Business Dynamics for Strategic Development

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Abstract

This paper examines the role of system dynamics in corporate strategic development. A framework for strategic development is introduced based on an analogy with feedback control. The strengths and limitations of the analogy are discussed.   The basic framework is then extended to include strategic rehearsal as a 'virtual feedback process' at the corporate level to test and modify strategic initiatives before and during implementation. System dynamics is one effective way to provide such virtual feedback. An example is given based on a modelling project for a company in fast-moving consumer goods. The purpose of the project was to investigate the strategic implications of a new product launch in a highly competitive industry. There is a description of how the model was conceptualised with the management team and a review of simulations that were helpful in assessing the strategic initiative. The paper concludes with comments on the insights from the project.

Key Words

Strategic development, rehearsing strategy, competitive dynamics, fast-moving consumer goods

Introduction

System dynamics has been widely used for strategy support to test market growth (Forrester 1968, Sterman 1988), product replacement (Morecroft 1984), professional staff development (Warren 2001), process improvement (Repenning and Sterman 2002), diversification (Gary 2005), and alliance formation (Kapmeier 2006) to name just a few. Such modelling work typically takes shape around dynamic behaviour associated with the specific business change under investigation. However it is also useful to see modelling in the larger context of strategic development through which companies continuously adapt to a changing business environment.

Feedback is a useful analogy for adaptive behaviour in business and society. In system dynamics the analogy is usually developed at an operational level to represent how various functions and subunits in an organisation strive to achieve local goals through actions that combine to yield overall strategic performance. However the same analogy can also be deployed at the corporate level to describe how organisations as a whole strive for strategic goals and take corrective action to achieve these goals in the face of uncertainty. This notion of corporate adaptive behaviour is captured in an enduring definition of strategy as being 'the act of aligning a company with its changing environment' (Learned et al 1965 and Andrews 1971). Achieving consistency of purposive action in the many parts of the firm is crucial to success.

A simple control system is surprisingly good at mimicking purposive behaviour. Consider a car fitted with cruise control. In this case the control process regulates the speed of the car and replaces the normal thinking, judgement and reaction of the driver, albeit in a limited way. It is an uncanny experience to drive such a vehicle because the accelerator pedal seems to have a mind and intelligence of its own. As the terrain changes the pedal presses itself down or eases off exactly as a person would move it. The control procedure is shown in figure 1. A block diagram format is deliberately used to emphasise the processes involved rather than circular causality. A target speed is set and compared with the measured speed of the car on the motorway. When the car encounters a hill its measured speed declines and the cruise control depresses the accelerator, thereby drawing more engine power and increasing the car's speed until it reaches the target speed. When dipping into a valley the reverse happens and the pedal moves up to reduce power. On the flat the accelerator pedal setting remains fixed with target speed and measured speed equal and just enough engine power to overcome wind resistance.
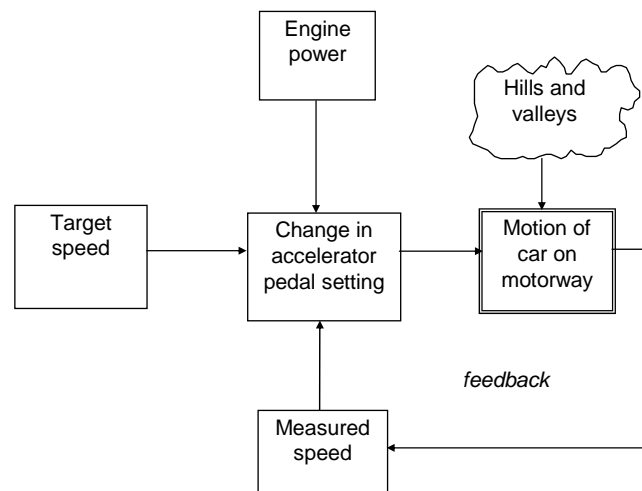
Figure 1 A Car with Cruise Control – Slightly Intelligent Adaptation

The striking similarity between the reaction of a cruise controller and a normal driver demonstrates vividly that feedback and intelligent adaptation are closely related.   Indeed control processes that incorporate additional feedback channels and more information can replicate quite sophisticated processes of adaptation. Imagine for example a system capable of taking a car safely to a chosen destination in a specified time. Skilful taxi drivers routinely accomplish this task, so what kind of feedback describes their behaviour? Cruise control alone is obviously not enough. Simultaneous speed *and* distance control are important to maintain a target speed without hitting the car in front. Also the car should not drift off the road, so there is a need to monitor and control positioning.   In other words intelligent adaptation is characterised by multiple goals, with corresponding performance measures and priorities to be managed.   But then there's what London taxi drivers call 'the knowledge', where to go and which road to take. Destination and route also belong in the control model to help plan the journey and take an overview. Nowadays satellite navigation systems make it possible to chart the best route to a given destination. This capability to look ahead, coupled with multiple feedback control processes, contains the necessary intelligence and information to complete the journey.

Strategic Development as an Intelligent Adaptive Feedback Process

Dyson and O'Brien (1998) argue that strategic development can be viewed as a feedback process for a corporate journey in which there is a similar need to set direction, look ahead, monitor performance, take corrective action and respond intelligently to changes in the environment.   The overall process is shown in figure 2 and encompasses a range of underlying management processes that inform, shape and support the strategic decisions confronting an organisation.
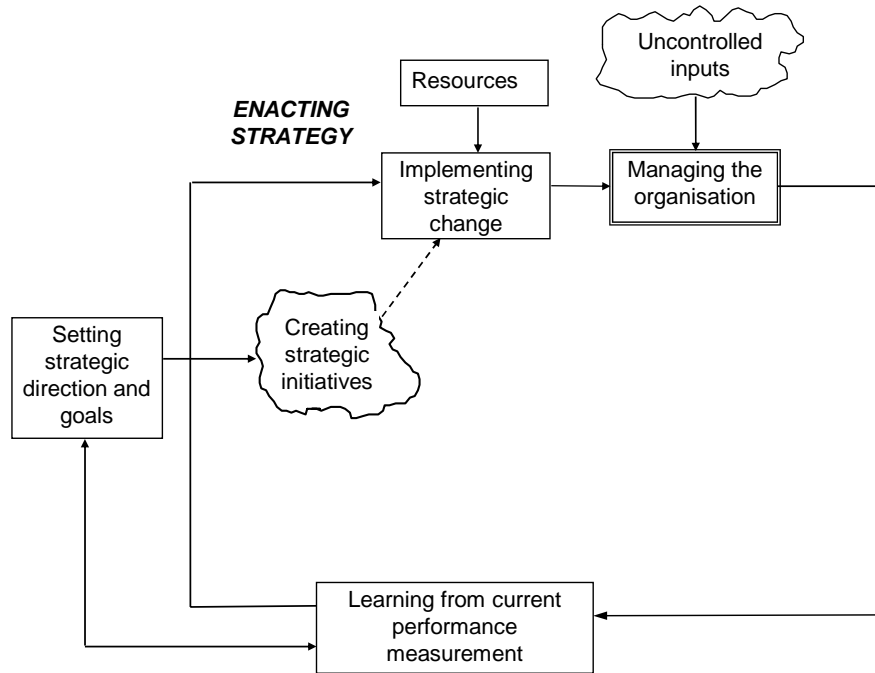
Figure 2 Strategic Development Process – Intelligent Goal Seeking Feedback with Direction Setting and Creativity (adapted from Dyson and O'Brien 1998)

At the heart of strategic development is a process for creating strategic initiatives that are capable of profoundly changing the business. But to be successful an initiative must be broadly consistent with strategic goals and responsive to changes in the environment. Feedback is central to such intelligent adaptive behaviour but it is far more than myopic corrective action. Strategic initiatives set in motion a process of implementing change that draws on the resources of the organisation and, through procedures for managing the organisation, deploys them in effective ways. Meanwhile uncontrolled inputs are also buffeting the organisation. The benefits of implementation are not always immediately obvious. Changes take time and success may be masked by temporary setbacks and unforeseen events. So there needs to be a carefully thought-out process for evaluating and learning from current performance. It is this process that provides feedback to adjust strategy in two ways. There is feedback to implementation if performance is viewed as unsatisfactory relative to strategic goals – the classic corrective action of a goal seeking system. There is also feedback to the setting of strategic direction and goals themselves that can in turn lead to reshaping of strategic initiatives in the light of experience.

