1.

The horizontal line in the middle of the graph relates the dynamic characteristics of a product market segment with an average level of growth. This level is commonly chosen as the GNP-growth or the industry growth. Segments in a low growth market usually correspond to products in the maturity or decay stage of their life-cycle. Segments in a high growth market correspond rather to products in an increasing stage.

In this way, four major categories of products are identified in

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* When referring to the BCG approach, we mean primarily the portfolio analysis via a matrix categorization. We do not intend to represent the BCG's views on strategic planning.

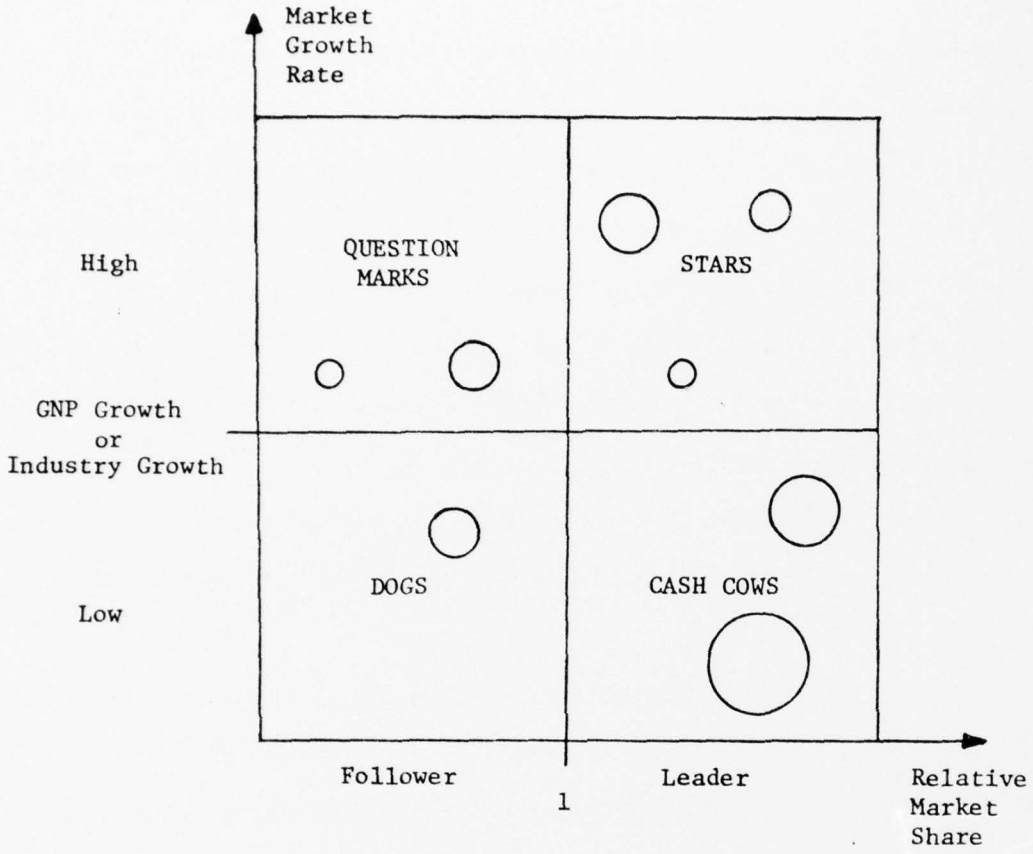


FIGURE 5. AN EXAMPLE OF MATRIX CATEGORIZATION USED BY BCG

the relative market share-growth matrix, whose names have been coined by BCG:

- "Cash Cows": High market share and low growth rate products, which usually generate large amounts of cash to be reinvested in potentially desirable products.
- "Dogs": Low market share and low growth rate products, which constitute typical "cash traps" that neither generate nor require significant amounts of cash.
- "Problem children or question marks": Low market share and high growth rate products, which require large amounts of cash to either maintain

or expand the marketing position.

- "Stars": High market share and high growth rate, which currently may need little or no cash flow, but have the future potential of generating large sums of money.

The heart of the decision making process vis-a-vis this classification, is to identify where to concentrate financial and marketing efforts to enhance the overall company performance.

The BCG group goes further in the interpretation of this matrix, when suggesting that the most likely expectations with regard to the generation and use of cash and those indicated in Figure 6.

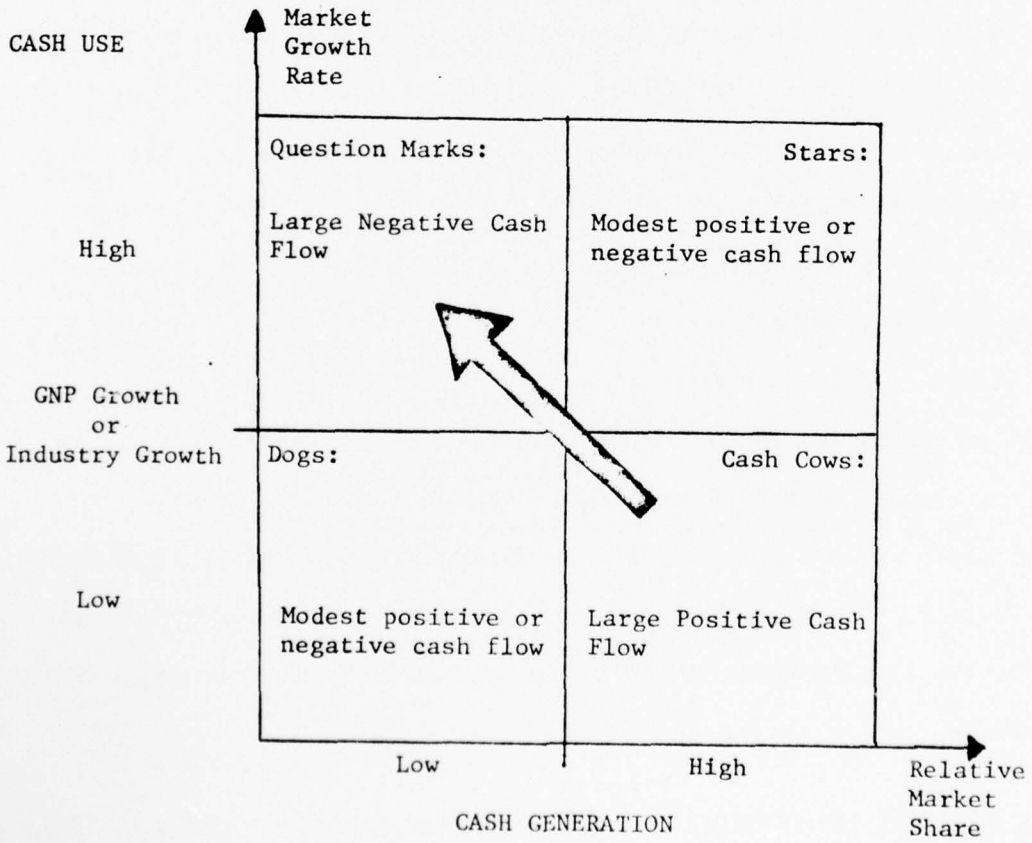


FIGURE 6. GENERATION AND USE OF CASH ACCORDING TO THE BCG GROUP

Consequently, the most important strategic decision in the BCG approach is to determine the way in which the cash generated by cash cows will be used to support and promote some carefully selected question marks. If the firm is successful in its attempt, it will push those question marks into a leadership position in the market (thus becoming star products), and it will have potential cash cows for the future.

Complementary to this fundamental strategic action, BCG indicates that the firm must decide also on which dog products may be profitably divested to have an extra source of cash. Finally, star products are in an expectant position in the market, and the firm should make every effort to maintain that position.

To think that one graph, like the matrix presented, may be enough to summarize all relevant information, and even to suggest the strategic courses of action unambiguously is certainly a simplistic conclusion. The intention behind the discussion of the BCG approach with certain parsimony, is to illustrate through that proposal the richness that may be condensed in a well thought graphical tool.

Step 3 in this framework is an effort to stimulate the intuition of people participating in the formulation of strategic plans. By drawing from approaches similar to BCG, Figure 7 makes a specific proposal for constructing a graph that leaves open the definition of all its parameters. These parameters must be a single or a composite measure capable of condensing the firm position in the market in terms of both firm and market variables.

Illustration of positioning product-market segments with respect to their life-cycle and the portfolio of the firm

The information collected in Tables 1 and 2 constitute the base of data needed for the graphic positioning of products, and it is now used

a. Establish a measure to identify the product-market segment position in its life-cycle (maturity of the market measured by market growth in the BCG approach).
b. Establish a measure to identify the firm's position in the product-market segment (relative market share in the BCG approach).
c. Establish a measure to identify the product-market segment contribution to the firm's results (net revenue is used in the BCG approach; net profit or other profitability index may also be used).
d. Prepare a chart with the three variables above:
   - Product-market segment position in its life-cycle (Y-axis)
   - Firm's position in this product-market segment (X-axis)
   - Product-market segment contribution to the firm's result (circle area).
e. Identify a cut-off rate to classify product-market segments position in its life-cycle (mature, non-mature, or unclear if the indication about the maturity of the product is not conclusive). (GNP growth or industry growth in the BCG appraoch.)
f. Identify a cut-off rate to classify products according to the firm position in each particular product-market segment (good, poor, or unclear if the information is not conclusive enough). (Relative market share of 1 is used in the BCG approach.)
g. If possible, prepare similar charts for most important competitors (competitors for existing and new product lines).

FIGURE 7. A FRAMEWORK FOR STRATEGIC PLANNING IN BUSINESS FIRMS - STEP 3: POSITIONING PRODUCT-MARKET SEGMENTS WITH RESPECT TO THEIR LIFE-CYCLE AND THE PORTFOLIO OF THE FIRM

for constructing a chart spanning the three years previous to the realization of the study. By putting the information of three years in the same chart, not only the positioning of products will be indicated, but also their relative movements in this period.

The kind of chart used in this illustration is very much like BCG's. The basic parameters used are relative market share, market growth, and net sales. The horizontal divisionary line is chosen as the industry growth

rate. The vertical divisionary line is defined in a more unorthodox way as the average relative market share:

$$\text{Average Relative Market Share} = \frac{\text{Sum of Company Sales}}{\text{Sum of Leading Competitors Sales}}$$

This was done because the firm was not the lead in any product-market segment.

However, since average relative market share and industry growth rate change from year to year, the parameters were refined as follows to permit dynamic comparisons:

X-axis: Relative market share - Average relative market share

Y-axis: Market growth rate - Industry growth rate

Circle area: Net sales (in dollars of year 0)

Vertical divisionary line: It is drawn at the level 0 (because with the redefinition of the X-axis, 0 represents the average relative market share)

Horizontal divisionary line: It is drawn at the level 0 (because with the redefinition of the Y-axis, 0 represents the industry growth rate).

Table 3 is constructed from the previous data, as an intermediate step to draw Figure 8, which in this illustration corresponds to the graphic positioning of product-market segments in the market and in the portfolio of the firm.

