# Strategic Management Dynamics

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# STRATEGIC MANAGEMENT DYNAMICS

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# ‘Strategic Management Dynamics’

## Kim Warren

## PART 1: PERFORMANCE, RESOURCES AND THE STRATEGIC ARCHITECTURE

### CHAPTER 1: DYNAMICS

*Topics covered:* The Performance-through-Time Imperative. Building performance over time, rather than seeking better ratios. Too-high vs. too-low aspirations. Target setting for business performance - and for public-service and voluntary organisations. Performance aims for functional issues. Time-charts fundamental to capturing performance dynamics. Links to core Strategy concept - economic profit and shareholder value.

### CHAPTER 2: RESOURCES DRIVE PERFORMANCE

*Topics covered:* Rigorous causal analysis. Identifying and specifying resources. Basic resource-types - customers, products, capacity, staff and cash. Resources drive demand, revenue and costs. Equivalent principles in public services and voluntary organisations. Comparing standard approaches to understanding and forecasting performance vs the resource-driven approach. Links to industry-forces, cost-leadership and differentiation, value-curve and the resource-based view of strategy.

### CHAPTER 3: BUILDING AND RETAINING RESOURCES

*Topics covered:* Key principle - ‘resources fill and drain’. Implications for rigorous causal analysis and for managerial control of performance-through-time. Limitations implied for the value of correlation methods. Impact of developing potential resources. Application in marketing [new-product adoption] human resources [staff hiring and retention] and product development. Links to segmentation, value-chain and asset-stock accumulation concepts in Strategy.

## PART 3: CONTROLLING STRATEGY AND INTANGIBLE FACTORS [FORTHCOMING]

### CHAPTER 8: GOALS AND CONTROLS

*Topics covered:* Key principle - flows of resource determine long-term performance. Close-coupling needed between metrics and control decisions. Dangers of control via financial outcomes. Dealing with multiple, conflicting goals. Multi-stakeholder issues when pursuing goals in public policy.

### CHAPTER 9: INTANGIBLE RESOURCES

*Topics covered:* Key principle - soft factors are powerful, so cannot be ignored. Intangibles accumulate and deplete like tangible resources - and can be managed. Threshold levels trigger discontinuous change - and can be anticipated.

### CHAPTER 10: CAPABILITIES

*Topics covered:* Key principle - capabilities as activities the organisation does well. Capabilities as combination of skills and processes. Capabilities accumulate, especially from learning. Organisational forgetting from downsizing, reorganising and staff turnover. Link to Strategy concepts - competence-based and knowledge-based approaches to strategy, and experience-curve cost-reduction.

# PREFACE

This book takes a somewhat different path from other strategy textbooks, largely because it starts from a slightly different point. The purpose of designing and implementing strategy is to improve performance *over time*. In corporate settings, shareholders value the likely stream of future cash flows, rather than profitability ratios. Simply put, investors will prefer a company generating 12% returns when cost of capital is 8% over a company generating 15% if the first company is growing substantially and the second is not. No matter how sustainable the second company's superior profitability may be, whether due to finding an attractive industry situation or establishing a hard-to-imitate advantage, its lack of growth limits its value.

This over-riding imperative to improve performance over time is not limited to the strategic management of corporate entities. It applies equally to public service and voluntary organisations, although they may focus on achieving some other quantifiable purpose rather than creating financial value. Functional parts of organisations also face the requirement to improve performance over time, such as improving service quality, accelerating product development or reducing staff turnover.

To move forward from this concern with performance over time requires a rigorous and quantitative causal explanation for the direction and rate at which performance is changing. This analysis quickly identifies that accumulating resources are the ultimate cause of current performance – customers drive revenue; capacity and staff drive costs, for example. Any desire to estimate how performance will change must therefore depend on how those tangible resources will change.

The complicating issue is that accumulation and depletion of resources do not follow the straightforward form of causality we usually hope to discover. The quantity of each resource at any particular time reflects the organisation's entire history, its customer base today, for example, being precisely the sum of every customer ever won, minus every customer ever lost. This has serious implications. If performance depends on factors that have been built

up and sustained throughout the past, it cannot be explained by the current values of other factors today – price or marketing spend, for example – no matter how persuasive the correlation results.

The accumulating asset-stock, or resource, is the fundamental component without which no explanation of performance can be accurate. Its principal consequence is that each organisation is on a trajectory into the future that has been steered by its previous strategies and decisions. Our quest is to find adjustments to those strategies and decisions that will redirect that trajectory onto a better path. Even when it is possible to achieve step-changes in performance, reliable growth thereafter is still required.

The time-based behaviour of accumulating resources and other asset-stocks lies at the heart of a method called system dynamics. This method also captures the next stage in the causal logic – showing *why* resources are being won and lost. These flow rates of resources are fundamental to why performance is changing over time. If there are no flows, then resources don't change, and if resources don't change then *ceteris paribus* performance remains the same. Rates of change in resources reflect management decisions and certain external factors, such as competitors' efforts or limited availability of those resources. Crucially, however, as the strategy field has long known, the rate at which resources can be acquired depends strongly on the quantities already in place. This gives rise to interdependence relationships, the capture and quantification of which generates the organisation's basic operating system – its core 'strategic architecture.'

This is the point to which Part 1 of this book progresses. Although the resulting frameworks cover only a mundane set of simple, tangible resources, they already provide valuable explanations for the performance of real organisations over time. Later chapters will add to this the intangible factors and capabilities of the strategy field's 'resource-based view' of performance[1], along with competitive and other mechanisms.

While linking resources to performance over time may be somewhat unfamiliar, it nevertheless connects to recognised strategy frameworks and tools. Since strategy is concerned with the acquisition and retention of customers, for example, chapter 3 shows how the value curve[2] can be a valuable tool for

[1] See for example Jay Barney, *Gaining and Sustaining Competitive Advantage*. 2nd edn. (2002), Pearson Education: Upper Saddle River NJ, Chapter 5.