The feedback paths in strategic development can be viewed as learning processes. Whenever the outcome of an initiative does not work out as intended it suggests there was something faulty about people's original ideas and expectations. However real-world feedback of the kind outlined above cannot always be relied on to alter people's strategic misconceptions because the relevant performance information is not available until implementation is well underway, and for one-off strategic decisions that is often too late. To overcome this learning deficiency organisations may look for comparable cases elsewhere in the industry or even run pilot projects. The need for valid analogies brings us to modelling and its role in

strategic development. One way to use models is for rehearsal – to test strategic initiatives for their future impact before rolling them out in the organisation. This modelling capability introduces a new feedback path in the strategic development process as shown in figure 3.

Here strategic initiatives are fed into models of the organisation specifically designed for assessing strategic ideas. Use of the models by the management team leads to an imagined outcome and *virtual* performance for comparison with strategic direction and goals. Such rehearsal introduces fast-acting 'virtual feedback' with which to adjust strategic initiatives in order to anticipate and avoid implementation problems. What can be imagined (and how vividly) depends on the modelling approach and the effort expended. Some models take the form of simple diagrams and maps while others involve simulations. Some models are particularly good for assessing a firm's positioning in a competitive industry while others are helpful for assessing internal strengths and weaknesses. Some models reveal problems of coordination between functions while others point to internal political barriers that may block initiatives. The models envisaged here are not a perfect replicas of the real organisation in all its complexity. Rather they each make special simplifications designed to test limited yet vital aspects of strategy implementation.
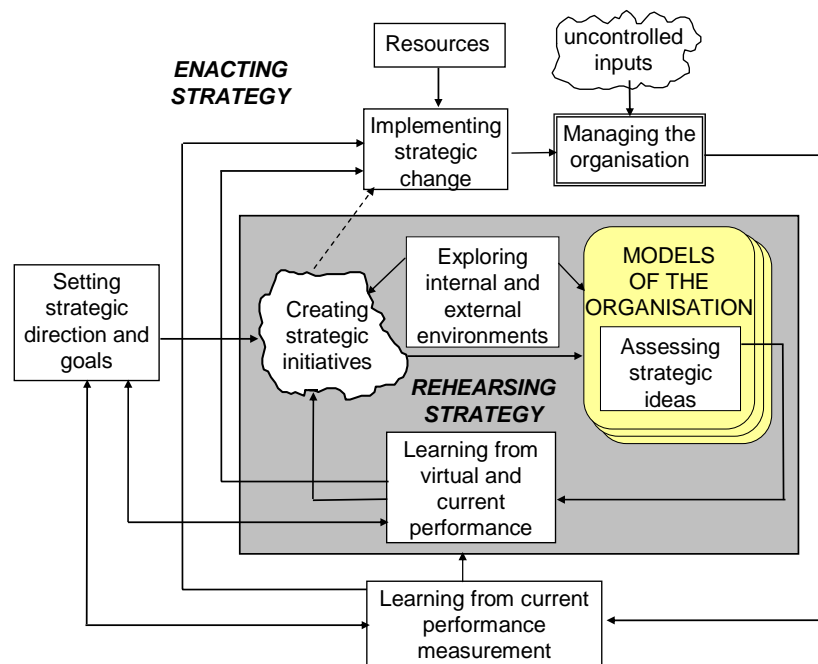

Figure 3 Strategic Development Process with Capability for Rehearsing Strategy

In this extended strategic development process a strategic initiative can be developed in one of two ways. It can be taken straight into the organisation as the basis for implementing strategic change or it can be cycled through the steps of rehearsing strategy. Essentially there are two complementary feedback paths, one real and one virtual, through which strategy is tested, modified and refined. The outer path for enacting strategy we have already reviewed with its real world processes for implementing strategic change, managing the organisation, and evaluating and learning from current performance. In parallel there is the inner path for rehearsing

strategy. Here aspects of the real world are replicated to enable learning from virtual performance. The advantage of the inner path is the fast feedback it provides about the feasibility of strategic initiatives. The route that goes from creating strategic initiatives *directly* to implementation is a route of emergent strategy that depends largely on hunch and hope, with all its limitations. We are suggesting that management teams also conduct complementary tests to rehearse strategy on the inner path, both before and during implementation. Tests that reveal unsatisfactory virtual performance may suggest pre-emptive tactical adjustments in implementation. Such tests may also lead to fundamental changes in strategic initiatives or even call into question the organisation's strategic goals and the strategic direction that lies behind them.

Case Study in Fast-Moving Consumer Goods

A system dynamics modelling project was conducted with the management team of a company in fast-moving consumer goods. The purpose of the project was to model the launch of a premium product designed as a replacement for a traditional product in a mature and highly competitive market sector whose profitability had been declining in recent years. The study investigates the product launch strategy and was undertaken at an early stage of implementation. For confidentiality reasons we cannot disclose the names of the actual firms and products, so we disguise the case to make it look like the UK soap market, another well-known market segment of the FMCG industry whose product innovations are familiar to most readers and quite similar to those in the real case. The disguised client firm is named 'VR-Cussons' (where VR stands for virtual), and its main competitors are named 'VR-Lever' and 'Own-labels'. It is important to stress that these are fictional names, not real soap companies. Real life market development involved a traditional product, a substitute product and a new product. In the disguised case the traditional product is bar soap, the substitute product is shower gel and the new product is liquid soap.

Market Overview

While bar soap has been the product leader in personal care since the beginning of this market, shower gels have been growing in recent years pushed by aggressive marketing campaigns and changes in life style, as figure 2 shows. This process has been occurring in a market whose volume has been stable for many years due to high penetration of demographic segments and low population growth. Meanwhile bar soap firms have introduced variations on their traditional product in an attempt to increase sales value. These variations have been justified by consumers' willingness to buy premium soaps (instead of cheaper alternatives) as well as demographic and life-style changes. In spite of these developments, the general trend has been away from bar soap towards shower gels because gels offer more benefits to the user.
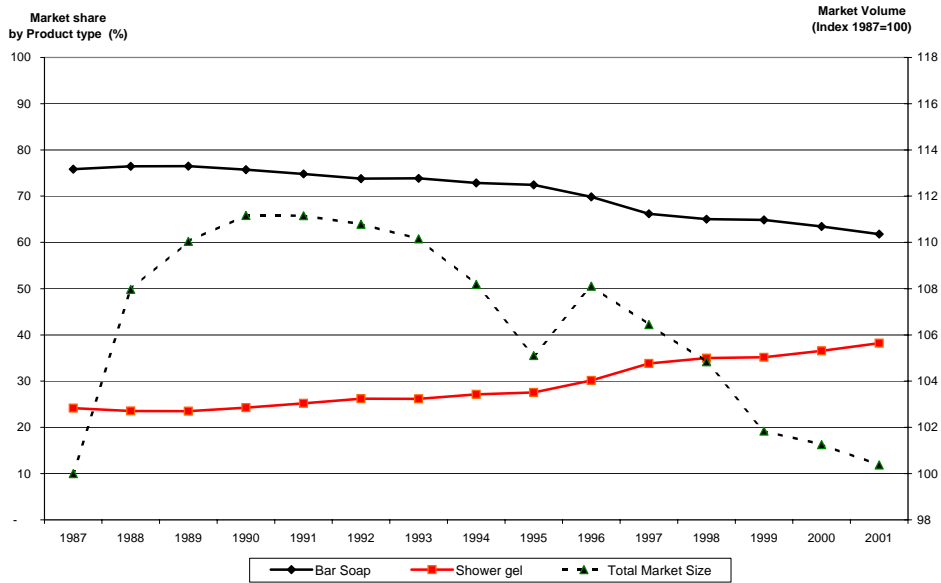
Figure 4 Total market volume and market share by product (1987-2001)
Source: Association of Manufacturers

The two main companies are VR-Cussons with 26% of market share and VR-Lever with 31% of market share. In addition there are Own-labels with 16% of market share. Together these rival groupings account for most of the market in value terms. The market has always been brand driven, with the major brands investing huge amounts of money in advertising. In recent years VR-Cussons has been offering a steady stream of new products in bar soap – its core and traditional competence – supported by high levels of advertising as it faced more competitive pressure. The company is recognised as an innovative leader in bar soap, but it lacks the same strength in shower gels. VR-Lever, though a newcomer to the market, has a long tradition in fast-moving consumer goods on a global scale. VR-Lever built its participation in the market during the 1980s and 1990s. The company entered the soap sector for the first time in the mid 1980s when it acquired a well-known but small local bar soap brand in the UK market. Like VR-Cussons, the company has a range of products aimed at various lifestyles and consumers. But VR-Lever is normally not as innovative as VR-Cussons and tends to follow rather than lead new developments.