From the graphic categorization of products it may be appreciated that Product A is the one with the highest rate of growth, but this is precisely the segment in which the firm's position is the weakest, and it has stayed this way during the three year period. Note that though

Product Line	Year -3			Year -2			Year -1		
	MG-IG (%)	RMS -ARMS (%)	Sales (000 US$)	MG-IG (%)	RMS -ARMS (%)	Sales (000 US$)	MG-IG (%)	RMS -ARMS (%)	Sales (000 US$)
Old-A	8.1	-10	891	10.0	-12	1,464	17.8	-11	2,036
Old-B	13.1	1	682	3.2	1	945	5.5	2	1,064
Old-C	-2.9	-12	1345	6.6	-5	1,909	-0.5	-1	1,818
Old-D	-2.0	33	2750	-5.3	23	3,054	-5.4	19	3,364
CUT-OFF	13.3	28	-	26.4	33	-	15.5	30	-

MG = Market Growth (%)

IG = Industry Growth (%)

RMS = Relative Market Share

ARMS = Average Relative Market Share

TABLE 3. DATA NEEDED TO POSITION THE PRODUCT-MARKET SEGMENTS WITH RESPECT TO THEIR LIFE-CYCLE AND THE PORTFOLIO OF THE FIRM

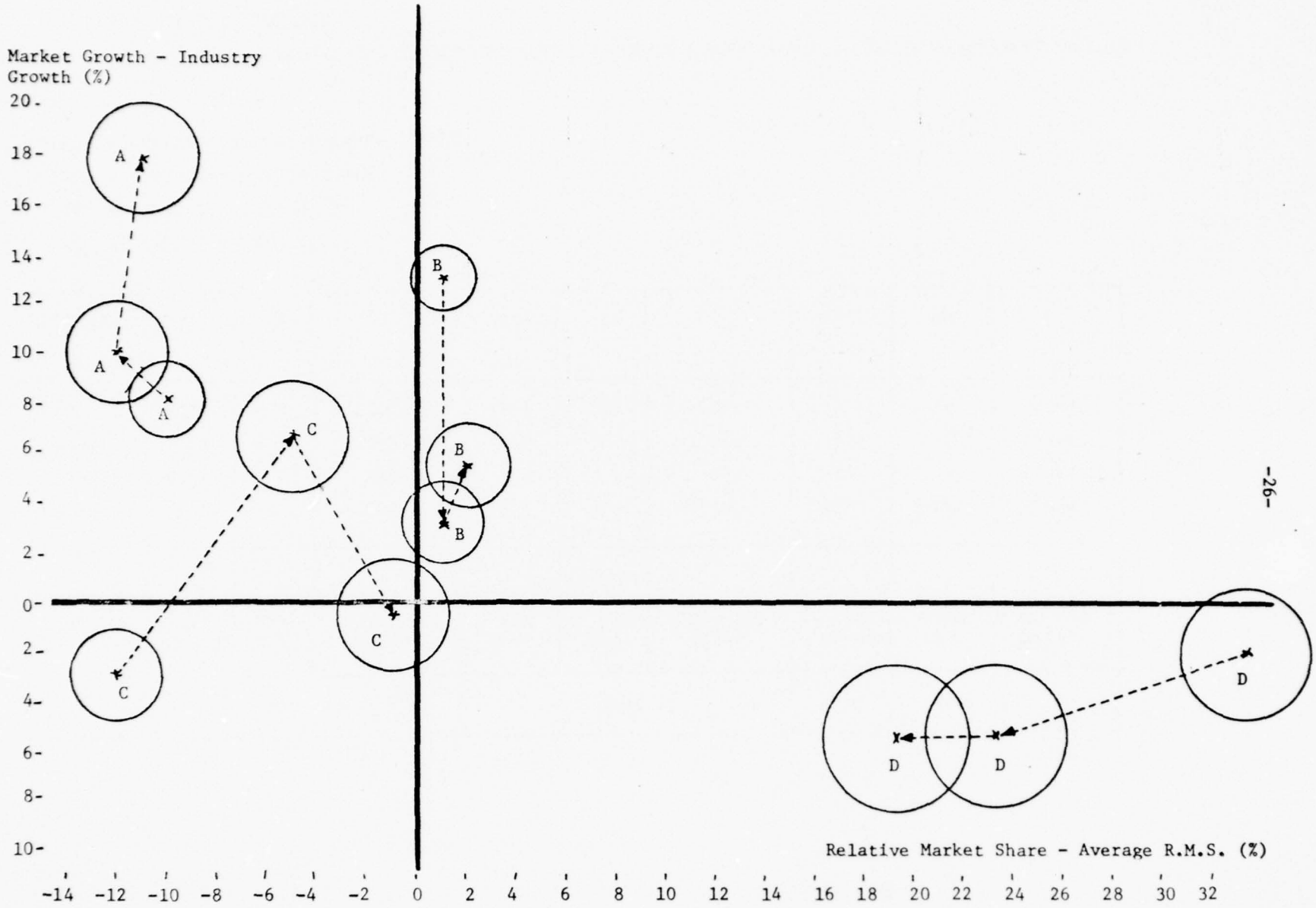


FIGURE 8. GRAPHIC ASSESSMENT OF THE PRODUCT-MARKET SEGMENTS WITH RESPECT TO THEIR LIFE-CYCLE AND THE PORTFOLIO OF THE FIRM

the circle size has been growing, the position of the segment in the market has remained unchanged. This indicates that the sales growth has been enough to match the leader growth in the market, but not to improve the relative position of the firm in it.

Product C is the only one in which the firm seems to be improving its relative position, but this is a dog in the BCG nomenclature. The growth of this product is below the growth of the industry, and it is a less attractive alternative for other firms in this market. The gain in the relative position of Product C may well be due to a possible retraction of other firms from this market. If this were the case, the firm should be prepared to leave that market at some time in the future, because this segment would be in a decay stage in the life-cycle.

Product B shows a more erratic growth and a stagnant position in the market. Finally, Product D, that is the only cash cow, is quicly losing its position in the market, despite the growth in sales shown by the larger area of circles. This should be a source of deep concern for the firm, and the causes behind this pattern, as well as the strategic alternatives that these causes may suggest, should be investigated thoroughly.

From this simple illustration, it may be seen that this categorization suggests a good number of interesting topics of concern for concentrating the effort of the strategic planning team. Balance sheets and operating statements are not enough to measure the strategic value of the different product market segments. This type of chart is a useful vehicle to conduct information in a simple pictorial way to people that need not be fully aware of the marketing options of the firm. This chart has given not only the product positioning, but also the trends observed in the last three years of the study.

6. *Step 4: Qualitative and Quantitative Market Analysis*

The realization of this step should bring in all qualitative and quantitative pieces of information that different groups can make available to finally generate a sales forecast. For expository purposes, Step 4 will be broken down into sections, qualitative market analysis and sales forecast. In turn, sales forecast is split into total market forecasts and definition of market share options.

6.1 *Qualitative Market Analysis*

The matrix categorization of the firm's product portfolio is intended to provide preliminary insights into the strategic process which may be sustained or dismissed when new data are brought into the analysis.

By using historical information and present expectations a forecast for the future should be provided. The kind of issues that should be focused upon are indicated in Figure 9. Three general areas are specifically addressed. The first one is the definition of plausible scenarios. For that to be done, trends should be analyzed and expectations formulated on the outlook for the economy, the industry, the specific markets, competitors' actions and the firm's situation. The information is summarized in terms of different scenarios for each one of which a sales forecast should be later on provided.

The second area to be addressed is an estimation of the competitive characteristics of the products in many different dimensions. The generation of the products' profile will disclose strengths and weaknesses of old and new products. For example, vulnerability to new technologies,

Some issues that should be focused:

a. Scenarios definition.
Determine trends and expectations on:

- The general economic environment
- The industry
- The product markets
- Competitor actions
- The firm's situation.

b. Generation of product's profiles.
Strengths and weaknesses of old and new products, like vulnerability to:

- New technologies
- Inflation
- Raw material supply
- Competitor actions
- Consumer preferences
- Cyclical fluctuations
- Strikes, workers' union actions
- Government and other regulatory bodies
- Environmental impact
- Community reaction.

c. Dynamic analysis under different scenarios of:

- The total market for each product. Life-cycle considerations.
- The firm's absolute and relative market share. Considerations on the firm's position in the market as the result of:
  - Environmental scenario
  - Competitors actions
  - Marketing strategy
  - Marketing effort
  - Market structure
  - Product's strengths and weaknesses (the product's profile).

d. Identification and analysis of the impact that other internal and external factors may have on the product's performance.

FIGURE 9. A FRAMEWORK FOR STRATEGIC PLANNING IN BUSINESS FIRMS - STEP 4: QUALITATIVE AND QUANTITATIVE MARKET ANALYSIS

inflation, raw material supply, competitors' actions, consumers' preferences, cyclical fluctuations, strikes, workers' union actions, government and other regulatory bodies, environmental impact, community reaction, etc., should be assessed.

Finally, a detailed analysis of the evolution to be expected in the total market for the product and in the firm's market share under different scenarios, will provide the fundamental information needed to produce a sales forecast.

A good discussion on relevant issues to consider at this stage of the strategic process is given by Steiner and Miner [19], Chapter 8.

Illustration of qualitative market analysis

To illustrate the extension and richness of the interaction generated by the qualitative market analysis, it would be necessary to provide too many details of the product's, firm's, market's, and material characteristics, which are peculiar to this specific example.

The following sample of the kind of information that was explored in drawing the product's profile provides a flavor for the qualitative analysis conducted.

(i) Characteristics of the product

- Size
- Weight
- Obsolescence
- Transportation
- The firm's production technology
- Uses given by the consumer
- Scientific principles behind the action of the product (in more sophisticated industries).

(ii) Characteristics of the market

- Size ($, units)
- Competitor's roles
- Analysis of most important competitors
- Characteristics of products recently launched to the market
- New production technologies being used by competitors.

(iii) Life-cycle position and market share

- Launching date
- Sales patterns (long-run trends, cyclical fluctuations)
- Market share patterns
- Relative market share patterns.

(iv) Responsiveness to marketing strategies

- Promotional effort
  - Media advertising
  - Samples
  - Salesmen's activities, etc.
- Price strategies
  - Demand elasticity
  - Competitor reactions
- Changes in advertising approach.

(v) Future competitive environment

- New competitors
- Expected activities of competitors
- Patent protection.

6.2 *Sales forecast*

The generation of a sales forecast is done in terms of some kind of explicit or subjective "marketing model", which incorporates the impact on sales of the general environmental situation, competitors' actions, marketing strategy, marketing effort, market structure, and the product's strengths and weaknesses. The approach to build a model like this varies greatly for each specific case, depending on the firm's practices and the degree of predictability that the external variables may present. Personal

preferences of the group in charge of a task like this, coupled with the particular characteristics of the firm's environment, determine if a highly sophisticated correlation model, and educated guess, or a more intermediate methodology is the most appropriate approach to produce a sales projection. An early marketing model with strategic planning implications was proposed by Weinberg [21]. The Brand Aid marketing models provide a valuable tool to identify key strategic variables and represent their dynamic interrelation (Little [13] and [14]).

We propose now a specific model of the market situation, abstracted from the particular experience underlying this study. The model intends to estimate total sales for a product by a two step procedure: first the total market projection, and second, the firm's decision on share of that market to be sought after. The total market is defined to be independent of the firm's actions and the desired market share to be a basic strategic decision of the firm. The relation to get sales is simply:

$$S_t = MS_t \times M_t \qquad (1)$$

where:

S_t = Sales in period t

MS_t = Market share in period t

M_t = Total market in period t.

Total market should be understood as total potential market, which is an environmental variable that can not be manipulated by the firm. Market share is the fraction of this potential market that the firm is considering capturing. This is the basic strategic result, because it is affected by all kinds of promotional and marketing decisions undertaken by the firm.

Steps 4a and 4b of the framework for strategic analysis correspond to the determination of these two factors concurring in the sales forecast. They are in turn analyzed in further detail.

7. *Step 4a: Total Market Projection*

The total market is projected by specifying its current value and the market growth factor, according to the following recursive relation:

$$M_t = MGF_t \times M_{t-1}$$

$$M_o = \text{given data} \qquad (2)$$

where:

M_t = Total market in period t

MGF_t = Market growth factor from (t-1) to t.