[2] Chan Kim and Renée Mauborgne, "Creating New Market Space", *Harvard Business Review*, Volume 77, No.1, (January-February 1999), 83–93

explaining those flows. Owning and acquiring resources are the principal costs incurred by most organisations, so the make-up of the value chain[3] can be more accurately assessed if these separate elements are made explicit. Chapter 4 explains how balanced scorecards[4] can be more robust if built on foundations of a strong causal explanation for performance, which the strategic architecture provides. It is not even necessary to desert our attachment to spreadsheet views of performance. Properly organised, the logic of causality that lies behind an organisation's strategic architecture and performance over time can readily be presented in spreadsheet form. However, there are better forms for displaying and working with an integrated picture of performance than the static, isolated tables and charts to which management is usually limited. The book is supported by a simple software tool that enables this improved display of strategic architecture and performance[5].

The book is organised in 3 parts, publication of which in electronic form will be phased between November 2006[6] and November 2007:

- Part 1: Performance, Resources and The Strategic Architecture [Chapters 1–4]
- Part 2: Developing Strategy, Competitive Dynamics and Industry Structure [Chapters 5–8]
- Part 3: Controlling Strategy, Intangible Factors and Corporate Strategy [Chapters 9–11]

Once these sections are complete, the book will be published in full, both in hard copy and electronic form by John Wiley & Sons, Chichester UK.

The book is intended to be useful in either of two ways. First, indivvidual chapters together with the supporting learning materials can readily be used to supplement existing courses, not just in strategy, but in marketing, entrepreneurship, voluntary sector and public service management and other subjects. The book can also be used as the basis for a full course that focuses on management's imperative to develop and implement strategies that improve performance over time.



[3] Michael Porter, *Competitive Strategy.* (1980), New York: Free Press, Chapter 2.

[4] Robert Kaplan and David Norton, *The Balanced Scorecard*, (1996), Harvard Business School Press: Boston MA.

[5] *'MyStrategy™'*, available from www.strategydynamics.com.

[6] Part 1 is available from www.strategydynamics.com/smd.

Since examination and analysis of performance over time is both unfamiliar and intuitively challenging, simulation-based learning is essential to its appreciation. While we can be told the principles of riding a bike in endless detail, it is not until we climb on and fall off that we learn to manage its dynamics. For most managers, that painful learning takes place on the job, and with other people's money! The frameworks in these chapters are therefore supported by a variety of simulation-based exercises, available from www.strategydynamics.com/smd. These include some substantial computer-based business games[7], suitable for class instruction and for distance learning. In particular, a complete and detailed example familiar to all audiences – a low-fare airline - is built up from chapter to chapter. Instructors can therefore make use of well-known case studies from the industry, as well as enriching their classes with the extensive business game provided for this setting.

**A note on case examples:**

Examples of companies or organisations that appear to be well managed — or sometimes badly managed — are very common in business books. However, exemplary cases at one point in time can readily become failures in later years, and failures can be turned around. In this book, case examples are used to illustrate good or poor practices or performance on a particular issue, in particular circumstances, and at particular times.

Organisations and their situations change constantly – executives come and go, competitors alter their strategies, new market challenges arise, and many organisations simply forget good practices they once employed. It is even possible for a practice that is good for an organisation under one set of circumstances becomes bad for it when things change. For these reasons, do not read more into the examples reported in this book than they deserve. Certainly do not conclude that 'Company X did well by doing Y, so that must be right for us too.' Each example should be considered in its own context.



[7] These games are known as 'microworlds', after Seymour Pappert, *Mindstorms,* (1980), Basic Books: New York.

CHAPTER 4

# THE STRATEGIC ARCHITECTURE

## KEY ISSUES

- Complementary resources: why growth depends on existing and potential resources.
- How interdependence causes feedback that can both drive growth and constrain it.
- Mapping the interactions amongst resources to complete the "strategic architecture" that drives organizations' performance over time.
- How different organizations in related industries exhibit common core architectures.
- The causes of discontinuities and tipping points.
- Using strategic architectures with other strategy tools.

Worksheet 4: Drivers of Resource Win- and Loss-rates.

Worksheet 5: The Core Strategic Architecture.

This chapter includes connections to the following frameworks and concepts: the Bass diffusion model, tipping points, issue tree analysis, value drivers, balanced scorecard, strategy maps.



Our attempts to explain how organizations' performance changes over time has so far identified that current performance depends on resources, external factors and certain management choices (Chapter 2), and that the current level of each resource depends on historic rates of gain and loss that cause them to accumulate and deplete (Chapter 3). We are left needing to explain what causes those resources to grow or decline at their particular rates. Chapter 3 started to explore this question, identifying that some of the same factors causing current performance are also involved in resource flow rates: price causes customers to be won and lost, for example, as well as affecting how much current customers buy, and working

conditions cause staff to leave us, as well as determining the productivity of staff currently in place.

This is an incomplete answer, however, because some of those causal factors themselves need to be explained—what causes working conditions to be attractive, for example—and because it leaves out other factors that must be important, such as competition. To complete the picture, it is necessary to return to the discipline adopted in Chapter 2, and step back along the logical chain of causality, to see what lies at the start of that chain. Carrying out this next step reveals that:

Three categories of factor determine the rate at which any resource increases or declines:

- management decisions
- competitive and other external factors
- the existing levels of resources already in place

Chapter 3 already showed that some resource-flows simply *are* management decisions—adding capacity or borrowing cash, for example. Other decisions may only have partial influence on flows, in combination with other factors. Figure 3.16 in Chapter 3 showed the "value curve" items determining airline Ryanair's ability to win customers, to retain customers and to persuade customers to fly frequently. Those value curve items included fares, choice of destinations, range of add-on services, and reliability. The three categories of factor influencing resource flow-rates can be illustrated by focusing on just one part of this structure—the winning of new customers—and tracing the causality back through these items.

## MANAGEMENT DECISIONS

It is no surprise that price plays an important role in the ability of a low-fare airline to attract new customers. Figure 4.1 shows the history of the company's average fares from 1995 to 2006, and its estimated customer win rate over that period. Of course, other factors have also played a major role in determining that win rate, especially its opening of new routes to gain access to new potential customers. However, had its price followed a different path, perhaps sustaining its highest level of something over €50 per flight, its customer win rate would certainly have been different. Critically, that also means the company would have a different *quantity* of regular customers today, and very different revenues and profits, even if all other factors had remained unchanged.