Own-labels are the large supermarket chains. We decided to aggregate all their products because the big retailers follow similar competitive strategies. Traditionally Own-labels have achieved only low penetration of the market. This small presence was due to the success of branded products arising from heavy advertising and promotional support. However, a programme of systematic upgrading and innovation increased Own-labels' reputation among buyers, which yielded rewards throughout the 1990s, as market share grew steadily. Additionally, Own-labels' products are priced between 5 and 10 percent lower than manufacturers' brands.

The Competitive Problem and Strategic Response

New product varieties in bar soap have been driving growth in sales value in recent years, especially for VR-Cussons. However, new lifestyle trends have turned

buyers to look for convenient products, helping shower gels to grow in volume at the expense of bar soaps. At the same time, the consolidation of competitors through mergers and acquisitions pushed the client company to timidly diversify into shower gels by acquiring a small firm with a strong position at the premium end of the market but outside the mass-market distribution channels. This acquisition was not the only response from VR-Cussons to increasing competition in the market.

The prospect of stagnation and declining profitability in their traditional bar soap business prompted VR-Cussons to launch an entirely new premium product, liquid soap, intended to halt the erosion of soap sales and to boost the profitability of their core business in the mature soap market. However, competitors were able to copy the product innovation sooner than expected, despite significant changes in manufacturing methods. For example, VR-Lever launched a liquid soap product 18 months later and Own-labels followed shortly after.

A Note on the Model Development Process

The modeling team consisted of an experienced system dynamics consultant, a model builder and an internal consultant of the company. The management team consisted of senior managers from marketing, sales and manufacturing, who were the strategic decision makers of the company. The project ran for one year with intermittent individual and team meetings to extract and validate the information required for the model. The model was designed to answer the following questions for the management team. How can we grow and sustain the new product in the face of stiff competition? What set of policies can help us to avoid losing revenues as happened with the old product?

The process followed during the project is summarized in figure 5. The essence of the modeling project was the continuous interaction between management and modeling teams in order to represent as closely as possible managers' understanding of the strategic problem and the competitive dynamics of the industry.
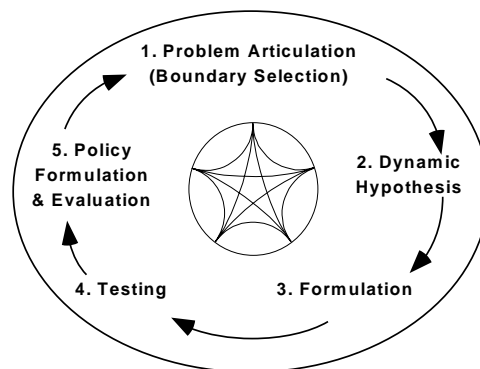

Figure 5 Project Methodology from Sterman (2000)

Model Conceptualisation

The launch of liquid soap is a typical example of a strategic initiative believed to be consistent with the company's overall strategic direction and intended to satisfy

its strategic goals. In this case VR-Cussons wished to maintain its traditional leadership position in soap products while at the same time remaining profitable. The modelling project was an opportunity to rehearse the thinking behind the strategy.

An initial meeting with the management team led to the stock and flow network shown in figure 6. There are two conceptually separate markets. At the top of the figure is bar soap, containing established bar soap volumes for VR-Cussons on the left and other competitors on the right. These volumes are represented as stock accumulations to capture the typical inertia of consumer buying habits. Volume lost to other product types is shown as outflows. Volume exchanged through competition is shown as a net flow of bar soap users between VR-Cussons and other competitors. Notice there are no inflows to the two stock accumulations, reflecting the important assumption that the market is mature. At the bottom of the figure is the new market for liquid soap in which trials of the new product lead to an accumulation of trial users who then adopt either VR-Cussons' product (called VR-Carex) or competitors' liquid soap. Adoption results in an increasing number of regular users represented by two stock accumulations. Note that managers expected to attract loyal customers in the new premium liquid soap market as there is no flow connecting VR-Carex (the new liquid soap) and regular users of competitors' liquid soaps.
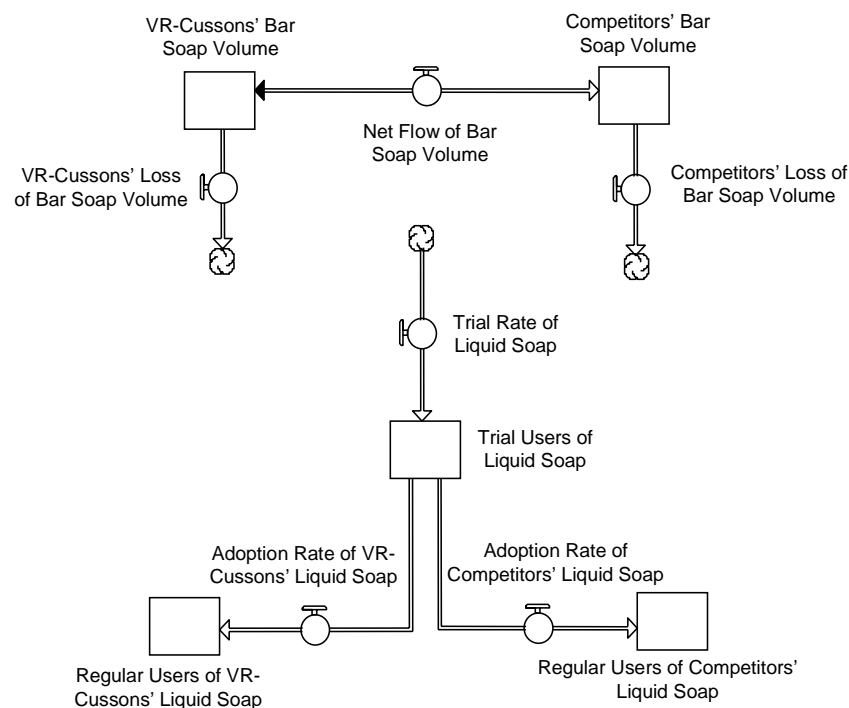

Figure 6 First Representation of the Management Team's View of the Market

Figure 6 reveals three interesting issues about the initial conceptualization of the strategic initiative in liquid soap. First, the management team perceived the bar soap and liquid soap market segments as disconnected from each other. Second, users of bar soap were lost to "somewhere" in the personal care market, through the outflow 'VR-Cussons loss of bar soap volume'. In fact much of this loss was to shower gel, but since VR-Cussons' management had neither a special interest nor the capabilities

to compete strongly in shower gel, the slow draining of customers to gels was not clearly recognised or at least its cumulative effect was thought to be small. This 'blind spot' might have influenced VR-Cussons' subsequent innovation. Third, the market for the new product was believed to be a 'one-off' simple adoption process. VR-Cussons management would convince bar soap consumers to trial the new product. These potential consumers would remain an uncertainty (stock 'Trial users of Liquid Soap') until they decided to adopt VR-Cussons or a competitors' liquid soap. The strategic problem would be solved for managers of VR-Cussons when trialing consumers became regular users of liquid soap, where VR-Cussons would have a first-mover advantage since it was the only firm with the technology to produce the new product. In other words, the strategic problem was to contain competitors in the bar soap segment while the company built its leadership in the liquid soap segment. Then, liquid soap users would remain isolated from competitors' actions because of first-mover advantage.