The market growth factor is expressed in terms of a factor depending on the general environmental situation (the scenario), and a life-cycle factor, as indicated in relation (3):

$$MGF_t = SF_t \times LCF_t \qquad (3)$$

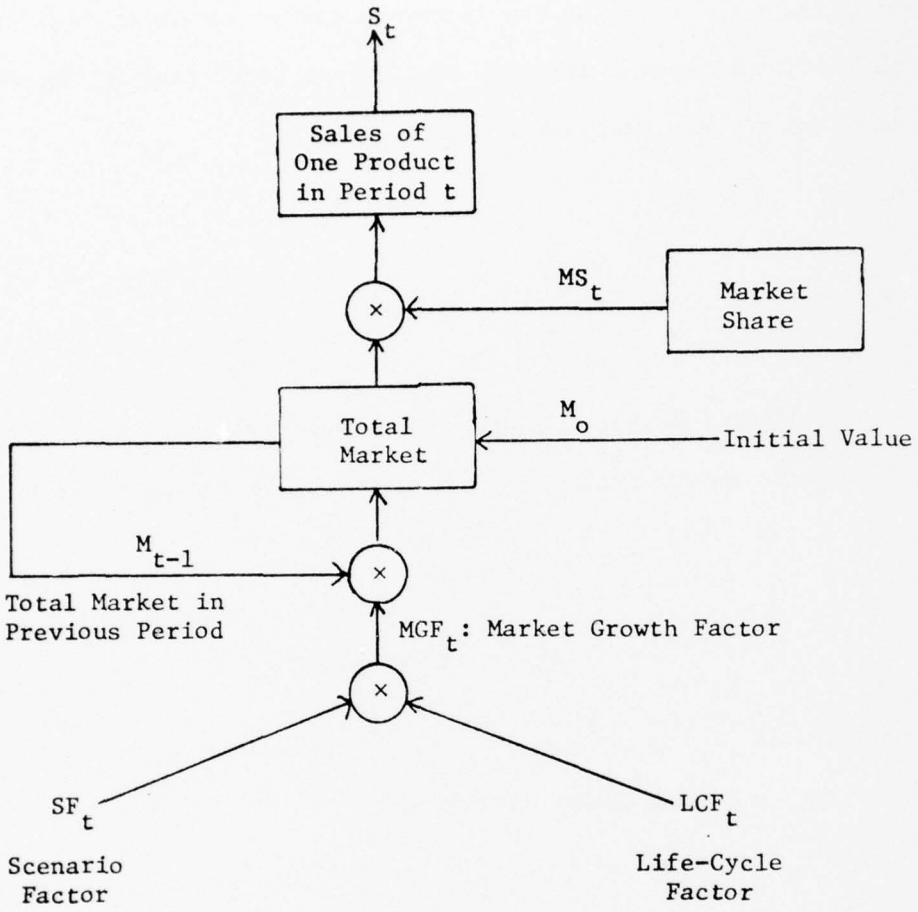
where:

MGF_t = Market growth factor in period t

SF_t = Scenario factor in period t (a factor external to the product that depends on the scenario)

LCF_t = Life-cycle factor in period t (a factor typical to the product).

Figure 10 gives a summarized view of the total market projection, and some specific forms that may be adopted by these factors. Four main objectives are being sought with the formulation of this model: first, maintain

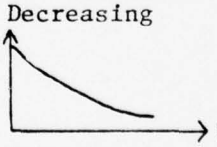


Examples:

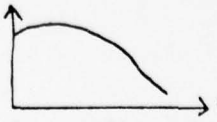
1) Variable growth $(1+G_t)$
2) Constant growth $(1+G)$

Examples:

1) Decreasing



2) Maturity-Decreasing



3) Growth-Maturity-Decreasing

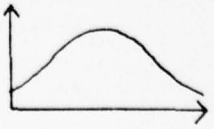


FIGURE 10. A FRAMEWORK FOR STRATEGIC ANALYSIS IN BUSINESS FIRMS - STEP 4a: THE TOTAL MARKET PROJECTION

its structure as simple as possible; second, provide enough flexibility to include subjective information in almost every place; third, leave room for using more advanced techniques in the determination of some of the factors (econometric methods, for example), or getting those factors from more comprehensive models (for example, to get the scenario factor from a macroeconomic model like DRI [10], MPS [16], or Wharton (McCarthy [15]); and fourth, make the model suitable for sensitivity analysis.

Illustration of Total Market Projection

A version of this model was used to produce the market projections in the case being presented. At the beginning, there was not analytic formulation of the market growth factors, but a later analysis disclosed the fairly consistent patterns used by the marketing team, because their numbers could be reproduced within a 1% deviation with the following exponential growth formulas:

$$MGF_t = SF_t \times LCF_t \qquad \text{[same as relation (3)]}$$

$$SF_t = (1+G)$$

where:

G = Market growth rate depending on overall economic conditions (G = .08 for the base case)

$LCF_t = 1.157e^{-0.012t}$ for product Old-A

$LCF_t = 1.07e^{-0.004t}$ for product Old-B

$LCF_t = 1.108e^{-0.0005t(t-4)}$ for product Old-C

$LCF_t = 1.017e^{-0.00075t(t-4)}$ for product Old-D

$LCF_t = 1.065e^{-0.0001t(t+1)(t-9)}$ for product New-A

$LCF_t = 1.08e^{-0.00012t(t+1)(t-9)}$ for product New-B

It is very useful to translate subjective estimates into analytical

expressions like these, because having these expressions greatly facilitates subsequent sensitivity or scenario analyses aimed at modifying life-cycle assumptions.

The market growth factors obtained from the application of these formulae are given in Table 4. It may be noticed that products A and B have a decreasing life-cycle factor, while products C and D have a fairly constant factor in the first years and a decreasing factor thereafter (maturity-decreasing situation). Finally, new products A and B show an increasing pattern at the beginning to continue later on with a maturity and decreasing life-cycle factor.

The total market, obtained by applying the market growth factor to the previous year total, is given in Table 5. The data for year 0 are provided as external data.

8. *Step 4b: The Set of Market Share Options*

Having determined the total market for each segment, now the aim is to produce a mechanism to estimate the impact that some decisions may have on the firm's share in each market under consideration. The main characteristic to be assessed for old and new product-market segments is the sensitivity of the market share to different marketing strategies.

Market share is a composite measure of marketing strategy that can be very much affected by decisions under the control of the firm. It is a global assessment of the degree of efficacy achieved by the marketing strategy adopted by the firm. This is the driving idea behind this step, in which the firm's decisions are being traced forward into their impact on market share.

Product Line	Year									
	1	2	3	4	5	6	7	8	9	10
Old-A	23.5	22.0	20.5	19.1	17.7	16.3	14.9	13.5	12.2	10.8
Old-B	15.1	14.6	14.2	13.7	13.3	12.8	12.4	11.9	11.5	11.0
Old-C	19.8	19.9	19.8	19.7	19.4	18.9	18.4	17.8	17.0	16.1
Old-D	10.1	10.2	10.1	9.8	9.4	8.9	8.1	7.2	6.2	5.0
New-A	15.2	15.5	15.9	16.2	16.4	16.5	16.3	15.9	15.0	13.8
New-B	16.9	17.2	17.7	18.0	18.3	18.4	18.2	17.7	16.6	15.1

TABLE 4. MARKET GROWTH FACTORS (%)

Product Line	Year									
	1	2	3	4	5	6	7	8	9	10
Old-A	157,138	191,697	231,067	275,200	323,853	376,561	432,626	491,108	550,846	610,481
Old-B	54,410	62,376	71,221	80,997	91,747	103,508	116,311	130,176	145,113	161,117
Old-C	185,867	222,861	267,084	319,604	381,496	453,782	537,342	632,799	740,385	859,790
Old-D	370,281	407,923	449,056	493,225	539,711	587,486	635,187	681,120	723,287	759,473
New-A	146,624	169,356	196,201	227,938	265,340	309,064	359,489	416,472	479,026	544,948
New-B	66,931	78,463	92,314	108,974	128,951	152,700	180,520	212,385	247,726	285,159
TOTAL	981,251	1132,676	1306,943	1505,938	1731,098	1983,101	2261,475	2564,060	2886,383	3220,968

TABLE 5. TOTAL MARKET PROJECTIONS (At price for products in year 0, 000 US$)

The main decision that the firm has to make for each one of the product-market segments, is to determine the market share target, which is the level of market share to be attained by the end of the planning horizon. This target implies an overall marketing strategy that the firm has to follow (marketing effort and pricing policy). At the same time, the dynamic pattern followed by market share from its present level up to the target, called the market share learning factor, is imbedded in the selection of the marketing strategy.

The attainment of the market share target is conditioned to a primary decision, the entry date for new products, and the withdrawal date for old ones. That is to say, the target is attained provided that the product is introduced to the market (if new), or it is not withdrawn (if old).

Consequently, the following parameters are being used to get market share through time:

- the present level of market share (0 for new products);
- the market share target, to be attained by the end of the planning horizon;
- the market share learning factor, which is the dynamic approach from the present level of market share to the target;
- the entry date for new products;
- the withdrawal date for old products.

It is in the determination and specification of these parameters that most of the subjective inputs have to be brought into the analysis, to complement and improve the information content of quantitative data.

Typical behaviors assumed for market share are exemplified in Figure 11.

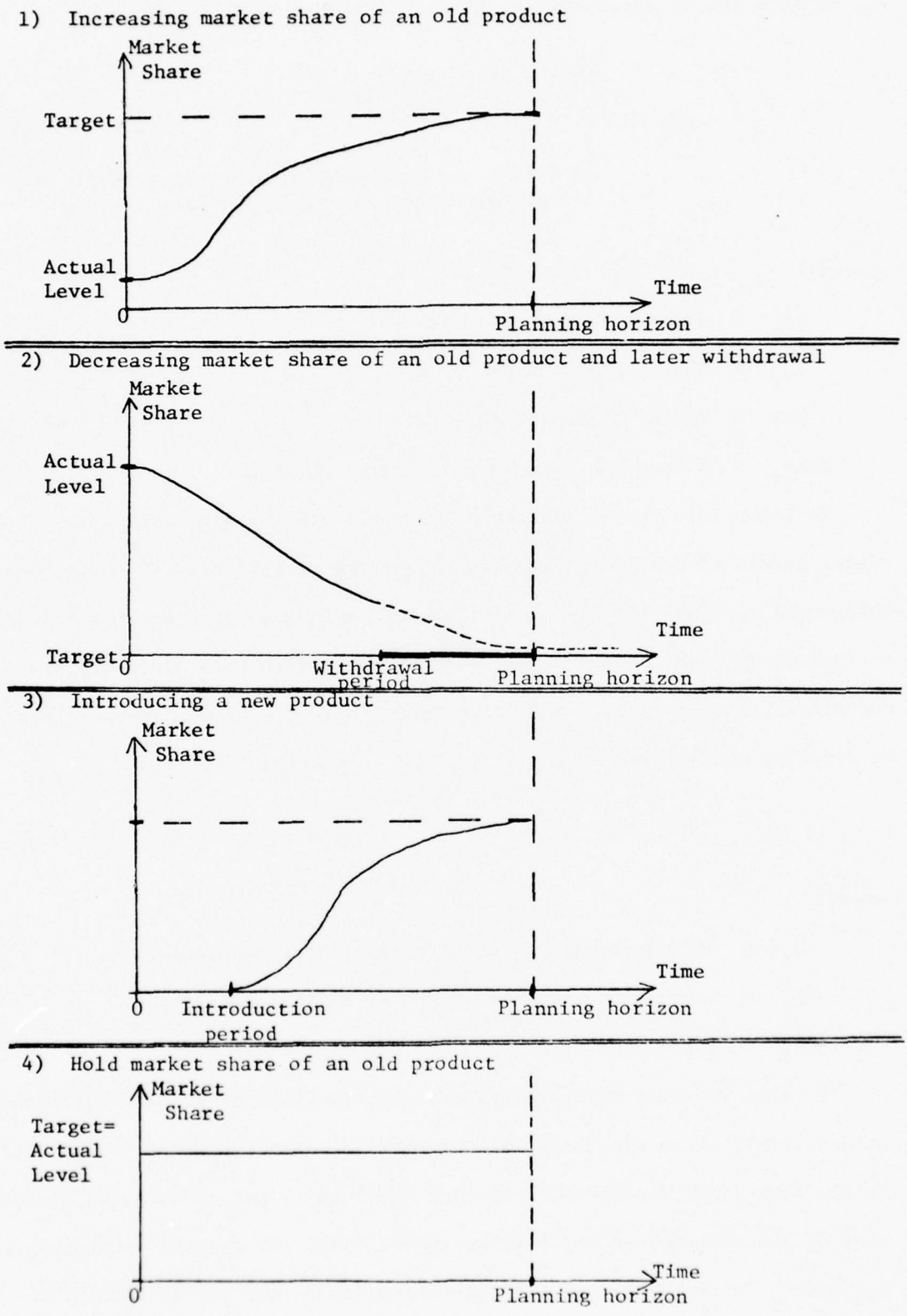


FIGURE 11. SOME EXAMPLES OF MARKET SHARE BEHAVIOR THROUGH TIME

All of them can be easily represented by the following relation:

$$MS_t = \begin{cases} MS_o + MSLF_t(MST-MS_o) \\ \\ 0 \text{ before the introduction of a new product or after the withdrawal of an old one} \end{cases} \quad (4)$$

where:

MS_o = Initial market share (given)

MS_t = Market share in period t

MST = Market share target

$MSLF_t$ = Market share learning factor in period t.

To bring into the estimation of market share the appraisal that higher levels of management may have about the overall risk of the business, this model contemplates the possibility of scaling up or down this initial estimation by means of a suitable factor. This factor is given the name overall efficiency factor, and it performs the correction of market share by directly multiplying it, as indicated in relation (5).

$$\overline{MS}_t = OEF_t \times MS_t \quad (5)$$

where:

$\overline{MS}_t$ = Corrected estimation of market share for period t

MS_t = Previous estimation of market share for period t

OEF_t = Overall efficiency factor for period t.

In this way, top managers are left with a slack to account for systematic pessimistic or optimistic biases introduced in the marketing projection by the functional departments, in such a way as to get an unbiased estimation of the expected value of market share under the assumed environmental scenario. Furthermore, the overall efficiency factor may be used conveniently to simplify the realization of a sensitivity analysis, or a risk

analysis over changes in market expectations held by the study team. For this to be done, it is enough to assign a set of values or a probabilistic distribution to the correction factor.

So far, the skeleton of the procedure for determining market share has been suggested. The main ideas are: first, to decompose market share in terms of the present level, target, learning factor, entry date for new products, withdrawal date for old ones, and the overall efficiency factor; and, second, to recognize the relationships between marketing strategy (marketing effort, and pricing policy), with the target, and the learning factor.

Relations (4) and (5) are formal relations of the way in which market share may be expressed in terms of the more basic components indicated above. Two additional assumptions are suggested to simplify the study of the causal relations between marketing effort, pricing policy, market share target, and market share learning factor.

First, pricing policy. In this model, prices are assumed to be maintained at levels in accordance with the normal practice of the firm, the industry, and the general economic environment. All market shares to be estimated are imbeded in this assumption of normality of the price strategy.

Price variations are then seen as different environmental situations that do not affect in a fundamental way the physical volume of sales. The impact of the price policy over the profitability of the strategic plan is not pursued in this model. If this assumption happens to be too restrictive for a specific case, an effort should be made to determine the elasticity of market share to prices and add a suitable term in the relations to get market share.*

---

* For example, add to the physical volumes of sales the factor $(P/P_o)^{\varepsilon}$, where:
P_o = Base price
P = Any price "close" to P_o
ε = Price elasticity of demand

Second, the market share learning factor. It has been assumed that this factor is given as an external data. This number is characteristic for each product, and it has to be kept in the [0,1] interval. By forcing the external provision of this factor, the model makes available to the study team a door open to represent the most capricious market share patterns that may be thought of by the marketing people. This is, in fact, an important flexibility to have in the model, because the learning factor may be very circumstantial for each product-market segment, and strongly dependent on the strategy resulting in an increase or decrease of market share.

The remaining part of this section is devoted to analyzing the relation between marketing effort and market share target. Two cases are distinguished in the course of this analysis depending on whether a change in market share target is or is not intended in the study period.

If there is no change in the market share target, the marketing effort in a given period is directly given by the follwoing relations:

$$ME_t = MEAF_t \times ME_{t-1} \qquad (6)$$

where:

ME_o = given data (0 for new products)

ME_t = Marketing effort in period t

$MEAF_t$ = Marketing effort adjustment factor from (t-1) to t.

The adjustment factor in relation (6) is obtained by the product of two factors; one is intended to incorporate the market characteristics, and the other the usual practices of the firm in the dosage of promotional effort for their products. Both factors should be given as external data or as a function of known information. Relation (7a) shows the factorization of the adjustment factor.

$$MEAF_t = MAF_t \times FAF_t \qquad (7a)$$

where:

$MEAF_t$ = Marketing effort adjustment factor from (t-1) to t

MAF_t = Market adjustment factor

FAF_t = Firm adjustment factor.

This relation is further simplified in the application in this paper by assuming that the market adjustment factor is the market growth factor, and the firm adjustment factor is a positive constant less than 1:

$$MEAF_t = MGF_t \times c \tag{7b}$$

where:

$MEAF_t$ = Marketing effort adjustment factor from (t-1) to t

MGF_t = Market growth factor

c = Positive constant less than 1.

When the market share target is changed because of the introduction of a new product, or the decision to increase or decrease market share for an old product, the pattern that the marketing effort is having is abruptly disrupted in that period. This is done by adding a pulse to the computation of market share in the period in which the target of the product is changed. Relation (6) is then turned into relation (8), in which it is also made explicit that the marketing effort is 0 before the introduction of a new product or after the withdrawal of an old one.

$$ME_t = \begin{cases} MEAF_t \times ME_{t-1} + \Delta ME_\theta \times \delta(t-\theta) \\ \\ 0 \text{ before the introduction of a new product or} \\ \text{after the withdrawal of an old one} \end{cases} \tag{8}$$

where:

ME_t = Marketing effort in period t

$MEAF_t$ = Marketing effort adjustment factor from (t-1) to t

θ = Period of a change in the market share target (introduction of a new product, or increase or decrease in target of an old product)

ΔME_θ = Change in the marketing effort of period θ needed to eventually reached the new target

$$\delta(t-\theta) = \begin{cases} 1 \text{ if } t = \theta \\ 0 \text{ otherwise} \end{cases}$$

The only piece of information that is missing is the relation to get the change in marketing effort as a function of the intended change in the market share target. This is the link provided in this model between market share target and marketing effort.

This link has to be given as external data to the model, but there are certain qualitative features that may be expected about it. The following examples are worth analyzing:

(i) Figure 12 gives a plausible relation between the market share target and the level of marketing effort that has to be reached in the period of introduction of a new product. Three elements are characterized in in graph:

- An upper limit for the market share target, which probably goes down if the product's introduction is retarded;
- A minimum marketing effort needed before any gain in market share is attained, which probably goes up with a later introduction of the product;
- A diminishing effectiveness of each extra unit of marketing effort added on top of the existing ones.

(ii) Figures 13 and 14 give a similar relation when the strategy of increasing the market share target of an existing product is followed. Note that the variables in the axis are the "changes" with respect to the levels existing at the moment of implementation of the new strategy.

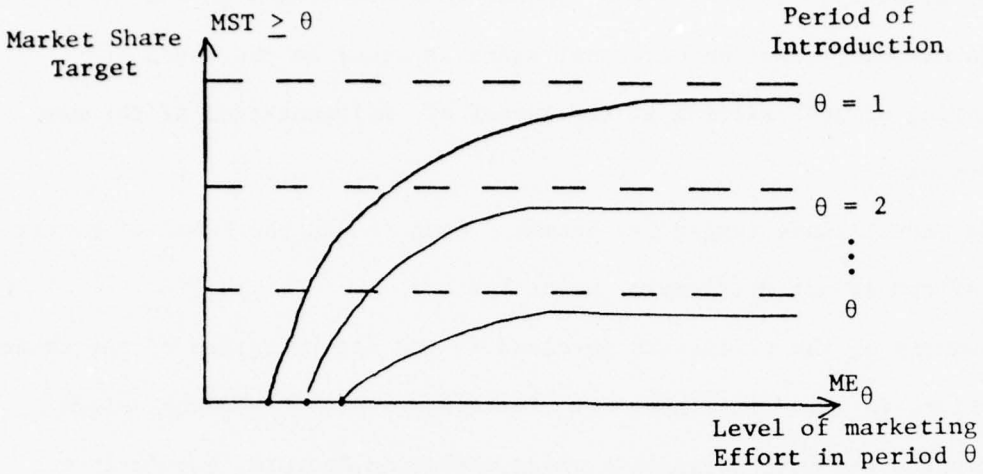


FIGURE 12. SOME EXAMPLES OF THE FUNCTIONAL RELATION BETWEEN THE CHANGE IN MARKET SHARE TARGET AND THE CHANGE IN MARKETING EFFORT - INTRODUCTION OF A NEW PRODUCT

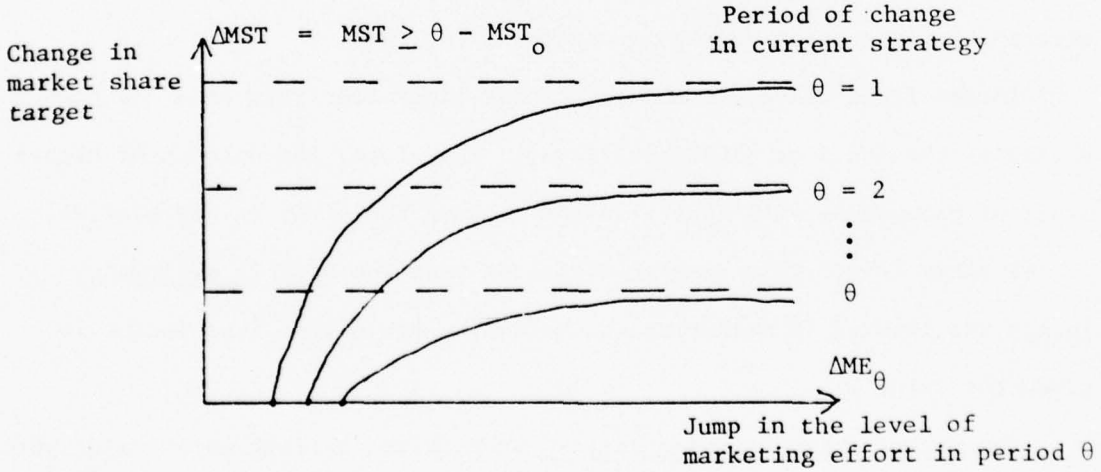


FIGURE 13. SOME EXAMPLE OF THE FUNCTIONAL RELATION BETWEEN THE CHANGE IN MARKET SHARE TARGET AND THE CHANGE IN MARKETING EFFORT - INCREASING MARKET SHARE OF AN EXISTING PRODUCT (VERSION 1)

(iii) Figure 15 completes the picture for a product whose market share is being given up. There are two special characteristics in this case:

- The maximum reduction of market share is equal to the level of marketing effort existing at the moment of implementation of the new strategy;
- The market share target may become 0 even though the level of marketing effort is not 0 (Example, point P).