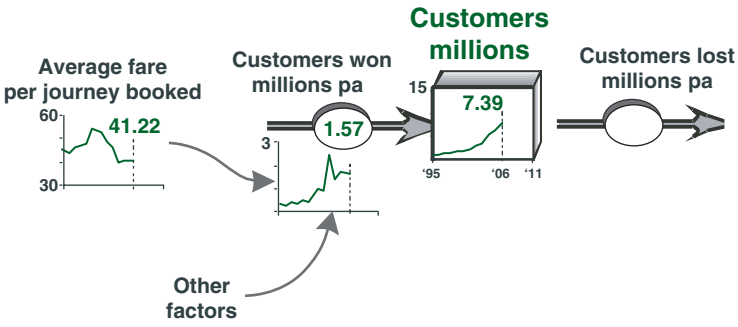



**Figure 4.1:** Ryanair's choice of price levels drives its customer win rate.

### COMPETITIVE FACTORS

Customers are likely to be attracted to any service offering lower fares, but Ryanair may not be alone in offering much cheaper flights. Also, the full-service airlines have not ignored the threat from low-fare rivals, and have themselves lowered prices. So although Ryanair's low prices have led to its winning new customers, this success has also required that those prices be as attractive as its competitors. This particular company is very aggressive in its pricing, so although detailed data are not available on competitor fares for comparable routes and services, it is reasonable to expect that Ryanair has maintained a price advantage over most of its history. Figure 4.2 illustrates the fare differential versus competitors, as well as how the company's own fares might have worked to drive its customer win rate.

Similar structures would depict competitive comparisons on other issues of importance to would-be customers, such as choice of destinations and range of services.

## INTERDEPENDENCE: RESOURCE FLOWS DEPEND ON EXISTING RESOURCE LEVELS

The third category of factors driving the inflow and outflow of resources is of such importance that it deserves extended attention. Chapter 2 explained the reasons why resources are important to performance (where "performance" concerns sales and profits), but pointed out that explanations of performance cannot ignore resources that are neither rare nor difficult for other organizations to imitate. One criterion in the resource-based view of strategy for determining whether resources are important

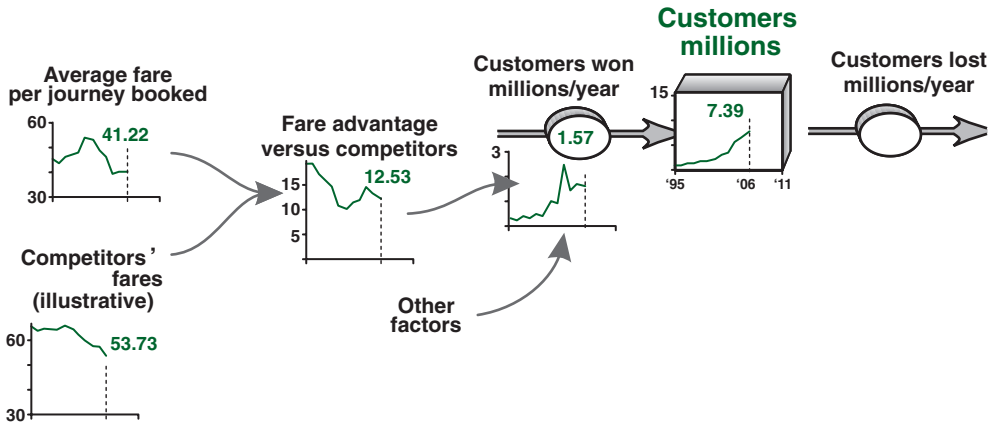



**Figure 4.2: Competitors' price levels also influence Ryanair's customer win rate.**

was not, however, examined at that point—namely the extent to which they are complementary, i.e. work well together.[1,2] This issue is critical and quite familiar to management. It is clearly not sufficient, for example, for a company to have products its customers might value if it does not have the sales capability to bring those products to their attention, and it may lead to trouble for a company to win customers if it lacks the physical capacity to produce the volume of product they need.

Chapter 3 explained further the unique characteristics of accumulating asset stocks[3] (including resources) and some of the resulting consequences. Two features of accumulating resources' role in determining performance, however, remain unexplored. First, there is the tendency of certain resources to be easier to acquire when there is already a substantial quantity in place—so-called "asset-mass efficiency." Secondly, there is the issue that asset-stocks are interconnected. If we trace back the causal logic of why a resource flow is running at a certain rate at a particular time, both of these features can be identified.

## Growth of a resource may depend on its own current level.

The simplest mechanism by which resource flows depend on existing resource levels is when that dependency is on the same resource. The most common examples concern word-of-mouth effects, when existing customers recommend products or services to others. This becomes apparent if, when we want to know what has caused the total customer win rate during a certain period, we find that a fraction of those new customers were influenced by recommendations they received. The rate of those recommendations must reflect the number of *existing* customers.

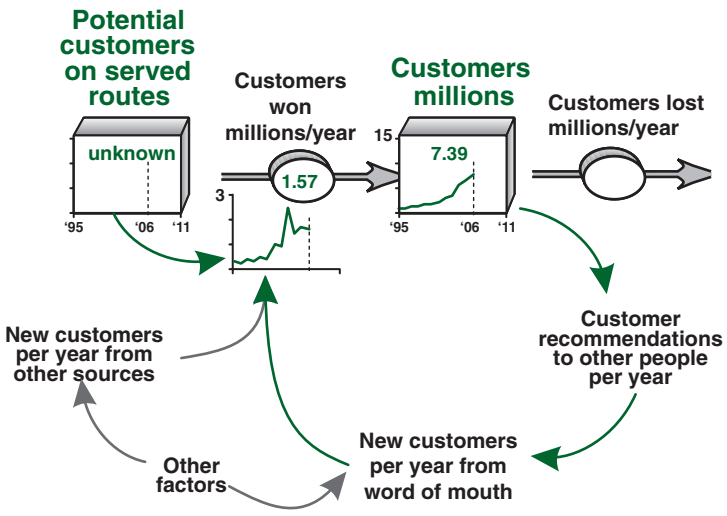



**Figure 4.3: Part of Ryanair's customer win rate is caused by recommendations from existing customers.**

Figure 4.3 demonstrates this causal chain for Ryanair's customer growth. Note that for this causal mechanism to function, other factors also must be satisfactory (e.g. attractive fares). For completeness, the picture must also include customers won from other sources.

Note that in this figure and others that follow, our aim is to *explain the flow rate*, and that tracing back along the green causal links ends up back at one or more *existing resource levels*.