A Refined View of the Market

After in-depth interviews with senior managers, we identified additional relevant issues that led to a modified the picture of the market shown in figure 7. Each player in the bar soap market faced a complex situation because they had to balance the attractiveness of their products, taking account of three different forces simultaneously influencing their customers. First there is the attractiveness of shower gels – a substitute product – represented as outflows from bar soap volume. Second there is the development of the liquid soap market represented as the set of three stocks above bar soaps' stocks. Third there is inter-firm rivalry from consumer promotions or advertising, aimed at maintaining market share in the bar soap market.

Since this is a mature market with a high level of penetration, there are no inflows to increase total volume. In other words, the development of the market is essentially a zero-sum game between brands and varieties - and in soaps this game is played against the backdrop of gradual volume loss to shower gels. While VR-Cussons managers' expectations were to move users from bar soaps into liquid soaps (and focus groups suggested that bar soap users would indeed adopt liquid soaps) they nevertheless faced a dynamically complex problem. The company needed to transfer the old product users to the new product without losing market share while improving profitability and avoiding costly price wars. Essentially they needed to simultaneously manage a growth business (liquid soap) alongside a declining business (bar soap) against strong and diverse rivals.
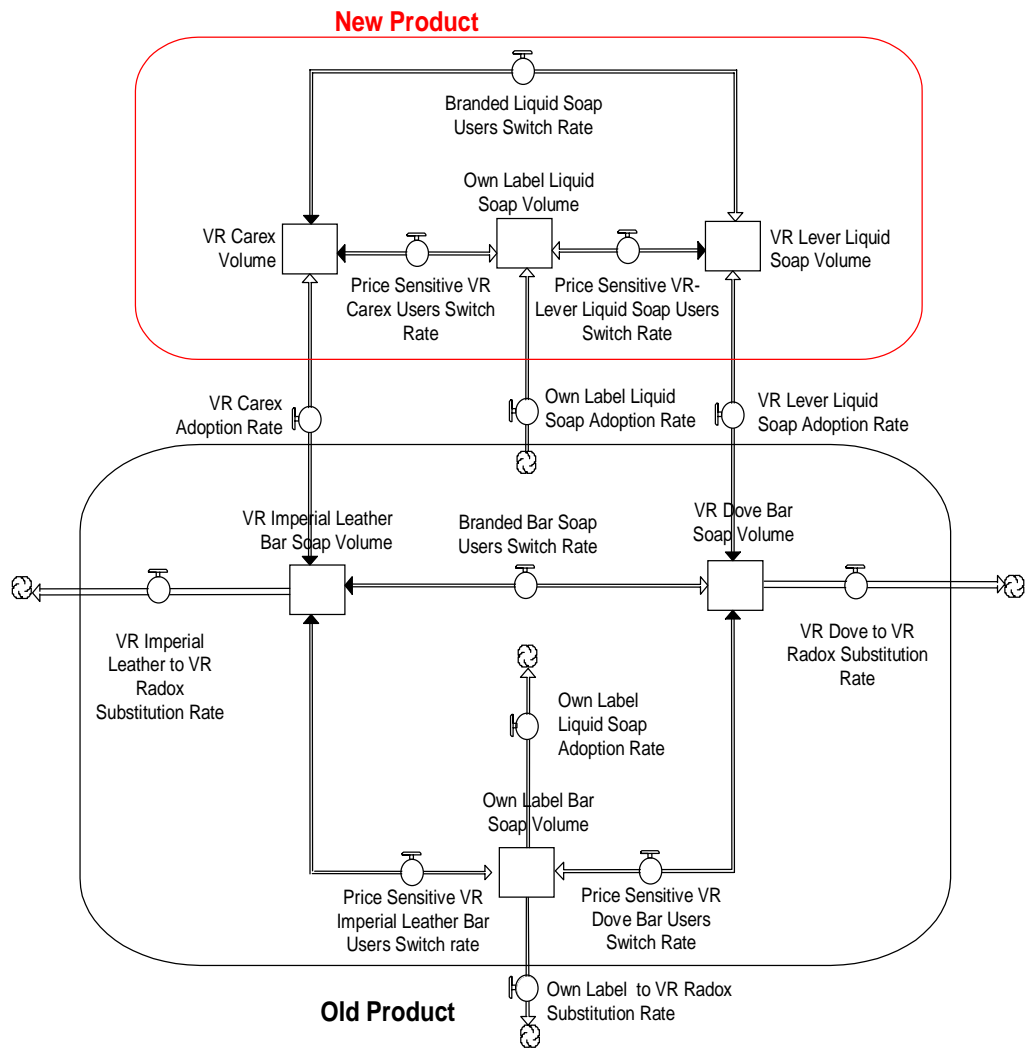
Figure 7 Management Team's Refined View of Their Market

The next step in the modeling project was to identify the factors controlling the flows between stocks. This information was obtained from interviews with the management team and meetings with other experts from the business.   Their observations were translated into diagrams and equations. There is not the space in this paper to present all the formulations. However the interested reader can find the complete documented model in Kunc (2005). Here we review a selection of important formulations describing consumers' response to competitive actions and the managerial decision-making processes responsible for these competitive actions.

Consumer Behaviour

The substitution process of bar soap for shower gel is modeled as the outflow 'VR Imperial Leather to VR Radox Substitution Rate', which is captured in the following equation:

*Shower gel adoption rate i = Bar soap volume i * s*   *(1)*

The index i represents the different players in the market, *Bar Soap Volume i* reflects bar soap monthly sales volume of a particular player, and *s* is a fixed percentage per month of the volume lost to shower gels. The fixed percentage, which was defined by the management team, is a simplification of the process of change in consumers' preferences. The management team suggested that the amount of bar soap consumption substituted each month by shower gels is a fixed percentage of the remaining customers. This fixed percentage captures two shared beliefs among managers: one is that most bar soap consumers will inevitably switch to shower gels sooner or later; and the second is that all players in bar soap are going through the same substitution process as figure 7 shows.

The management also believed that the personal care market is commoditised so customers are responsive to price differences among similar products, and advertising campaigns achieve short-term volume gains rather than long-term loyalty. Price and advertising determine the net flow between firms, as equation 2 shows.

Net flow between firms = Consumers switching due to price + Net effect of advertising   *(2)*

Given the existing product similarities, we considered that consumers' choice between two brands was based on the price of one brand as a reference point for comparison with the other brand – an empirical generalization used in modeling consumer choice (Meyer and Johnson, 1995). When consumers make their decisions, the price of VR-Cussons' bar soap acts as a reference point for comparison with VR-Lever' bar soap. Therefore, the price effect on consumers' choice was represented using the following equation:

Consumers switching due to price = ƒ(Effective retail price i / Effective retail price j)   *(3)*

Effective Retail Price i is the suggested retail price less price discounts (where discounts are consumer promotions intended to boost short-term consumption). Despite the variety of soaps on offer, VR-Cussons' management team believed the differences between each players' soaps were small, so the model uses the average price ratio of the two brands (across all varieties) to represent the effect of price on consumers' switching rate. The price ratio affects change in volume according to the function shown in figure 8. The function was calibrated using time series data for relative prices and volume[1].