A summary of the parameters involved in the determination of the market share options is given in Figure 16. Certainly, this is not the unique way to capture the interdependence among marketing factors, but it is a simple way and it serves the purpose of formally bringing into the picture some factors that the marketing people may want to consider in their forecasts.

Illustration of the set of market share options

The objective to be accomplished by the realization of this step, is to get a formal representation for the set of market share options available in the case being used as an example.

In the first place, it should be made clear that this study is conducted at the local or divisional level. Therefore, the opinion of higher level of management with regard to the bias of the study is not available to the study team. This comment indicates that the overall efficiency factor was ignored in marketing the marketing projection (the factor is given the value 1).

The market share learning factors used in the estimation of sales were generated by the marketing group, and are given in Table 6.

	Year of Introduction	+1	+2	+3	+4	+5	≥6
Old-products	40	70	90	100	100	100	100
New-A	10	30	60	85	95	100	100
New-B	30	45	60	75	85	95	100

TABLE 6. MARKET SHARE LEARNING FACTORS FOR OLD AND NEW PRODUCTS (%)

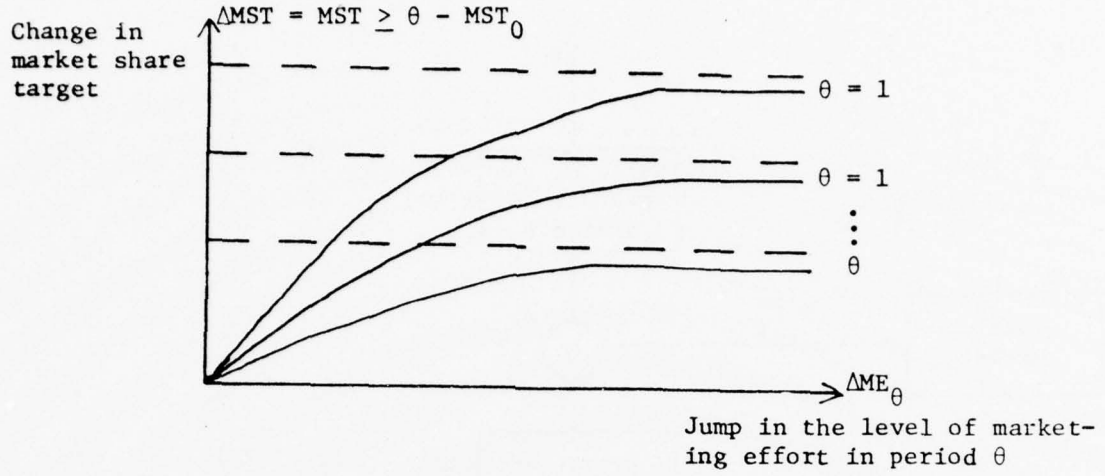


FIGURE 14. SOME EXAMPLES OF THE FUNCTIONAL RELATION BETWEEN THE CHANGE IN MARKET SHARE TARGET AND THE CHANGE IN MARKETING EFFORT - INCREASING MARKET SHARE OF AN EXISTING PRODUCT (VERSION 2)

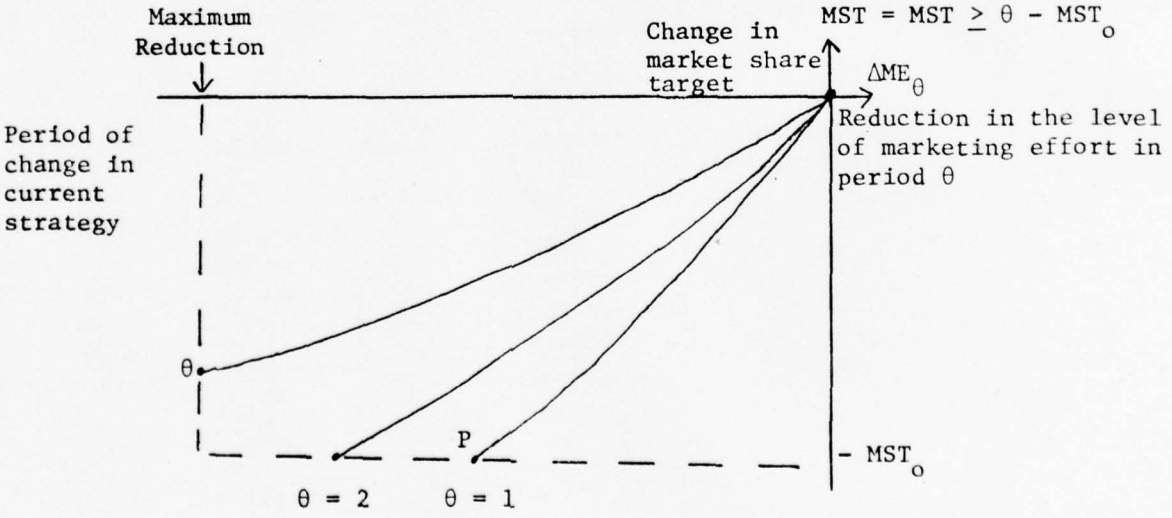


FIGURE 15. SOME EXAMPLES OF THE FUNCTIONAL RELATION BETWEEN THE CHANGE IN MARKET SHARE TARGET AND THE CHANGE IN MARKETING EFFORT - DECREASING MARKET SHARE OF AN EXISTING PRODUCT

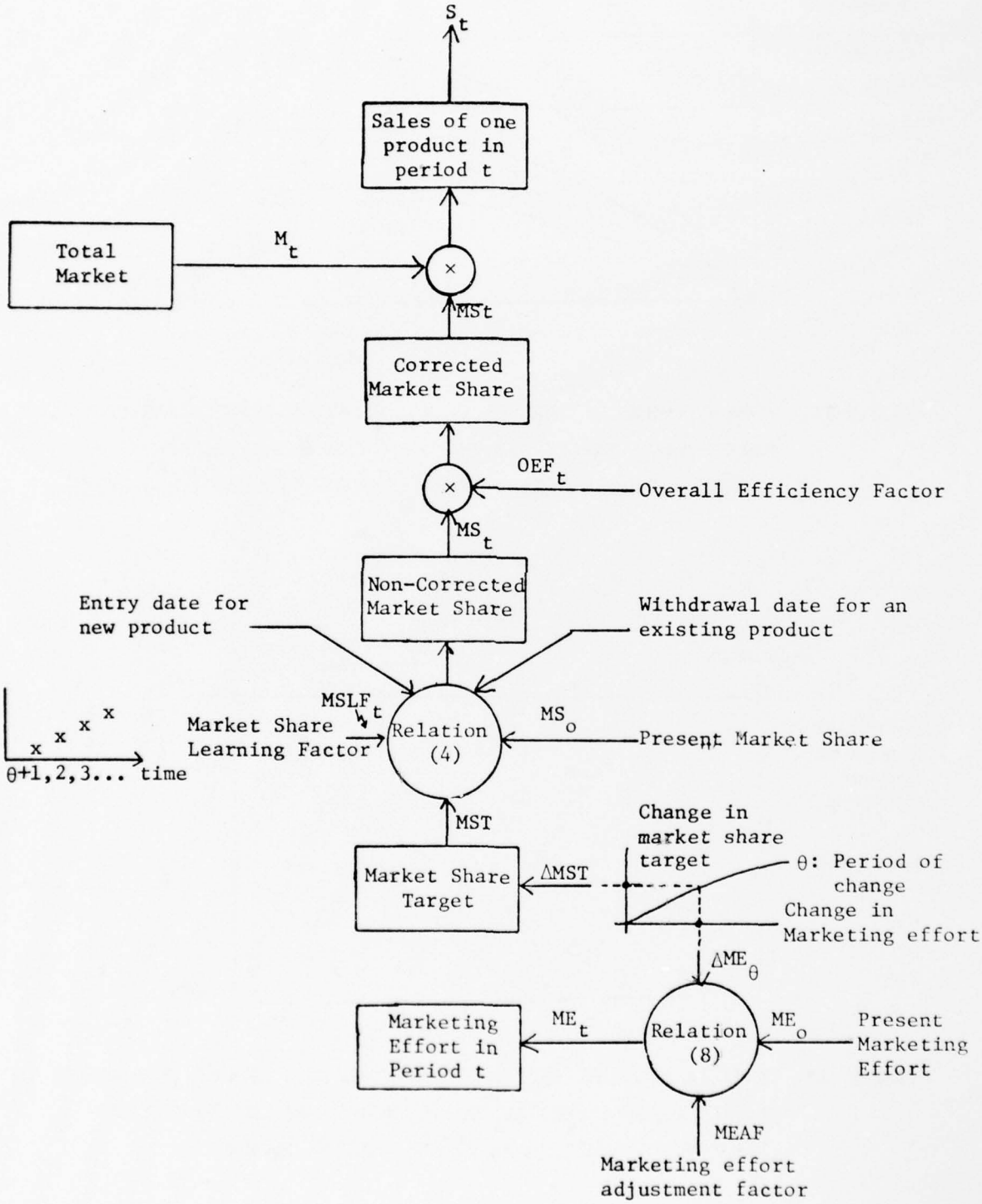


FIGURE 16. A FRAMEWORK FOR STRATEGIC PLANNING IN BUSINESS FIRMS - STEP 4b: THE SET OF MARKET SHARE OPTIONS

The basic strategy formulated for old products is to maintain market share at the current levels, according to what is indicated below.

Product	Market Share (%)	Marketing Effort (Equivalent # of persons)
Old-A	2	35
Old-B	2.5	25
Old-C	1.5	30
Old-D	1.0	20

Marketing effort is directly determined in this case by relations (6) and (7b). In particular, this last relation was used with a constant c = .9, becoming:

$$MEAF_t = .9 \times MGF_t$$

The choice of c = .9 indicates that for the firm to have the same level of sales in a 0-growth market, only 90% of the marketing effort of previous year needs to be done.

The marketing effort obtained by applying these relations under the conditions of the problem are indicated in Table 7.

Product	Year										
	0	1	2	3	4	5	6	7	8	9	10
Old-A	35	38.9	42.7	46.3	49.7	52.6	55.0	56.9	58.1	58.7	58.5
Old-B	25	25.9	26.7	27.5	28.1	28.7	29.1	29.4	29.6	29.7	29.7
Old-C	30	32.4	34.9	37.7	40.6	43.6	46.6	49.7	52.7	55.5	58.0
Old-D	20	19.8	19.6	19.5	19.2	18.9	18.6	18.1	17.4	16.7	15.7

TABLE 7. THE MARKETING EFFORT NEEDED TO MAINTAIN THE MARKET SHARE OF OLD-PRODUCTS (Equivalent number of persons)

It may be noticed that the marketing effort required to maintain the

actual level of market share stabilizes for Products A and B at the end of the period, is persistently increasing for Product C, and persistently decreasing for Product D.

To get marketing effort for new products, it is essential to specify the relation between market share target and marketing effort in the year of introduction. The qualitative properties of this relation, pictured in Figure 12, are analytically represented by means of the following exponential formula:

$$MST_\theta = \begin{cases} U_\theta[1-e^{-A(ME_\theta - B_\theta)}] & \text{if } ME_\theta \geq B_\theta \\ 0 \text{ otherwise} \end{cases}$$

where:

θ = Year of introduction of the product to the market

MST_θ = Target Market Share in year θ

ME_θ = Marketing effort in year θ (measured as number of people in the sales force)

U_θ = Upper limit for market share (decreasing with time) in year θ

B_θ = Minimum marketing effort needed to introduce the product in the market (increasing with time) in year θ

A = Constant to escalate the marketing effort.