Such self-dependency between resources and their own growth rate can apply to resources other than customers. It is common, for example, for people who enjoy their jobs to recommend that their friends seek employment with the same organization. Nor need such mechanisms rely on active communication between existing resources and those who may be won. Airport operators who welcome requests by Ryanair to start services from their airport need not have had conversations with existing airports served by the company, because they can readily see the passenger traffic the airline brings.

### Resource growth may depend on the existing levels of other resources.

The final part of the causal explanation for resource flow rates completes both the key mechanism in the resource-based view of strategy and performance—that resources should be "complementary"—and the interconnectedness that features among accumulating asset stocks. If we trace back what causes the current rate of

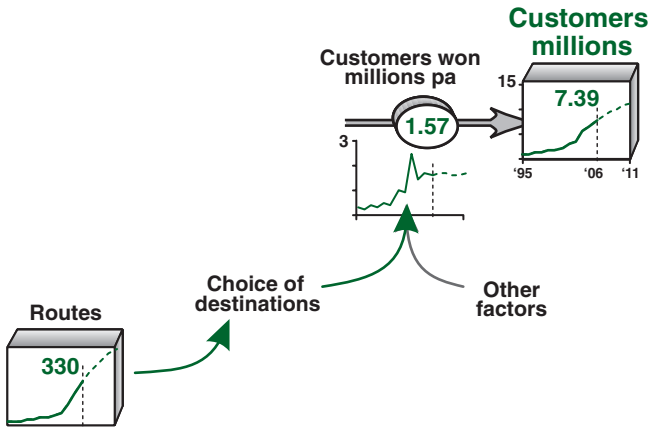



**Figure 4.4: Ryanair's customer win rate depends on the number of routes it operates.**

any particular resource flow, we frequently find at the start of that causal chain the existing level of *other* resources.

Figure 4.4 shows that Ryanair's customer win rate depends in part on the choice of destinations available, which in turn depends on the number of routes the airline operates. The choice of destinations available to a particular individual at a location is not a simple function of the number of routes, since many more destinations are offered from some locations (such as Dublin), than from others (Oslo, for example). Nevertheless, adding destinations clearly increases the number of people who may fly with the airline. Ryanair needs to consider whether adding a particular route will attract enough new customers to be commercially viable.

Note that the dependency here traces back to *routes* rather than *airports*. This is because the airline has many options to add further routes among the network of airports it already operates. Its decision to add a new route is therefore separate from, but enabled by, any earlier decision to add another airport to its network—another case of a resource *flow rate* (opening new routes) depending on the *existing* stock of resources (airports served and routes already offered).

### Loss of a resource depends on its own current level and may depend on the level of other resources.

Customers are lost for many reasons, including the activities of competitors. However, before blaming outside forces, it is useful to check that the organization has not brought about its own loss of this important resource. Frequently, the ability to retain a resource depends directly on the adequacy of other resources, the most common mechanism being when poor service quality reflects inadequate numbers

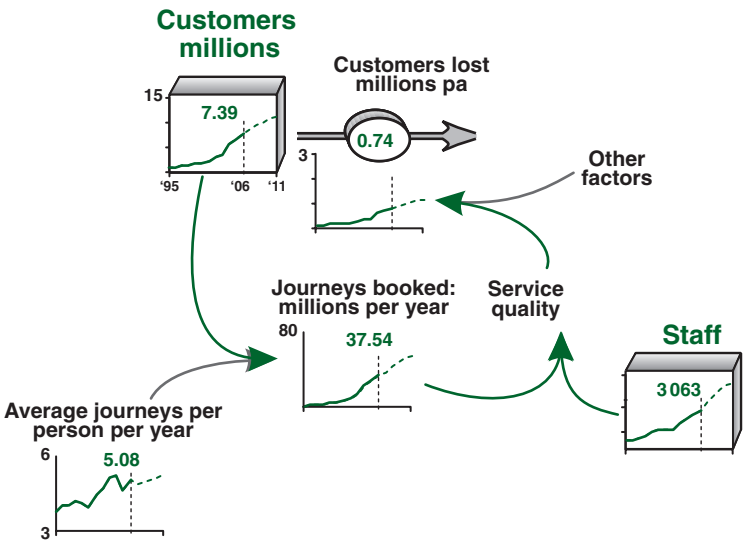



**Figure 4.5: Ryanair's customer loss-rate depends on the current number of customers and staff.[4]**

of staff. Figure 4.5 demonstrates how this mechanism would work for Ryanair. We have estimated that the airline might have over 7 million customers, making over 37 million journeys per year. Those journeys create demands on airline staff, especially for check-in and inflight service. If there are too few service staff, customers will experience poor service—delayed check-in, late departures and so on—which will cause a fraction of those customers to decide not to use the airline again in the future. The stock of customers is then reduced by this loss rate.

This structure is common in many situations and has important properties:

- We do not say here that the customer loss rate *may* depend on the current number of customers—it *does* depend on that number. At the most basic level, a company can only lose customers that it has. If the number approaches zero, no customers are lost due to poor service or for any other reason.
- There is a threshold for staff capacity to cope with customer demand. The approximately 3063 staff may be able to handle 35 million passenger journeys per year, but not 40 million. Provided that customer numbers remain below about 7 million, service quality is fine, and losses due to poor service are negligible; if customer numbers cross that threshold, staff become increasingly unable to cope, and loss-rates escalate. Thresholds of this kind are a further obstacle to discovering the causes of organizations' performance, and add further to the limited value of correlation methods for such purposes discussed in Chapter 3.

- This structure is self-correcting. If poor service drives customers away, customer numbers and journeys booked will drop, until a level is reached at which staff capacity is once again sufficient. Happily, customer service is satisfactory once again, although the reason for that good news may not be so welcome. This phenomenon seems remarkably common in real-world cases. This raises the intriguing question as to whether management is commonly satisfied with limited growth caused by their own choice to provide inadequate resources, even when considerably greater growth potential exists.

Structures similar to Figure 4.5 account for other causes of customer loss. The number of aircraft limits the frequency of flights that can be offered, so any attempt to offer more than that frequency will result in delays and cancellations. Those problems will affect a fraction of current customers, who may then decide not to use the airline again. Unlike the capacity of service staff, there may be no threshold in this case. Customers are affected by delays, even if the aircraft is half empty, so losses could continue down to very low numbers of customers.