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[1] Market data for calibrating the function was obtained from AC Nielsen report of volumes and sales per distribution channel.
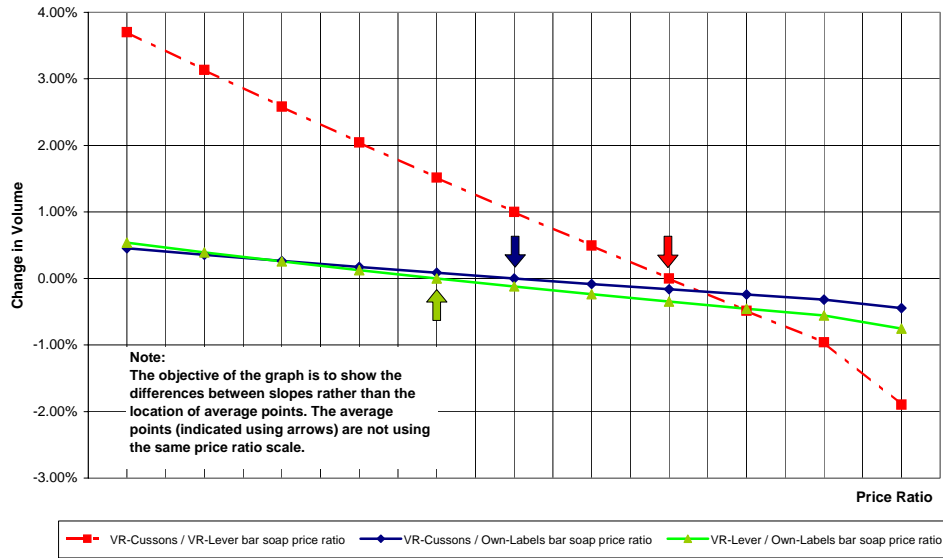
Figure 8 Price Response Functions in the Bar Soap Market

The effect of different value perceptions for competing products can be deduced from the slope of the functions shown in figure 8. For example, the slope of the function for two products with similar perceived value (VR-Cussons' and VR-Lever's bar soaps) is steeper – dashed line in figure 8 – than the function for two products that customers perceive to have different value (VR-Cussons' and VR-Levers' bar soaps compared with Own-labels bar soaps) – light and dark solid lines. Consumers are more likely to switch between two products perceived similarly than two products perceived differently, which implies that Own-labels need to sustain bigger price differentials with respect to branded products to lure customers from branded products or to avoid losing them.

A similar price response curve was devised for liquid soap and is shown in figure 9. For comparison the equivalent price response for bar soap is shown as a dotted line.
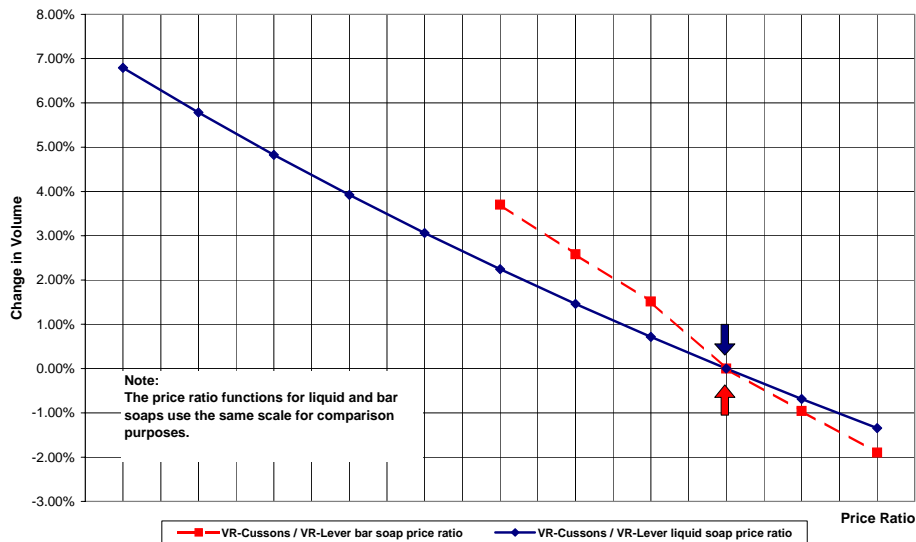

Figure 9 Price Response Functions for Bar and Liquid Soaps

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Managerial Decision-Making Processes in VR-Cussons

The majority of the model was devoted to representing managerial decision-making processes inside the rival firms that, directly or indirectly, influence consumer behaviour. These decision-making processes include pricing, marketing, trade promotions and the management of display shelf. Manufacturing capacity management is also important as scale economies and capacity utilization affect manufacturing cost and ultimately price. The corresponding formulations run to more than one hundred equations. They were constructed from concepts and facts gathered in many hours of meetings and sketched on a diagram occupying twelve A4 pages. Below is a brief verbal description of the formulations.

Marketing is adjusted to achieve a sales performance target. In VR-Cussons the target is past sales. So the decisionmaking process is as follows. When current sales volume is much less than past sales volume the result is more intense marketing action through bigger price discounts or new advertising campaigns. On the other hand when current sales volume is much greater than past sales volume the result is less intense marketing action in order to improve operating cash flows. Small differences between current and past volumes tend to be ignored. The management response function is shown in figure 10 and was calibrated by comparing observed volume changes with the historical behavior of retail prices and the intensity of advertising campaigns. Interestingly, this formulation of pricing and advertising implies that VR-Cussons' managers ignore competitors' actions. They focus on their own volumes rather than benchmarking prices or volumes against VR-Lever or Own-labels.
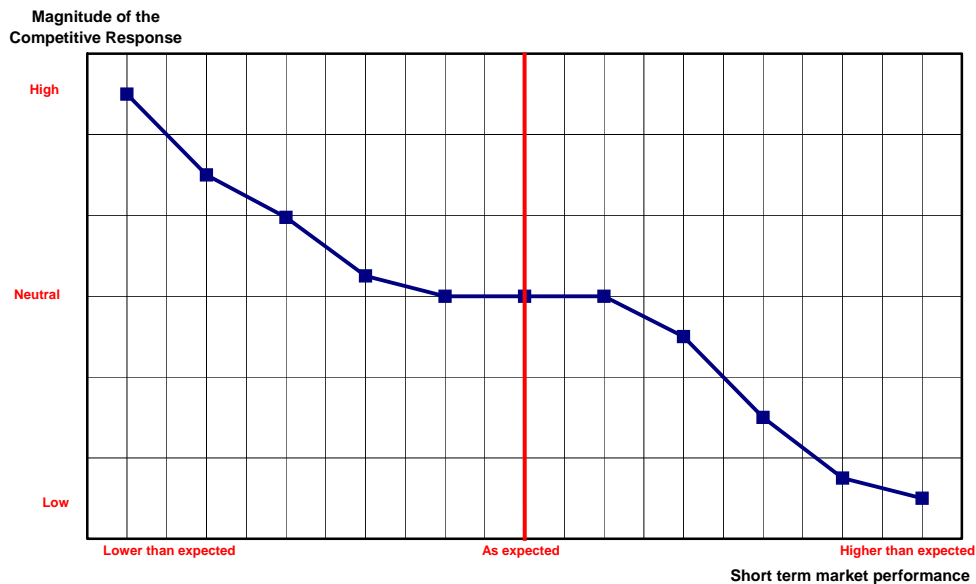
Figure 10 Function Determining the Strength of Competitive Response
to Market Performance

Display shelf is negotiated between branded manufacturers and retailers. Share of the display shelf is a fiercely contested resource in fast-moving consumer goods, no matter how large or small the store. While big stores can offer lots of shelf space, it is easily filled by the huge proliferation of available products, thereby

improving the bargaining positioning of retailers (Messinger and Narasimhan 1995). The task of branded manufacturers' sales managers is to negotiate a significant share of display shelf at low cost in order to enhance daily sales and to increase the effectiveness of advertising campaigns. In comparison, retailers' management teams try to maximize the income received for allocated space by assigning the greatest share to the most profitable items. The decision making process for changes in display shelf depends on trade margin and market share. The more market share or the greater trade margin then the larger the display shelf. This decision logic is embedded in a reinforcing feedback loop where the more shelf space, the greater sales volume, the higher market share and the more shelf space. If unchecked this reinforcing loop enables branded manufacturers to dominate the market. However, retailers can use private label products to retain some control as described later.