U_θ, A, B_θ are a measure on the competitive characteristics of the environment.

Four questions have to be answered to determine the parameters of this situation:

(i) What is the maximum market share that the firm can capture if the product is introduced in year 1 (other year may be used as anchor if desired)? This is the value of U_1.

(ii) What is the minimum marketing effort that has to be committed in year 1 before any market share can be captured? This is the value of B_1.

(iii) Assess the marketing effort required to get a market share $.5 \times U_1$ (any number between 0 and U_1 may be used). This provides enough information to find the constant A.

(iv) Estimate the way in which this relation can be affected if the product is introduced in a later year instead. The variation of parameters with the year of introduction θ has to stem from this exercise.

In this part of the model, there is a great deal of latitude for the study group to bring in subjective and objective knowledge pertinent to the situation.

The relations obtained for new products are the following:

For product New-A:

$$MST_{\geq\theta} = \begin{cases} 0.041(0.95)^{\theta-1}\left[1-e^{-0.18(ME-\theta-9)}\right] & ME \geq \theta+9 \\ 0 & \text{otherwise} \end{cases}$$

For the base case:

$$ME = 30 \quad \text{(persons in the sales force)}$$

$$\theta = 1 \quad \text{(product introduced in the first year)}$$

$$MST_{\geq 1} = 4\%$$

For product New-B:

$$MST_{\geq\theta} = \begin{cases} 0.035(0.95)^{\theta-1}\left[1-e^{-0.1(ME-\theta-9)}\right] & ME \geq \theta+9 \\ 0 & \text{otherwise} \end{cases}$$

For the base case:

$$ME = 30 \quad \text{(persons in the sales force)}$$

$$\theta = 1 \quad \text{(product introduced in the first year)}$$

$$MST_{\underline{>1}} = 3\%$$

Obviously, these relations are hard to generate. Nonetheless, when successfully going through such an experience, the relations produced are a consensus attained by all participants in the study group with regard to the potential of the product, the effort required, and the competitive characteristics of the market. It should be stressed that there is a powerful capability of synthesizing a host of wide experiences and data buried in these relations when they are carefully obtained. There is a parallel between the evaluation of market share targets presented here, and the techniques employed within the framework of decision theory to assess uncertainties and utility functions.

The basic strategy formulated for new products is to assume they are introduced in the first year of the planning horizon, and the marketing effort done in this year of introduction is 30 (equivalent persons) for each product. The resulting market share target is 4.0% for product New-A and 3.0% for product New-B.

By applying relation (4) to these data, the market shares indicated in Table 8 are obtained.

Product	Year									
	1	2	3	4	5	6	7	8	9	10
New-A	.4	1.2	2.4	3.4	3.8	4.0	4.0	4.0	4.0	4.0
New-B	.9	1.4	1.8	2.3	2.6	2.9	3.0	3.0	3.0	3.0

TABLE 8. MARKET SHARES FOR NEW PRODUCTS UNDER BASIC ASSUMPTIONS (%)

The marketing effort needed to maintain the market share target is derived from relations (8) and (7b) (with c = .9), and is indicated in Table 9.

Product	Year										
	0	1	2	3	4	5	6	7	8	9	10
New-A	0	30.0	31.2	32.5	34.0	35.6	37.3	39.1	40.8	42.2	43.2
New-B	0	30.0	31.7	33.5	35.6	37.9	40.4	43.0	45.5	47.8	49.5

TABLE 9. MARKETING EFFORT NEEDED TO REACH TARGETS OF 4.0% AND 3.0% FOR NEW-PRODUCTS A AND B RESPECTIVELY (Equivalent number of persons)

It may be observed that the marketing effort jumps in the first year (introduction of products in the market), and then increases progressively, pushed by the market growth and the condition of holding market share target.

9. *Step 5: Definition of a Base Case and Its Sales Projections*

The selection of a base case is a corner-stone to the proper evaluation and comparison among strategic alternatives. The base case is used as reference to appraise the attractiveness of different decisions. Though it may be defined arbitrarily, it is convenient to choose as the base case the set of circumstances and decisions that appear as the most valid on an a priori analysis.

If the final strategy is selected by exploring the neighborhood of the base case, as is usually done in many complex decisions, this choice might be greatly influenced by the definition of the base case. Under these circumstances, the base case is not only a point of comparison, but

an important initial step in reaching a final strategic decision. If a global optimization could be done, the careful selection of the base case is much less important, but as Cyert and March suggest [9], firms perform only limited comparisons rather than exhaustive searches for optimality, in order to agree on a final course of action.

All preceeding steps in this framework have provided us with the basic information to forecast sales. This forecast is conditional upon the strategic decisions regarding market share, and the scenario of circumstances. The definition of a base case corresponds to the identification of the basic scenario and basic strategic decisions.

The basic scenario is summarized in this model in terms of the planning horizon and the scenario factor that enters in the estimation of the total market for each product [relation (3)].

The basic strategic decisions are summarized in the entry date for new products, the withdrawal date for old products, and the selection of a market share target (for old and new products). Typical strategic options with regard to the target are: hold, increase, reduce, withdraw, and harvest (first reduce and then withdraw).

With this information it is possible to get total sales and marketing effort for all products along the planning horizon. Figure 17 summarizes the definitions involved in the selection of a base case and the projection of sales.

Illustration of the definition of a base case, and its sales projections

When the total market and market share were projected in the illustration give before, the assumptions behind those projections were the base case assumptions. They are now more carefully stated to avoid any confusion:

a. Definition of the basic scenario
   - Determine the planning horizon
   - Indicate the proper scenario factor [Relation (4)]

b. Identification of basic strategic decisions
   - Entry dates for new products
   - Withdrawal dates for existing products
   - Pick a strategy concerning market share target. Typical options are:
     - Hold
     - Increase
     - Reduce
     - Withdraw
     - Harvest (First reduce and then withdraw)

c. Get Total Market (procedure summarized in Figure 10).

d. Get Market Share and marketing effort (procedure summarized in Figure 16).

e. Get Sales for all years in the planning horizon [Relation (1)].

FIGURE 17. A FRAMEWORK FOR STRATEGIC ANALYSIS IN BUSINESS FIRMS - STEP 5: DEFINITION OF A BASE CASE AND ITS SALES PROJECTIONS

Definition of the basic scenario

Planning horizon = 10 years

Scenario factor = 1+G with G = .08

Identification of basic strategic decisions

Product

Old-A	hold market share to 2% during the 10 years	
Old-B	hold market share to 2.5% during the 10 years	
Old-C	hold market share to 1.5% during the 10 years	
Old-D	hold market share to 1.0% during the 10 years	
New-A	Entry date: 1st year	Market Share Target: 4.0%
New-B	Entry date: 1st year	Market Share Target: 3.0%

These parameters and other basic data indicated along the illustration of this example, were used to get the total markets and market shares given in Tables 5 and 8 for each one of the products being considered. Sales projections are now obtained as the simple product of these quantities, and they are presented in Table 10.

Product-Market Segment	Year									
	1	2	3	4	5	6	7	8	9	10
Old-A	3,150	3,818	4,614	5,505	5,491	7,541	8,655	9,832	11,009	12,218
Old-B	1,364	1,564	1,782	2,027	2,291	2,591	2,909	3,255	3,627	4,027
Old-C	2,782	3,345	4,000	4,800	5,727	6,800	8,055	9,491	11,109	12,891
Old-D	3,705	4,077	4,491	4,932	5,395	5,873	6,350	6,809	7,232	7,595
New-A	582	2,036	4,691	7,709	10,036	12,327	14,327	16,618	19,091	21,745
New-B	614	1,064	1,677	2,468	3,314	4,391	5,468	6,423	7,500	8,632
TOTAL	12,197	15,904	21,255	27,441	33,254	39,523	45,764	52,428	59,568	67,108

TABLE 10. SALES PROJECTIONS FOR THE BASE CASE (at price for products in year 0, 000 US$)

In a similar way, sales in physical units are also projected. The resulting numbers are given in Table 11. It is worth noticing that Old-D is a high volume, but not a high revenue product. For example, in year 10, it corresponds to 52.1% of the total volume of Old-products,

Product	Year									
	1	2	3	4	5	6	7	8	9	10
Old-A	990	1220	1450	1730	2040	2370	2720	3090	3460	3840
Old-B	1500	1720	1960	2230	2520	2850	3200	3580	3990	4430
Old-C	1530	1840	2200	2640	3150	3740	4430	5220	3110	7090
Old-D	8150	8970	9880	10850	10850	12920	13970	14980	15910	16710
New-A	160	560	1290	2120	2760	3390	3940	4570	5250	5980
New-B	450	780	1230	1810	2430	3220	4010	4710	5500	6330

TABLE 11. SALES PROJECTIONS FOR THE BASE CASE (000 units)

and only to 20.7% of their revenue. Considering Old and New Products, D represents 37.7% of the volume and 11.3% of the revenue. This observation suggests a strategy that opposes the primary indication of the BCG-kind of graph, because divesting D (a cow in the graph) has the desirable property of freeing plant capacity for other products of higher return. Therefore, investments in a new plant may be postponed by sacrificing part of the sales revenue.

10. *Step 6: Determination of Physical Facilities and Investment Requirements Associated with the Base Case*

It was already indicated that, in this framework of analysis, the set of logistics options is dependent upon the adopted marketing strategy. As a first step, an assessment should be made on the technical viability of the marketing options being considered. Also, the adequacy of existing facilities, the need for their expansion, or the acquisition of new ones ought to be studied.

This initial analysis should provide the appropriate information that, starting with the sales estimates, could render the fundamental consequences of the logistics options. A model to accomplish this task has not been elaborated upon in this paper, because it has been assumed that the level of knowledge and information on the technical options is rather low in the first stages of exploration of a new venture. But such a model can certainly be made more specific if the available data allows that.

The impact of the logistics choices is condensed in terms of investments and cost functions, both of which are representative of the chosen technology. The total investment and its calendar should be given for the base case, and for other relevant alternatives. The investment should

be classified according to its depreciation pattern: for example, in this study it was given in terms of land, equipment, and buildings.

The cost functions are expressions to get the total production and distribution costs corresponding to the level of sales. They have been directly integrated into the financial model and its detailed specification is done in the next section. Special attention is given here only to the raw materials used per unit of final product, singling out those coming from the parent corporation. This is because an important strategic variable is the transfer prices charged for those raw materials, which can substantially change the outlook for the project.

Figure 18 gives a summary of the aggregated way adopted in this study to transmit into monetary terms the impact of the technical choice. The mathematical forms chosen to express investment and cost functions must be adequate to explore the base case and a neighborhood of it, without engaging into an exhaustive new assessment of basic parameters. This is particularly helpful when conducting a sensitivity analysis.

Specification of a technical model:

a. Assumptions regarding investment
   - Total investment for the base case
   - Functions to adjust this investment to close alternatives
   - Calendar of investment
   - Classification of investment according to its depreciation pattern. Typical option:
     - Land
     - Equipment
     - Construction

b. Assumptions regarding cost functions
   - Production costs (Details in the financial model). Separate raw materials coming from the parent corporation (charged cost depends on transfer prices).
   - Distribution costs (Details in the financial model.