Figure 4.6 brings together the mechanisms discussed above to depict some of the major mechanisms likely to account for Ryanair's gains and losses of customers, and

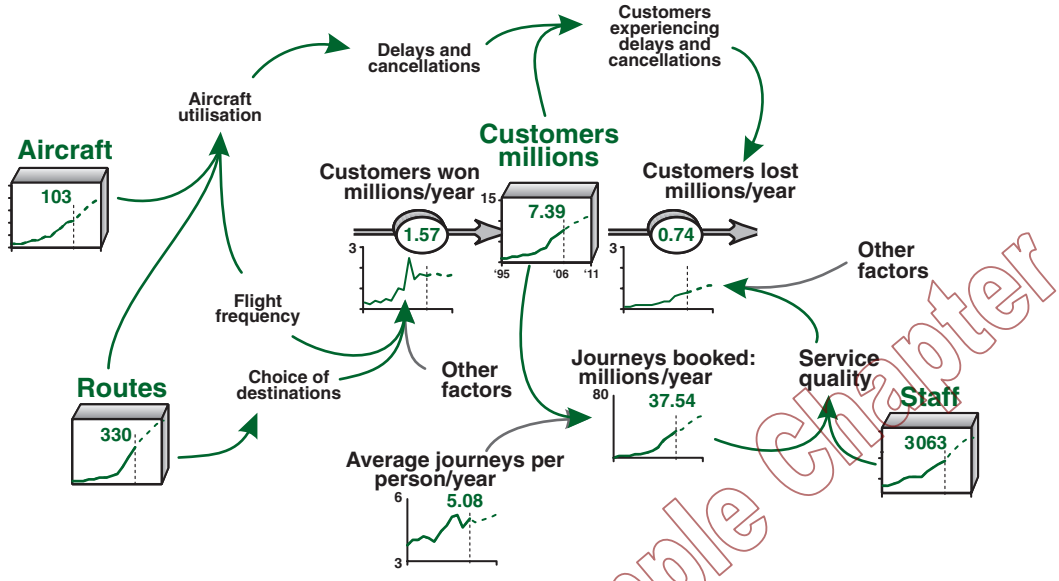



**Figure 4.6: How Ryanair's customer win and loss rate depend on the existing level of certain resources.†**

† Software models for Figure 4.6 and other examples in this chapter can be obtained from www.strategydynamics.com/smd4.

extends the data from actual historical values to plausible future trajectories. The diagram shows how the growth of resources outlined in Chapter 2 (Figure 2.29) come together to hit the "preferred" sales projection in terms of *journeys booked*.

The green causal chains in Figures 4.3 to 4.6 show the critical principle that accounts for interdependency and complementarity among resources:

**The current *rate* at which any resource is won or lost frequently depends on the existing *level* of other resources and of that resource itself.**

The main exceptions to this mechanism arise when a resource flow depends solely on a management decision, e.g. adding capacity, as described in Chapter 3.

### A simple exercise where word-of-mouth feedback interacts with capacity constraints

The interaction between self-reinforcing growth amongst customers and constraints imposed by limited capacity can be explored in a simple model concerning an illustrative new cellphone market,[5] as shown in Figure 4.7.

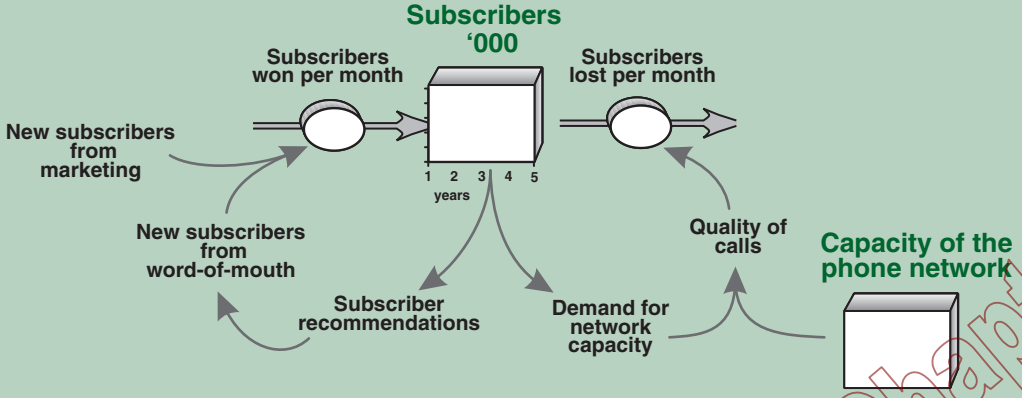



**Figure 4.7: Structure for growth of an illustrative cellphone business with network capacity constraints.**

The business has a simple income statement, with revenue from new subscribers as well as calls made by existing subscribers, and costs driven by marketing, capacity and the acquisition of new subscribers. Even so, the model illustrates the challenge of trying to optimizing profit growth by balancing customer acquisition with increases in investment.

Dell Computers is a case that illustrates the potential for service capacity to damage an otherwise powerful business growth system. Long admired as a seemingly unstoppable leader in PC supply, with its ultra-efficient production systems and direct-supply logistics,[6] the company lost its top rating for customer service after moving much of its call-centre support to offshore locations and employing large numbers of part-time staff. As Michael Dell put it, "The team was managing cost instead of managing service and quality."[7] Fixing this problem required hiring literally thousands of staff, at a cost of over $100 million per year.