Manufacturing capacity is the responsibility of the manufacturing manager. The technology of liquid soap production is entirely different from bar soap and requires new equipment. So the manufacturing manager faced a strategic dilemma: how quickly to build capacity for the new product and how quickly to retire capacity for the old product. The decision-making process for the adjustment of manufacturing capacity is essentially driven by market size. The larger expected sales volume the more capacity is needed and vice-versa. Economies of scale are important too. The greater capacity, the lower unit cost and the lower price (at a given margin), leading to more sales and eventually to more capacity. The same process also works in reverse. When sales fall, cost per unit increases due to a combination of low capacity utilization, high fixed cost and fewer scale economies. As a result retail price increases too unless the firm reduces gross margin to maintain sales. The model captures the interplay of manufacturing cost dynamics arising from the growth of liquid soap capacity and the simultaneous decline of bar soap capacity.

Managerial Decision-Making Processes in VR-Lever

The management team felt that VR-Lever's decision-making processes were broadly similar to VR-Cussons. Therefore we modeled VR-Lever by replicating the formulations for VR-Cussons while modifying information flows or parameters to capture important differences of managerial emphasis. For example we assumed that VR-Lever focuses its competitive actions on managing market share rather than sales volume. So in VR-Lever promotions and advertising increase when market share falls below its historic value. Sales volume plays no significant role. Similarly VR-Lever's adjustment to mark-up or gross margin is formulated as a function of long-term market share instead of sales volume. We also assumed VR-Lever offers a slightly higher trade margin than VR-Cussons in order to obtain an adequate share of shelf space despite lower market share.

Managerial Decision-Making Processes in Own-labels

Own-labels pricing is much different than VR-Cussons and VR-Lever for a number of reasons. First, Own-labels do not aspire to be market leaders. Rather they participate in the market enough to bargain effectively with existing branded manufacturers. Second, Own-labels do not manufacture or own capacity. Instead they buy from manufacturers that specialise in private-label products. Third, Own-labels do not promote their product through advertising. They compete on price only.

Own-labels pricing is intended to boost income from display shelf. The decision rule for Own-labels pricing is influenced by trade margin received and by product sales - the two main sources of retailers' income. The income received from

branded products in the form of trade margin is compared with the historical trade margin. If income from branded products falls, either as result of a reduction in branded manufacturers' trade margin or market share, then Own-labels' managers reduce retail price for two reasons. First, they want to expand Own-label sales to substitute for income lost from manufacturers. Second, they want to force an improvement in the trade margin. However, as Own-labels expand their market share, the income from branded products will decline even more (if manufacturers of branded products do not offer higher trade margins), and Own-labels will further reduce their prices.

An extreme outcome of this interaction between manufacturers and retailers is that Own-labels will dominate the market through continuous price reductions (as has happened with Wal-Mart in some FMCG market segments). Pricing decisions that respond to income from trade margin are embedded in a reinforcing feedback process in which price spirals downwards. Although there is a lower limit to price it depends on the sourcing cost of own-label products and the actual trade margin obtained from branded manufacturers. However, Own-labels' managers usually prefer to set a target market share, which is low enough to maintain bargaining power without pushing branded manufacturers out of the market. This policy introduces an additional balancing feedback loop that halts the spiral decline in price.

That concludes the discussion of model formulations. The main assumptions and parameters were reviewed and agreed by the management team, and the model was tested and carefully calibrated. It was then ready for evaluating the new product strategy. A number of simulation experiments were conducted to understand the performance of the strategic initiative and to extract key lessons to adjust the implementation of the strategic initiative in the market.

Evaluating the strategic initiative using the model

The first set of simulations shown to the management team was the simulated performance of the market with comparison to real data – the base case. The base case, which is the best fit of the simulated performance with the historical time series, *replicates the decisionmaking processes employed by the management team since the launch of the product*. The intention in showing the base case was to help the management team to understand how their decisionmaking processes led to the actual situation they were facing. In other words, the simulation moves them from actors to spectators of their strategies, similar to playing a videotape of the performance of a team after a match. We discussed some observations regarding the decisionmaking processes and their effects on the performance of the strategic initiative.

The Base Case - Simulated Performance of the Market With Comparison to Real Data

Figure 11 shows simulated sales volume for the branded liquid soaps. For comparison real time series data is also shown. Although there is not a perfect match of simulated and real trajectories the magnitude and main trends are similar. As we will see, the simulations provide an explanation for observed behaviour and this is an important part of their value in rehearsing strategy. VR-Cussons new product grows exceptionally fast during the first 36 months, exactly as the management team had hoped. This growth is due to two managerial actions: trialing and price reductions. The trialing effort is complemented with a large reduction in the retail price of liquid

soaps that boosts the adoption rate. Meanwhile competitors are slow to respond on price as we will see later in figures 12 and 13.
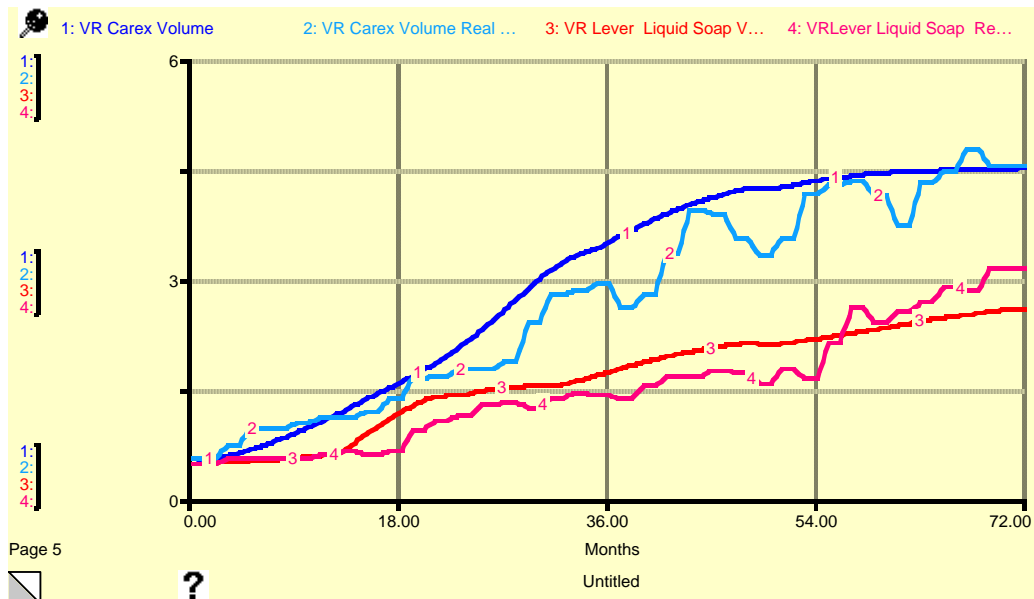

Figure 11 Liquid Soap: Simulated and Real Volumes

After month 36, two factors reduce the rate of growth of VR-Carex as shown in lines 1 and 2 in figure 11. First, VR-Cussons' management stops reducing the price of the new product due to the early success of the launch.   Sales volume after three years matches the expected market size and managers do not want to further erode the revenues from liquid soap. Second, the steady reduction in the number of bar soap users begins to slow market growth, despite the intensity of marketing actions. One lesson from the simulation is that VR-Cussons' managers might have been able to further exploit the potential of the new market with more intense marketing actions at the beginning of the process. A corollary is that later marketing action is much less effective. Both these insights were useful for the company and confirm the first-mover advantage for developing the liquid soap market.