FIGURE 18. A FRAMEWORK FOR STRATEGIC ANALYSIS IN BUSINESS FIRMS - STEP 6: DETERMINATION OF PHYSICAL FACILITIES AND INVESTMENT REQUIREMENTS ASSOCIATED WITH THE BASE CASE

Illustration of determination of physical facilities and investment requirements associated with the base case

It was estimated that the plant expansion for the base case should increase actual capacity up to 70,000 units. For a plant capacity of 70,000 (units), the investments required are the following:

- Land: LC$ 11,000,000 — 3 years before starting
- Equipment: US$ 2,400,000 — 1 year before starting
- Construction: LC$ 65,000,000 — 2 years before starting
  LC$ 21,000,000 — 1 year before starting

(LC$ = Local currency; US$ = U.S. dollars)

(1 US$ = 11 LC$)

If capacity is different to 70,000, but close to it, the following relations are used to get the new estimates for the investment.

- For Land and Construction

$$I(C) = I_o(\frac{C}{C_o})^{\alpha}$$

where:

$I(C)$ = Investment at capacity C

I_o = Investment at capacity C_o = 70,000

α = Constant = .5

- For Equipment

$$E(C) = E_o(\frac{C}{C_o})^{\alpha}$$

where:

$E(C)$ = Equipment at capacity C

E_o = Equipment at capacity C_o = 70,000

α = Constant = .2

Expressions such as those provided above are standard engineering practices to obtain crude assessments of investment estimates (Woods [22]).

With regard to cost functions, Table 12 gives the data used in the base case as costs proportional to production.

Product	Raw Materials from Parent Corporation US$/unit*	Other Imported Raw Material US$/unit	Local Raw Materials LC$/unit	Direct Labor LC$/unit
Old-A	0.7	0.3	0.4	0.2
Old-B	0.1	0.0	2.0	0.1
Old-C	0.3	0.0	3.0	0.8
Old-D	0.0	0.1	1.0	0.1
New-A	1.0	0.2	0.5	0.2
New-B	0.2	0.0	2.5	0.5

LC$ = Local currency (1 US$ = 11 LC$)
US$ = U.S. dollars

TABLE 12: COSTS PROPORTIONAL TO PRODUCTION

11. *Step 7: Financial Model Specification. The Set of Financial Options*

The financial model, coupled with the marketing and production models, constitutes the basic mechanism to fully assess the impact of a strategic course of action at the corporative level. Both the financial and production models are pretty much preconditioned by the existing financial policies, and by the marketing strategies chosen. In fact, those two models are not strictly differentiated entities at the level of detail chosen in this paper to make the strategic analysis. They may be thought of as a unique black box that is fed by the marketing projections, and generates cash-flows and

* Transfer prices are assumed to be the current ones (transfer prices index = 1).

profitability measures. These cash-flows encompass all production costs and investment needs, as well as the impact that different financial options may have on it.

The core of the financial model is then an analytic construct allowing the determination of cash streams for the overall planning horizon, under different sales levels, production conditions, and financial options. To make the exposition easier, two sections will be distinguished: model characteristics, and financial options.

11.1 *Model Characteristics*

The general structure adopted for the financial model, that is shown in Figure 19, follows widely accepted conventions (Anthony and Reece [4]). A more detailed version of the same model is given in Figure 20, which gives the itemized specification of the cost of goods sold, that correspond to the representation of the technical model indicated in Step 5.

The analysts should direct their efforts to providing close expressions for each one of the items being included in the model. These expressions are very circumstantial to the firm characteristics and organization style, and, most important, to the institutional setting in which the local subsidiary is operating. This is especially true when dealing with a subsidiary of a U.S. corporation located in a foreign country. In this case, taxes, financing by the parent corporation, profit remittance, capital remittance, raw materials imported, etc., are issues that may be regulated in extremely different ways by the different countries. These institutional peculiarities should be captured by the financial model.

One of the most immediate impacts of having the corporation headquarters and the subsidiary located in different countries, is that these two organizations will be operating in a different currency. In this

a) INCOME STATEMENT

Sales
- Allowances (bad debts, returns, discounts)

Net Sales
- Cost of Goods Sold

Gross Margin
- Marketing Expenses
- Administrative Expenses

Incoming from Operation
- Interest Expenses

Net Income Before Taxes
- Taxes

Net Income After Taxes

b) LOCAL NET CASH FLOW

Net Income After Taxes
+ *Depreciation*
- Increase in Working Capital
- Investments
+ Borrowings
- Principal Payments
+ Salvage Value of Investments*
+ Working Capital Recovery*

Local Net Cash Flow

c) CORPORATE CASH FLOW

Local Net Cash Flow
± Transactions between Parent Corporation and Division

Net Contribution to Corporate Cash Flow

FIGURE 19: A FRAMEWORK FOR STRATEGIC PLANNING IN BUSINESS FIRMS - STEP 7: FINANCIAL MODEL SPECIFICATION (GENERAL STRUCTURE)

* Items are only applicable to compute cash-flow at the end of the planning horizon.

FIGURE 20: FINANCIAL MODEL SPECIFICATION (DETAILED STRUCTURE)

a. INCOME STATEMENT:

Sales

- Allowances (Bad Debts, Returns, Discounts)

Net Sales

- Cost of Goods Sold
  - * Production Costs
    - * Proportional to Sales
      - * Imported Raw Materials
        - * Parent Corporation
        - * Others
      - * Local Raw Materials
      - * Direct Labor
    - * Other Production Costs (Overhead)
      - * Indirect Labor
      - * Depreciation of Industrial Buildings & Equipment
      - * Other
  - * Distribution Costs
    - * Salaries
    - * Freight
    - * Other

Gross Margin

- Marketing Expenses
  - * Promotional Effort
    - * Salaries
    - * Advertising
    - * Samples (Production and Distribution Costs)
      - * Raw Material from Parent Corporation
      - * Other Costs
    - * Other Marketing Expenses
  - * Depreciation of Marketing Buildings and Equipment
- Administrative Expenses (and other General Expenses)
  - * Salaries
  - * Other Administrative Expenses
  - * Depreciation of Administrative Buildings and Equipment

Income from Operation

FIGURE 20 (Cont'd.)

Income from Operation

- Interest Expenses
  - * Paid to the Parent Corporation
  - * Paid to Other Parties
    - * Local
    - * Others

Net Income Before Taxes

- Taxes

Net Income After Taxes

b. LOCAL NET CASH FLOW:

Net Income After Taxes

+ Depreciation of Buildings and Equipment
  - * Industrial
  - * Marketing
  - * Administrative

- Increase in Working Capital Coming From:
  - * Increase in Current Assets
    - * Accounts Receivables
    - * Inventories
    - * Cash and Prepaid Expenses
  - * Decrease in Current Liabilities
    - * Account Payable and Accrued Liabilities

- Investments
  - * Land
  - * Equipment
    - * Industrial
    - * Marketing
    - * Administrative
  - * Buildings
    - * Industrial
    - * Marketing
    - * Administrative

+ Borrowing
    * Parent Corporation
    * Other Parties
        * Local
        * Other
- Principal Payment
    * Parent Corporation
    * Other Parties
        * Local
        * Other

Local Net Cash Flow
+ Working Capital Recovery
+ Salvage Value of Investments
+ Others

Local Net Cash Flow Plus Residual Value

c. CORPORATE CASH FLOW:

Local Profit Remittance
+ Profit Contribution of Raw Materials from Parent Corporation
- Equity Financing
+ Capital Remittance
- Borrowing from Parent Corporation
+ Principal Paid to Parent Corporation
+ Interest Paid to Parent Corporation
± Adjustments for Deviations from Corporative D/E
± Adjustments for inflation and changes in conversion rate

Net Contribution to Corporate Cash Flow

FIGURE 20: A FRAMEWORK FOR STRATEGIC PLANNING IN BUSINESS FIRMS - STEP 7: FINANCIAL MODEL SPECIFICATION (DETAILED STRUCTURE)

model it is assumed that the corporation operates in dollars (US$), and the subsidiary in local currency (LC$). All institutional rules are represented more easily when allowing this distinction; but what is more valuable, from an analytic point of view, is that these two currencies follow very different inflationary patterns, and the corporation may suffer a loss or get a net gain, by pure changes in the conversion rates between the beginning and the end of an exercise. Therefore, the recognition of two different currencies in the model allows for a more systematic exploration of the risk factors involved in the venture.

The impact of inflation is another important feature to be included in the financial model, because it tends to distort the relative growth of the different cash-flows. To model inflationary trends, it is not convenient to try guessing the absolute changes in prices, but only the relative ones, because absolute changes do not add important information to the cash-flow (it is only a change in scale). The validity of this assertion is conditioned to the existence of institutional rules whose objective is precisely the correction of purely inflationary impacts on the profitability of a business. For example, some countries with heavy inflation permit the revaluation of assets and depreciation allowances. The absence of these kinds of rules would require a more involved analytic treatment of inflation. (Notice one more the impact of the institutional setting in the specification of the model.)

The cash flow is determined at the local and at the corporate level. This last cash flow should include all those effects over the entire corporation that are not perceived at the level of the subsidiary engaged in the analysis. The institutional rules are certainly a major factor in this part of the model. Also, the attractiveness of the project is fundamentally affected by the corporate definition of a financial strategy.

When the size of the venture is rather small compared with the overall corporation, the assumption done in this paper of constant financial strategy is a good one. But if the venture represents a substantial commitment of resources, the corporation may be willing to make an overall assessment of its current financial strategy, and change parameters like the capital structure, and the dividend policy. This type of study would require a very different perspective of analysis, which has not been included in this paper. The interested reader is referred to Zakon [23].

Illustration of Model Characteristics

Given the very particular nature of the evaluation model, there is no point in making a full specification of it in this paper. Only certain related equations and properties will be given here as illustration.

a) "What if" kind of model.

The model is a mathematical structure that allows the determination of cash-flow and rentability indeces under different combinations of externally given values for parameters. To facilitate the exploration of the venture, the model has been implemented in computers using APL, which is a powerful conversational language.

b) Two types of currencies are being used.

The model contemplates the possibility of differentiating between local currency (LC$) and dollars (US$). This capability makes possible the distinction of three kinds of transaction in the determination of the cash-flow:

- Transactions between the subsidiary and the local environment (in LC$);
- Transactions between the subsidiary and other business firms outside the country of the venture (in US$, with no control on prices);

- Transactions between the subsidiary and the corporation (in US$, with corporate control on terms of the transaction).

c) Modeling inflation.

The model works with a constant monetary base in US$ and LC$. The impact of inflation is represented by relative changes in the prices of labor, products, construction costs, and conversion rate.

No attempt is made to estimate the absolute level of inflation, because existing regulations allow the revaluation of assets and depreciation rate.

The specification of changes in relative prices by means of properly defined price indeces, is the way in which the study team condenses its expectations about evolutionary changes in the environment. The degree of comprehensiveness chosen for the description of the environment is the consequence of the available information, and of the essential dimensions of the environment as perceived by the study team.

d) Net Sales.

Net sales is obtained from the sales volumes expressed in physical units (generated by the marketing model), and their corresponding prices, as indicated in relation (9).

$$NETS(T) = PPIND(T) \times \left[\sum_{P=1}^{PP} VSAL(P,T) \times PRICE(P) \right] \qquad (9)$$

$$\text{for } T=0,1,2,\ldots,TT$$

where:

NETS(T) = Net Sales in year T

PPIND(T) = Products price index in year T

VSAL(P,T) = Volume of sales for product P in year T

PRICE(P) = Price of Product P in year 0

PP = Total number of products (old and new)

TT = Last year in the planning horizon.

Prices holding in year 0 (the year of realization of the study) are given net of bad debts and any applicable discount. To account for the relative change of product prices with regard to the monetary base, the price index PPIND(T) is introduced.

e) Production costs proposal to sales.

This cost source is estimated as the total constribution coming from four cost components (see Table 12):

First, raw materials imported from the parent corporation, which are given in (US$/unit): To get the total contribution of this component, both the conversion rate, and the transfer price indeces should be taken into consideration.