## THE IMPACT OF POTENTIAL RESOURCES

The final dependency of resource flows concerns resources that have not been visible up to now, namely *potential* resources. Organizations are often constrained in their ability to develop because they run out of potential—they cannot find more customers who are not already buying from them or their competitors, or key staff in their industry prove to be scarce. In Figure 4.8, advertising is attracting a potential market of 500 000 customers. An advertising spend of $2 million per month is needed to reach all potential consumers, and this reach declines as less advertising is spent. This decline is not a straight line, however, so advertising of $1 million per month reaches 61 % of that potential. Of those potential customers that advertising reaches, 5 % become customers each month. As the potential is used up, however, even a large advertising commitment can only attract ever smaller numbers, and the customer win rate declines

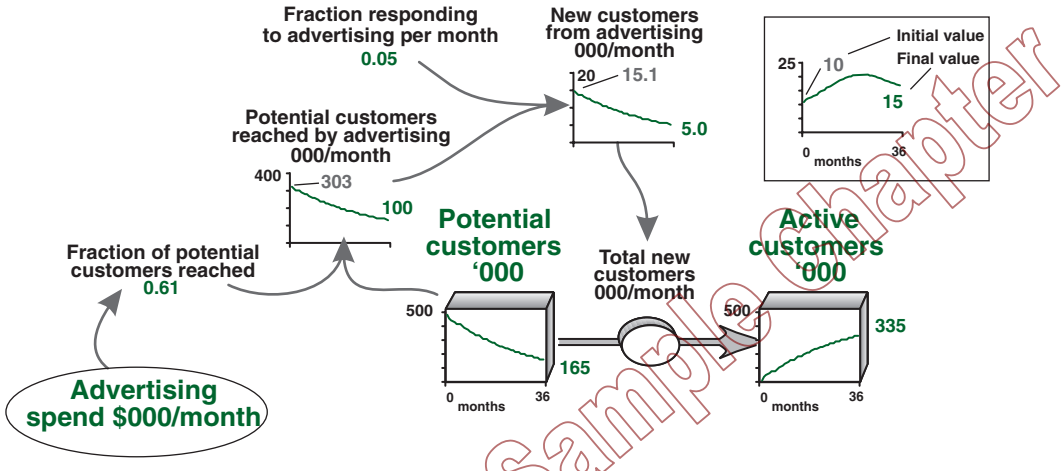





**Figure 4.8: Declining customer win rate as a potential population is used up.**

Eventually, the potential market is so small that advertising is completely ineffective. One might wonder, then, why companies such as Coca-Cola or Heinz continue heavily advertising products that seem to have used up their market. These cases feature several mechanisms not captured in Figure 4.8. First, customers tend to lose interest in products and slip back out of the *actual customers* stock. Second, there are often competing products, and therefore a third place for consumers to be—in the competitors' stock. Then there is a constant feed of new consumers as each new year, groups of consumers start to buy the kind of product these companies offer. Finally, there may be potential to persuade active customers to purchase more of the product.

How potential customers constrain growth is somewhat complicated in Ryanair's case, because the company itself adds constantly to that potential by its rapid opening of new routes. If it were to stop adding new routes, its success in winning potential customers on routes already served would soon have captured just about every customer who might like to fly, and its growth would be seriously limited. Given that our aim is to be able to calculate or estimate the customer win rate, we cannot fulfill this aim if analysis does not take into account this number of potential customers (the green link in Figure 4.9). Only in situations where the potential is so vast that any likely win rate will not significantly alter that potential can the potential customers resource be ignored.

Ryanair's actual growth is so significant because every newly opened route brings with it a new population of potential customers—the company is constantly refilling the left-hand stock in Figure 4.9. The potential is also being refilled by underlying growth in both the desire of consumers to fly and their ability to do so as incomes and free time increase. In some cases, growth in this potential can be extremely

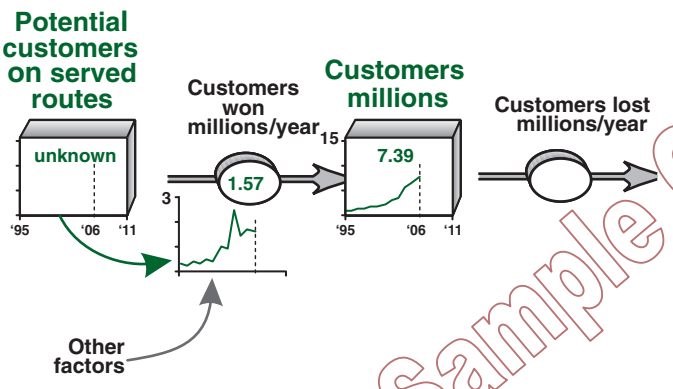





**Figure 4.9: How Ryanair's customer win rate is constrained by the limited number of potential customers.**

rapid, even without any action by the business. Growth in demand for cellphones in China, for example, has been fueled by a rapid increase in the number of potential subscribers, as incomes rise. Demand for many software products and online services is enabled by increasing numbers of potential customers as P.C. ownership and broadband access rise.

Chapter 2 highlighted the need for executives to focus less on market share, and more on "opportunity share"—how much of the feasible potential for their products or services they have developed and captured, and how quickly they can capture the maximum share of the remaining potential. Such attention to what might be possible can sometimes yield surprising results. For example, Professor C.K. Prahalad has examined the possibility for companies to alleviate poverty in low-income economies, yet do so profitably.[8,9]

Limited potential among customers is not the only constraint to growth that organizations face. Limited potential staff can also cause difficulties. Such limitations may be quite local. One company that decided to locate a customer service call center in a town with high unemployment found itself well able to staff its operations—until success in growing its business required so many new staff that it could not hire enough people in that locality. Ultimately, it had to open a second call center elsewhere.

On the other hand, limited staff potential can be a global problem. The Royal Dutch/Shell oil company wanted to restore its reputation in exploration and production in 2005. After a controversy over its reporting of oil reserves, it announced a drive to hire 1 000 experienced petroleum engineers. Following many years of underrecruitment in the industry, combined with young graduates choosing other careers, all oil companies faced both a shortage of such staff and an aging workforce, the average age rising to 48. Industry commentators and rival companies alike expected that the company would find it extremely difficult to find so many experienced staff. Note that, in this case, the company is regarding as potential staff those who currently work for competitors, a feature that can readily give rise to a "war for talent" within an industry.[10] This issue will be examined further in Part 2.