Figure 12 presents real and simulated retail prices in the new product market for branded products. VR-Cussons reduces price at an early stage to stimulate growth - lines 1 and 2 in figure 12. Some time later VR-Lever also reduces liquid soap price – lines 3 and 4 in figure 12, as a reaction to erosion of market share. VR-Lever's price falls until it slightly undercuts VR-Cussons' price, in an effort to sustain market share. When VR-Lever reduces its prices, there are two effects: one effect is to start attracting bar soap users into liquid soap, which expands the liquid soap market; the second effect is to reverse the flow of customers switching from VR-Lever liquid soaps to VR-Carex.
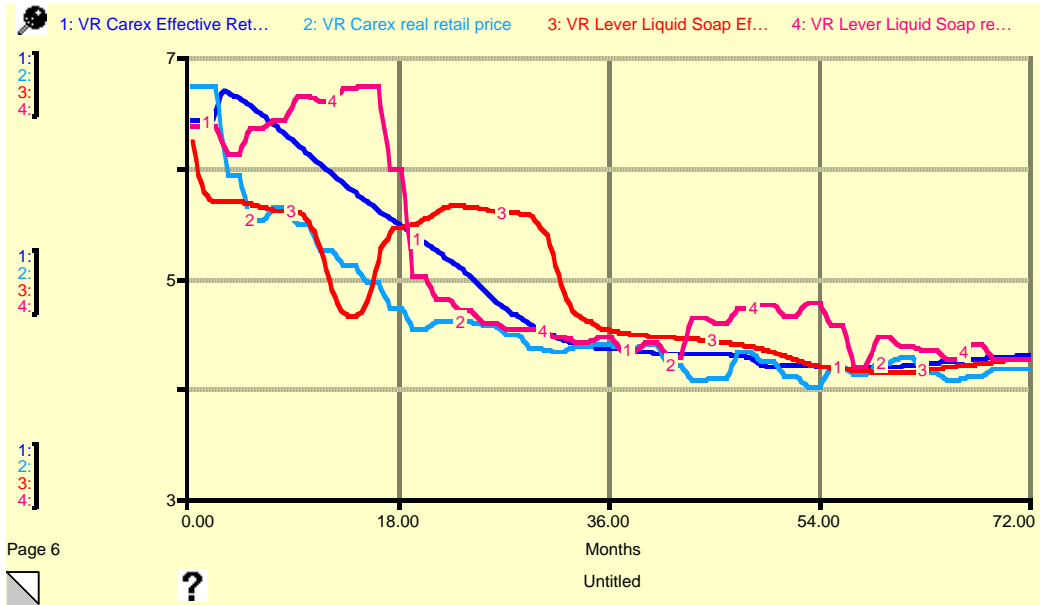
Figure 12 Liquid Soaps: Simulated and Real Prices

Own-labels also reduce their prices as lines 1 and 2 (simulated and real volume) in figure 13 show. Even though Own-labels are obtaining more income from trade margins (line 4) due to growth in branded liquid soap sales, the retailers' desire to maintain market share (line 3) is reducing Own-labels' prices. When Own-labels' market share increases, prices stabilise.
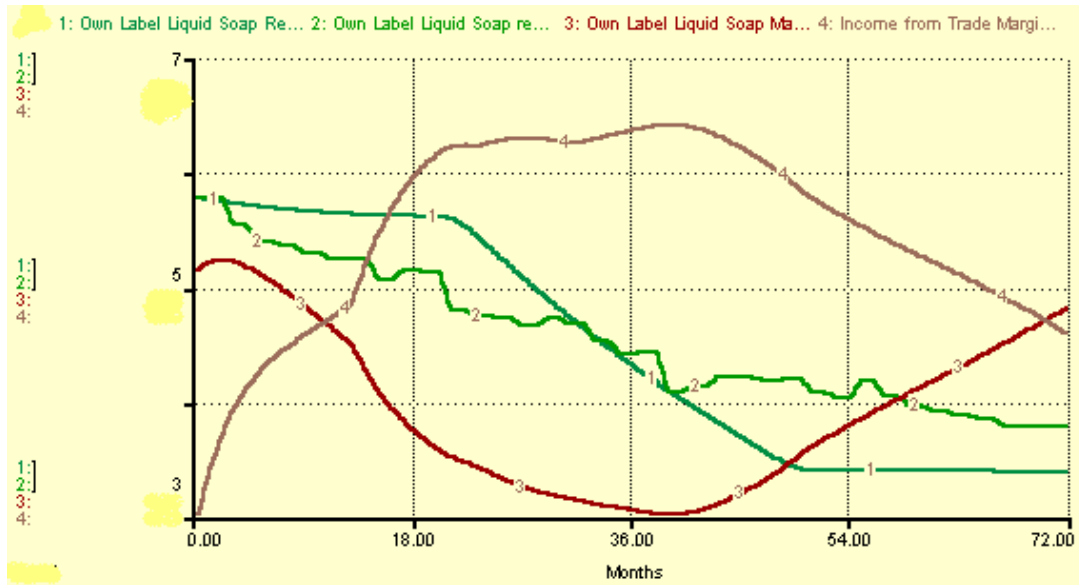
Figure 13 New product: Own-Label Simulated Price

The base case simulations provide some insight into the development of the new product segment and the reasons behind it. Two particular features stand out. First, an equilibrium price for VR-Cussons and VR-Lever liquid soap is established once both firms satisfy their evolving market performance goals. Own-labels also achieve an equilibrium price once they acquire adequate bargaining power

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(represented here as a market share goal). Second, VR-Cussons volume in the new product segment reaches a plateau due to two factors. The first factor is the equilibrium price that reduces the attractiveness of the new product to more price sensitive old product users. The second factor is that VR-Lever stops losing customers to VR-Cussons when it matches VR-Cussons' price. While Own-labels' volume grows strongly at the end of the period, influenced by the price differential with the branded products, Own-labels' market size will eventually reach a plateau, similar to the old product market, once the branded products reduce the price gap.

Memories of the Future

While the base case was important for interpreting what had happened so far, additional simulations of future time paths had much deeper impact on the management team's view of the strategic initiative. This use of the model creates 'memories of the future' (de Geus 1997) that managers use to adjust the strategy if it appears unlikely to fulfil company objectives, or to adjust the objectives themselves. Selected simulations are presented below.

We ran the model five years into the future using the same parameters as in the base case that assume the firm's decisionmaking processes continue unchanged. This business-as-usual projection led to several insights:

- The retail price of the old product (bar soap) rises in response to increased manufacturing cost – unless the company is prepared to sacrifice profitability in the highly competitive bar soap business. The increase in manufacturing cost is due to falling sales volume and fewer economies of scale in traditional bar soap production.

- Future growth in sales volume of the new product (liquid soap) is limited by three factors. First, the diminishing pool of bar soap users implies that it will be more difficult to sustain the same conversion rate to liquid soap as in the previous five years as the new market becomes saturated. Second, the reaction of competitors, especially Own-labels, starts to attract price sensitive consumers to liquid soap. Third, stabilizing the new product's price in the aftermath of initial successful growth establishes a price difference in favour of Own-labels products that, in the medium-to-long-term, will erode the company's market volume.

Lack of awareness of the effect of Own-labels on the performance of the strategic initiative was a particularly important strategic misconception. To illustrate this misconception we presented a comparison of three runs, as shown in figure 14. First, we presented what would happen if no competitors were able to copy the liquid soap innovation: an optimistic belief in first-mover advantage that was widely shared among the management team. Sales volume of liquid soap (line 1) expands swiftly in the historical period to 2004 and then settles into a pattern of sustained slow growth. Second, we showed the company's sales as if the other branded competitor were the only rival able to imitate the new product: a recognition that imitation is possible, but still an optimistic view since the branded competitor is the least disruptive rival (due to its similar cost structure and pricing policies). Sales volume of liquid soap (line 2) is slightly lower than before and again seems to confirm the assumption of first-mover advantage. Finally we showed the company's sales if both the branded competitor *and* Own-labels were able to imitate liquid soap. In this case Own-labels' capability to match the strategic initiative changed the outcome of the strategic move because

they pushed price down and captured new customers from the branded products (line 3).
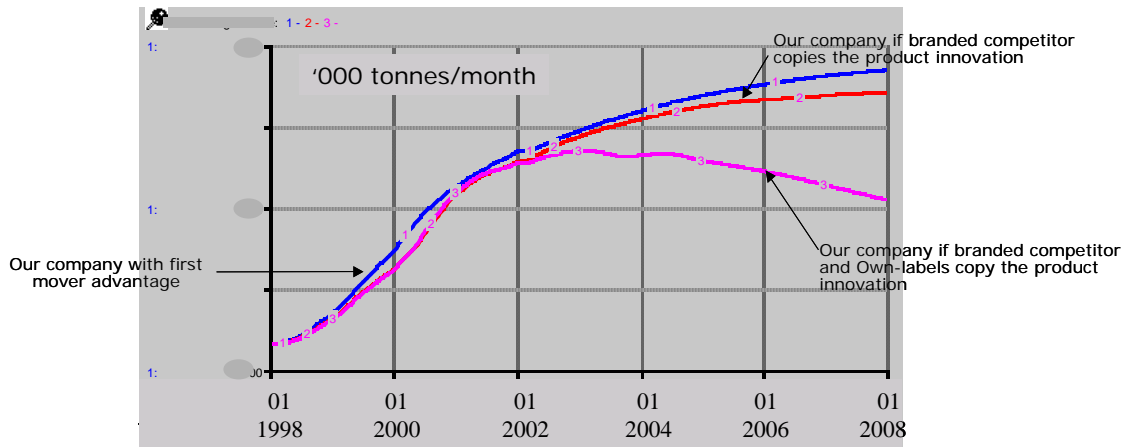