Second, raw materials imported from other firms out of the country in which the subsidiary is residing (US$/unit): Only the correction due to relative changes in the conversion rate should be used in this case to get the total cost for this concept.

Third, local raw materials, which are given in (LC$/unit): This price is supposed to vary at the same pace as inflation in the country; therefore, no correction index is needed, because there is no relative change between the price for these local raw materials and the general price index.

Fourth, direct labor, which is given in (LC$/unit): A salary index is used in this case to correct for the relative change in the price of labor.

Based on these considerations, the following expression gives the cost of production proportional to sales:

$$PCPS(T) = [TPIND(T) \times CRO \times CRIND(T) \sum_{P=1}^{PP} UC(P,1) \times VSAL(P,T)] +$$

$$+ [CRO \times CRIND(T) \times \sum_{P=1}^{PP} UC(P,2) \times VSAL(P,T)] +$$

$$+ \left[\sum_{P=1}^{PP} UC(P,3) \times VSAL(P,T) \right] +$$

$$+ \left[SLIND(T) \times \sum_{P=1}^{PP} UC(P,4) \times VSAL(P,T) \right] \qquad (10)$$

$$\text{for } T=1,2,\ldots,TT$$

where:

PCPS(T) = Production costs proportional to sales in year T

TPIND(T) = Transfer price index in year T

CRO = Conversion rate in year 0

CRIND(T) = Conversion rate index in year T

UC(P,C) = Unit cost of production proportional to sales for product P and cost component C.

VSAL(P,T) = Volume of sales for product P in year T

SLIND(T) = Salary price index in year T

PP = Total number of products (old and new)

TT = Last year in the planning horizon.

f) Distribution costs.

These costs are obtained by adding the contribution of salaries (and all items that change with the salary index), freight, and other expenses. Freight is estimated as a fraction of net sales, while salaries and other expenses are constants that are adjusted by the salary index, and by the increase in the level of business activity respectively.

$$DCOST(T) = [C_1 \times SLIND(T)] + [C_2 \times NETS(T)] + [C_3 \times BAIND(T)]$$

$$\text{for } T=1,\ldots,TT \qquad (11)$$

where:

DCOST(T) = Distribution costs in year T

SLIND(T) = Salary index in year T

NETS(T) = Net sales in year T

BAIND(T) = Business activity index in year T

TT = Last year in the planning horizon.

C_1, C_2, and C_3 are constants determined empirically. Notice in this example the way in which inflation changes the relative importance of the three sources of distribution costs.

g) Marketing effort.

The important point tc remember with regard to marketing effort is that this item is rooted in the marketing model, where marketing effort is determined as a function of the strategies chosen for each one of the products. The financial model has to make use of that information for getting the total cost for this concept.

h) Taxes.

The payment of taxes is directly linked to the tax law in the country. A point to be considered is the existence of carry backward, and carry forward provisions for tax payment. For example, is a tax credit granted for losses in a given exercise? If so, for how many years?

i) Working Capital.

Important policy variables, that are usually controllable at the local level, are the credit terms given by the firm to its buyers. Working capital may reach substantial levels depending on the credit terms. In this example, working capital and new investments are of the same order of magnitude.

j) Depreciation Allowances.

Total depreciation is obtained by considering depreciation allowances for buildings and equipment used in the production, marketing, and administrating activities. These values are directly dependent on institutional regulations like the type of depreciation allowed (linear, acce-

lerated, etc.), the period of depreciation, and the treatment of local inflation (revluation rules).

k) Financing and interest expenses.

This is another important policy variable and it is presented and discussed now as part of the financial options.

11.2 *Financial Options*

The long exposition and illustration of the model structure is not particularly helpful in providing with clarity the set of financial options open to the firm. This second part in Step 7 of the framework is pursuing precisely that end.

The financial options that have been represented in this evaluation model are primarily four: transfer prices of raw materials, terms of the project's financing, capital structure at the corporate level, and credit terms for sales at the local level.

Transfer prices of raw materials is an important decision variable that affects the attractiveness of the business by changing the profitability of the subsidiary as well as the rest of the corporation. The project's financing can change the characteristics and composition of cash-flow at the local and corporate level. Even more important, it can deviate from the capital structure fixed for the corporation, imposing an extra burden, or generating an extra slack in the capability to engage in long term debts. This is a factor that should be introduced in the evaluation at the corporate level.

Finally, the credit terms for sales may be used as a financial option, but it should be recalled that they cannot be treated independently of prices being given to products. Figure 21 summarizes a set of financial

options that may be considered in the strategic analysis of a project.

Four variables are considered in this modelling:

a. Transfer prices
   - A transfer price index is defined and it is given the value 1 in the base case.

b. Financing.
   Three components are distinguished:
   - Uses
     - Land
     - Equipment
     - Construction
     - Working Capital
   - Source for each use
     - Local
     - Parent Corporation
     - Other
   - Credit terms for each source
     - Interest
     - Term of Loan
     - Grace Period
     - Earmarking and Inspection Fee
     - Principal Payment Schedule

c. Capital Structure
   - The debt-equity ratio must be used to correct cash-flow at the corporate level. (There is no option on the capital structure. It is given by the corporation.)

d. Credit terms on sales
   - This option can not be considered in the absence of the price chosen for products.

FIGURE 21: A FRAMEWORK FOR STRATEGIC PLANNING IN BUSINESS FIRMS - STEP 7: FINANCIAL OPTIONS

Illustration of financial options

In the example case, transfer prices are represented in terms of a transfer price index, which is given the value 1 for the conditions assumed in the base case. The project's financing is assumed to be all equity in

the base case, though alternative financing is explored in the sensitivity study. Correction for deviations of this project from the corporate capital structure are provided in the evaluation at the corporate level.

Credit terms for sales financing are not considered as a financial option in this case, but are assumed to be largely the imposition of sales conditions prevailing in the industry. This assumption is justifiable because all demand projections are done assuming a certain historical pattern of price behavior for the industry and the firm, which is very much associated with a tradition in credit terms that can hardly be changed unilaterally by the firm.

12. *Step 8: Evaluation of the Base Case and Sensitivity Analysis*

Up to this point, all steps in the framework have been preparing the ground for a final evaluation of the strategic alternatives, by orderly and formally defining these alternatives in terms of the environmental parameters and the available strategic options. This first analysis of the problem is concluded by the evaluation of the base case, that at this point is a very mechanical task suitable to be implemented in a computer.

But the potentiality of a formal procedure like the one presented in this paper would be badly misused if no analysis is made on the sensitivity of the profitability indices to different scenarios, and to different strategic options. The whole conception of the system has been thought of as to provide enough flexibility in these final steps of the analysis. People should raise doubts about certain assumptions, study the impact on profitability of different decisions, or simply feel curiousity for the impact of a change in the definition of the base case parameters. In

a nutshell, people should grow confident with the use of the model, and develop a quantitative understanding for the effect that different circumstances and decisions may have over the profitability of the venture.

In this way, all participants in the decision will be able to reach an agreement, in a more formal way, regarding the attractiveness and riskiness of the venture.

Illustration of Evaluation of the Base Case and Sensitivity Analysis

The complete evaluation of the base case is presented in Table 13. It may be observed that all profitability indices show an attractive venture.

In Table 14 are included many interesting examples of the sensitivity of the net present value indicator to different changes in the assumptions. The assumptions changed are the following:

Scenarios -

- Pessimistic : Scenario factor = G = 0.03
- Optimisitic : Scenario factor = G = 0.10

Strategic options -

- Delay new products one year (introduction in year 2)
- Supress new products (they are not introduced)
- Withdraw product D in year 7
- Assume 100% financing of fixed assets

It may be observed that supressing or delaying the introduction of new products has undesirable effects on the profitability of the venture; therefore, all efforts should be concentrated in the introduction of these new products. The other interesting aspect shown in this sensitivity analysis is that withdrawing product D in period 7 does not require any new investment, thus improving the cash position at the beginning of the study period, and deteriorating it toward the end. This is clearly an

Year	1	2	3	4	5	6	7	8	9	10
INCOME STATEMENT (000 US$):										
Net Sales	11830	14965	19398	24293	28557	32921	36976	41090	45286	49488
Cost Goods Sold	5740	7357	9654	12320	14871	17652	20953	23946	27174	30597
Gross Margin	6090	7608	9744	11973	13686	15269	16023	17144	18112	18891
Marketing Expns	5004	5398	5833	6289	6739	7191	7899	8311	8684	8997
Administr Expns	1175	1309	1484	1675	1849	2031	2532	2719	2916	3121
Income Operatn	-89	901	2427	4009	5098	6047	5592	6114	6512	6773
Interest Expns	0	0	0	0	0	0	0	0	0	0
Net Inc. Bef. Tax	-89	901	2427	4009	5098	6047	5592	6114	6512	6773
Taxes	0	325	971	1604	2039	2419	2237	2445	2604	2709
Net Inc. Aft. Tax	-89	576	1456	2405	3059	3628	3355	3669	3908	4064
LOCAL NET CASH FLOW (000 US$):*										
Net Inc. Aft. Tax	-89	576	1456	2405	3059	3628	3355	3669	2908	4064
Depreciation	73	73	73	73	73	73	1165	1165	1165	1165
Change w. Cap	723	940	1330	1468	1279	1309	1216	1234	1259	1261
Investments	0	0	0	1146	6976	4739	0	0	0	0
Borrwoings	0	0	0	0	0	0	0	0	0	0
Princp. Payment	0	0	0	0	0	0	0	0	0	0
Net Cash Flow	-739	-291	199	-136	-5123	-2347	3304	3600	3814	3968
Assets End Per.	0	0	0	0	0	0	0	0	0	25156
CORPORATE CASH FLOW (000 US$):**										
Local Cash Flow	-739	-291	199	-136	-5123	-2347	3304	3600	3814	3968
Raw M. Transfer	1047	1507	2210	3013	3726	4477	5204	5997	6849	7755
D/E Adjustments	12	27	51	101	263	381	380	380	381	381
Corp. Cash Flow	320	1243	2460	2978	-1134	2511	8888	9977	11044	12104

*At the Local Level: Net present value at 10% = 10859
Net present value at 15% = 6331
Net present value at 20% = 3589

**At the Corporate Level: Net present value at 10% = 34178
Net present value at 15% = 24012
Net present value at 20% = 17334

TABLE 13. EVALUATION OF THE BASE CASE

	Change in NPV with regard to the base case (000 US$)					
	AT THE LOCAL LEVEL			AT THE CORPORATE LEVEL		
	10%	15%	20%	10%	15%	20%
	[10859] *	[6331]	[3589]	[34178] *	[24012]	[17334]
Base Case	0	0	0	0	0	0
Scenarios						
- Optimistic	1100	273	-219	4128	2474	1419
- Pessimistic	-1130	327	1041	-7602	-4372	-2449
Strategic Options						
- Delay new products	-1459	-1020	-705	-3355	-2583	-2018
- Supress new products	-5125	-2464	-865	-17481	-11696	-7924
- Withdraw product D	2333	2664	2645	1691	2195	2296
- Financing	1044	1601	1779	-181	703	1109

* These are the absolute values of NPV in the base case

TABLE 14. SENSITIVITY OF NET PRESENT VALUE TO A CHANGE IN ONLY ONE ASSUMPTION OF THE BASE CASE

interesting possibility that should be given proper consideration, because it looks as a favorable option. (It should be recalled that product Old-D is the only cash cow under the BCG approach, therefore the strategy of withdrawing it is contradicting the option of milking the product before discarding it.)

By making considerations like the ones exemplified in this illustration, it is possible to go over those aspects of the decision whose exploration appears as a rewarding effort. The systematic analysis of the problem will generate the needed confidence and understanding of the characteristics and riskiness of the project.

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