This section has added the third principle to the emerging theory of performance:

1. **Performance depends on resources.**
2. **Resources accumulate and deplete.**
3. **Resource accumulation and depletion depend on existing resource levels.**



Statements 1 and 3 need to be extended somewhat to recognize that both current performance and current resource accumulation and depletion rates also depend

on (a) management decisions regarding key factors under their control, such as price, and (b) exogenous factors, such as competitors' decisions and market conditions. This allows us to formalize the principles as follows:

Performance, $P$, at time $t$ is a function of the quantity of resources $R_1$ to $R_n$, discretionary management choices, $M$, and exogenous factors, $E$, at that time (Equation 4.1).

$$P(t) = f[R_1(t), .. R_n(t), M(t), E(t)] \quad (4.1)$$

The current quantity of each resource $R_i$ at time $t$ is its level at time $t$-1 plus or minus any resource-flows that have occurred between $t$-1 and $t$ (Equation 2).

$$R_i(t) = R_i\ (t-1) +/- \Delta R_i(t-1. .\ t) \quad (4.2)$$

The change in quantity of $R_i$ between time $t$-1 and time $t$ is a function of the quantity of resources $R_1$ to $R_n$ at time $t$-1, including that of resource $R_i$ itself, on management choices, $M$, and on exogenous factors $E$ at that time (Equation 3).

$$\Delta R_i(t-1. .\ t) = f[R_1(t-1),. .\ R_n(t-1), M(t-1), E(t-1)] \quad (4.3)$$

(Note that for this set of equations to be accurate, the time period must be sufficiently short for the change $\Delta R_i(t\text{-}1. .\ t)$ to be small, relative to the scale of resource $R_i$. Since our purpose is to explain performance *today*, we must explain resource-quantities today, which depend on those quantities *yesterday*. It is equally true that resource quantities *tomorrow* will be equal to the quantities today plus or minus the rate at which they are currently changing, i.e.$-R_i(t+1) = R_i\ (t) +/-\Delta R_i(t. .\ t+1)$ ).

## THE BASS DIFFUSION MODEL

A particularly useful framework arises when the saturation of a limited opportunity combines with word-of-mouth communication between already active customers and potential customers. The mechanism explaining how customers "diffuse" from potential to active was identified and specified in a 1969 article by Professor Frank Bass,[11] hence the framework's title. Although initially focused on how durable products become adopted, i.e. products that last a long time after their initial purchase before being replaced, the principle can be widened to deal with both consumable and durable products.

As in Figure 4.8, advertising is the direct factor under the discretion of management for attracting potential customers. In addition, potential customers are persuaded to buy a product by talking to or observing actual customers. Consider a market with the following characteristics:

- Potential customers = 500 000 (Initial customers or owners = 0.)
- Advertising required to reach all potential customers = $2 million per month (lower spending reaches a progressively smaller fraction of potential customers).
- Maximum contacts per month between potential and actual customers = two times per month. Up to that point, contact frequency per potential customer reflects the proportion of the total population who are already actual customers.
- Two percent of potential customers reached by advertising become new customers each month (a lower fraction than the 5% assumed in Figure 4.8).
- Five percent of potential customers who come into contact with actual customers become new customers each month.

Figure 4.10 shows how customers in this market develop, going through what is known as "S-shaped growth", because the chart of active customers looks like an elongated "S." Initially, advertising is the only factor driving the customer win rate, as there are no active customers for potential customers to talk with or observe. As potential customers are used up, advertising effectiveness declines as before, but now potential customers are also made aware of the product by contact with active

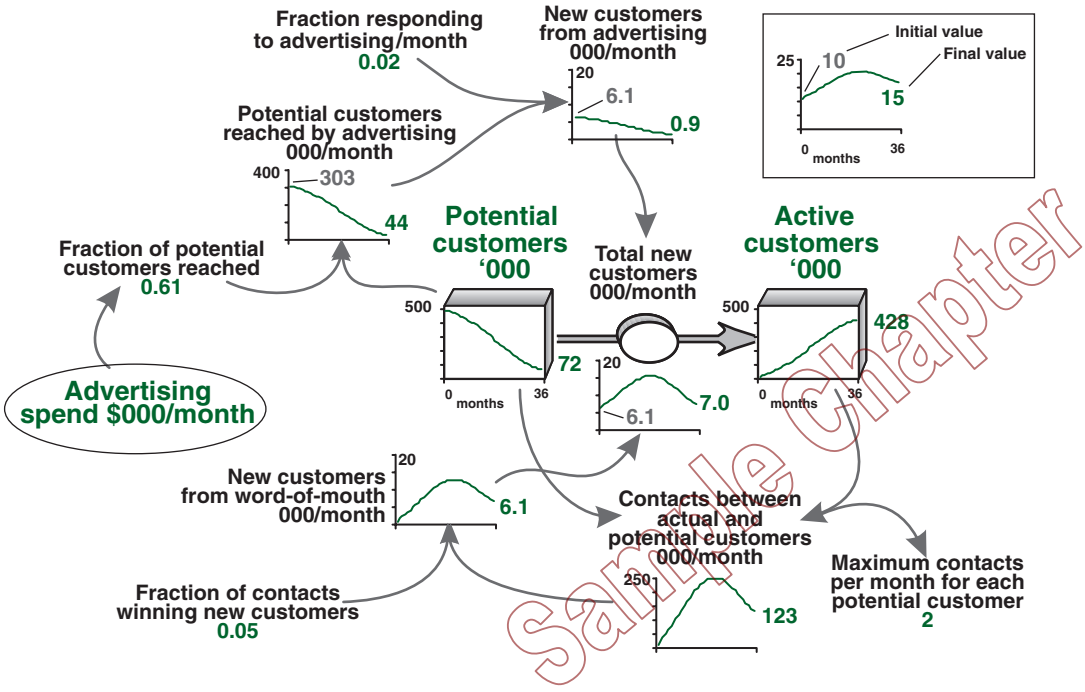



**Figure 4.10:** The Bass diffusion model of new product uptake.

customers. While the active customer base is growing fast and the potential is still large, this word-of-mouth effect wins customers increasingly fast. Eventually, however, so few potential customers remain that this rate also declines, even though there is a large number of active customers. The word-of-mouth win rate also starts to decline, along with the advertising-driven win rate.

Exactly what pattern of customer win rate this model exhibits over time depends heavily on several factors—the size of the potential market, the relationship between advertising spend and potential customers reached, the contact frequency between active and potential customers, and the fractions of people contacted who are converted into active customers. What makes this model especially useful is that, unlike other forecasting techniques, it is able to anticipate a reversal of sales. This occurs in month 19, when *total new customers* hits a peak of nearly 16 000 per month. It is therefore possible to assess the impact of *changing* advertising rates as the product's uptake develops. It might make sense, for example, to start with heavy advertising to get some active customers quickly, then cut back on advertising and allow the word-of-mouth mechanism to do the work of winning new customers.[12]

## CONSUMABLE VERSUS DURABLE PRODUCTS

Chapter 2 noted the need to be careful about the principle that *customers drive sales*, since for durable products, sales volume and revenue arise from the winning of the customer, rather from holding the customer into the future. The stock of active customers is then an "installed base" of product owners, who may not generate any continuing sales revenue at all until the next time they replace the product. In contrast to highly durable products, such as cookers, other products are semi-durable —they are replaced relatively frequently, but not repeatedly consumed, e.g. sports shoes. Figure 4.11 shows how sales and revenues play out over 36 months for durable, semi-durable and consumable products with the characteristics in Table 4.1.