Figure 14 Alternative trajectories for sales volume of liquid soap as first-mover advantage fades and additional players are assumed able to imitate the new product

Additional simulation experiments were run to test other ideas proposed by the management team. For example one simulation examined the feasibility of achieving a sustained growth rate of 20% per year. Another simulation investigated the pricing policy for liquid soap that would be required to move all bar soap customers to the new product in 30 months or, more ambitiously, in only 12 months. These what-ifs further enriched management team discussion of the strategic initiative.

Using the model to test the strategic initiative in other geographical markets

The model was also used to test the strategic initiative in other countries such as France and Germany. The model building process and, later on, simulations helped managers to appreciate country differences in the new product launch in terms of customers' price sensitivity factors and pricing decisions.

Conclusion – Understanding Competitive Dynamics in the Fast-Moving Consumer Goods Industry

The management team extracted a number of insights from the model and simulations that clarified their understanding of competitive dynamics in the industry. This process of learning contributes to strategic development and is the intended benefit of rehearsing strategy. In this section, we present a brief explanation of competitive dynamics as revealed by the modeling project.

It is widely known that managers in the FMCG industry compete fiercely to sustain their level of participation in the market. The graphical representation of the business in figure 15 provides some insight into this phenomenon. The figure concentrates on bar soap, but similar processes are at work for liquid soap. The interaction between price and capacity is important. Sales volume drives manufacturing capacity. If manufacturing capacity rises then cost of goods sold declines due to economies of scale (and vice-versa). Lower cost leads to lower price. Low price increases the value for money of the product thereby attracting more customers and more sales volume. Once established, success breeds success around

the reinforcing loop R1 leading to a gradual demise of rivals unable to compete due to their higher costs. An effective way for competitors to halt this reinforcing process is to reduce the attractiveness of leader's products as soon as possible, either by launching similar products or by reducing prices, as occurred in liquid soap.
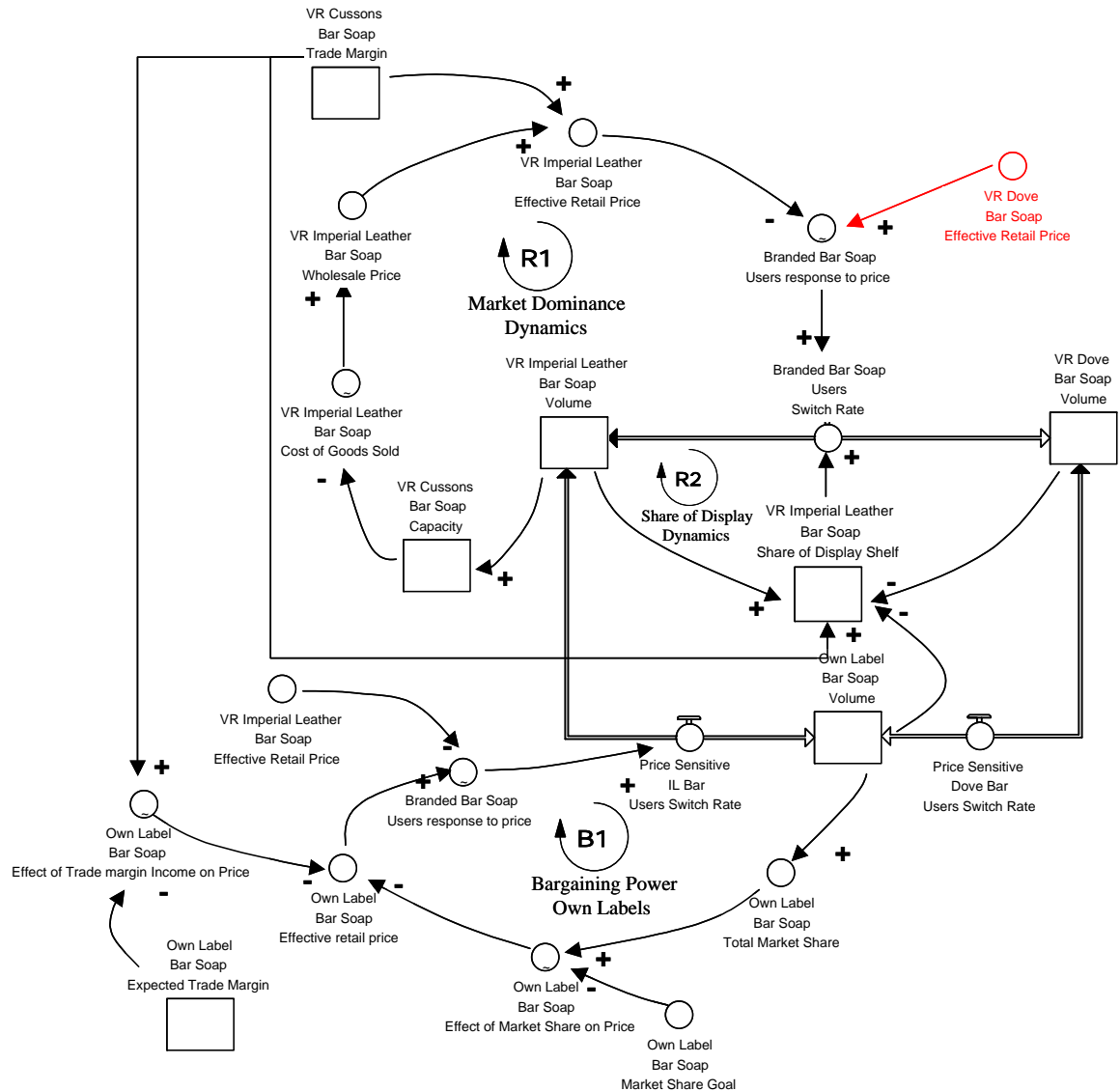

Figure 15 Strategic Resources and Feedback Loops Underlying Competitive Dynamics in the FMCG Industry

An additional effect is the power of retailers to control the allocation of shelf space. As mentioned, display shelf is a fiercely contested resource in the FMCG industry and has a major influence on the effectiveness of price promotions and advertising. Companies in the industry use trade margin to negotiate their share of display shelf with retailers. Higher sales volume and market share normally command greater share of display shelf because of the additional income for the retailer. Additional shelf space attracts more customers and higher sales volume and these relationships form reinforcing loop R2. However there is more to the allocation of shelf space than sales volume. Retailers can use the display shelf for their own private label products and use this threat to negotiate attractive trade margins.

Competitors with low market share may buy display shelf by offering a better trade margin to retailers, providing they are willing to accept a compensating reduction of gross margin in order to remain price competitive. Own label products enable retailers to control the strength of the two reinforcing loops R1 and R2 by exercising bargaining power through balancing loop B1 in figure 15. The interaction of these three feedback loops adds significant dynamic complexity to the management of fast moving consumer goods and to strategic initiatives such as new product launches.

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