**TABLE 4.1: CHARACTERISTICS OF ILLUSTRATIVE DURABLE, SEMIDURABLE AND CONSUMABLE PRODUCTS**

| | Durable | Semidurable | Consumable |
|---|---|---|---|
| Fraction of customers repurchasing per month | Zero | 0.1 | 1.0 |
| Implied repurchase frequency | Never | 10 months | monthly |
| Unit price | $1 000 | $100 | $10 |

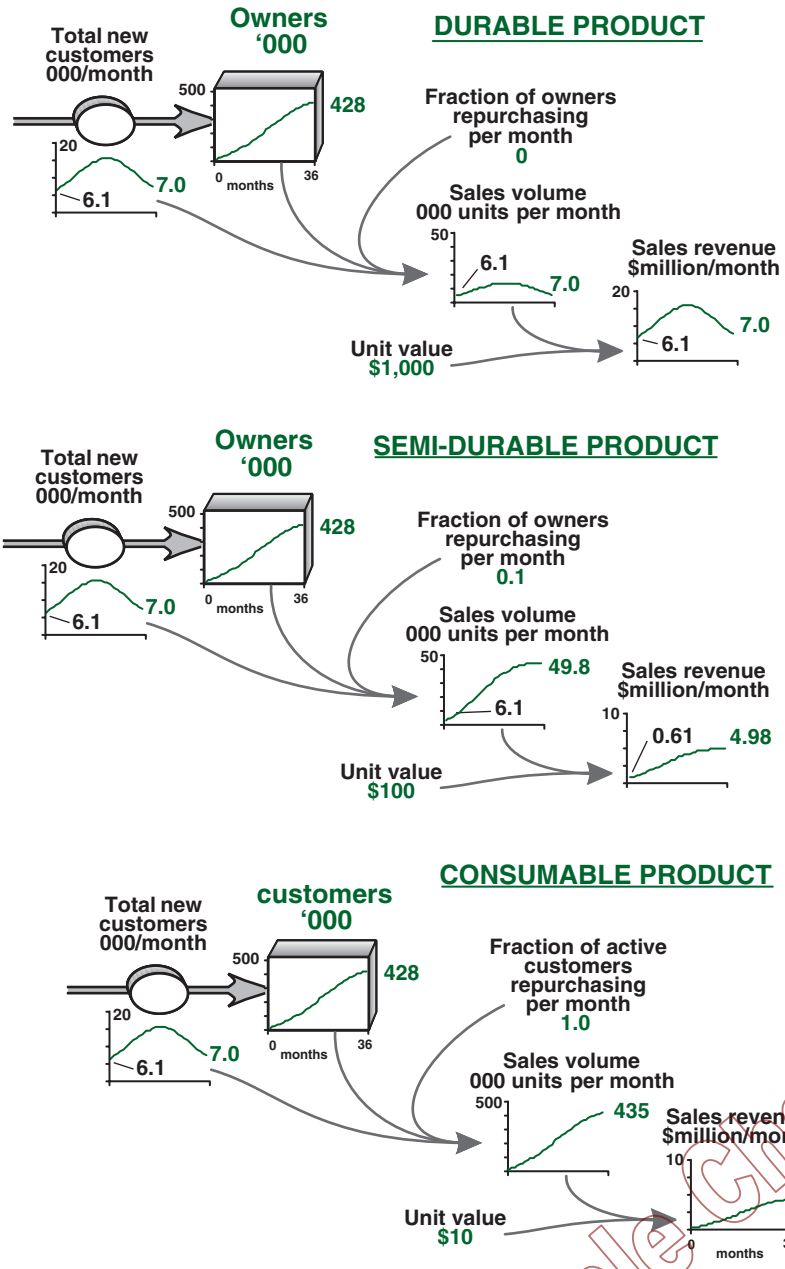



**Figure 4.11:** Sales outcomes from durable, semi-durable and consumable products in the Bass framework.

There are two details of this comparison to note. First, the durable product is "never" replaced. This extreme case is not realistic for actual products of course, since all wear out eventually. However, it approaches reality for very long-lived products, such as swimming pools. Second, the repurchase frequency for the semi-durable product is not shown as a simple delay in which, for example, people buy the product today and repurchase in exactly 10 months. Rather, 10 % of owners repurchase each month, even from the start. A fixed-delay scenario would produce slightly different results.

Note that cases where the sale of durable products is followed by the sale of consumables that customers subsequently require, operate somewhat differently than the situations distinguished in Figure 4.11. Companies that provide printers and ink cartridges or elevators and elevator service enjoy two separate streams of revenue. The first comes from the durable product (printer or elevator), and will follow the durables model above, while the second (ink or elevator service) follows the consumables model. While such companies would clearly like the consumables revenue to share the installed base of *owners* arising from the durables sale, this cannot always be guaranteed, as demonstrated by the sale of compatible ink cartridges by competing companies. In elevator service, manufacturing companies can often capture continuing revenue by servicing rivals' elevators—Schindler maintaining Otis elevators, for example.

The Bass Diffusion model can be found in numerous real-world situations, and can be extended in many ways to capture the richness of more complex situations than discussed here. For example, the potential customer stock can be divided between "early adopters"—customers who are particularly keen to try new products and respond strongly both to advertising and to observing other early adopters with the product—and late adopters or followers who only respond when products are well established. There may indeed be several categories of potential customer, each of which responds at a different rate.[13] The model can also be extended to deal with complex issues, such as pricing, product functionality, R&D investments and the timing of new-product introductions.[14]

## FEEDBACK EFFECTS ARISING FROM INTERDEPENDENCE

The dependence of resource flow rates on the current levels of existing resources gives rise to a critically important phenomenon: feedback. Feedback comes in two different flavors:

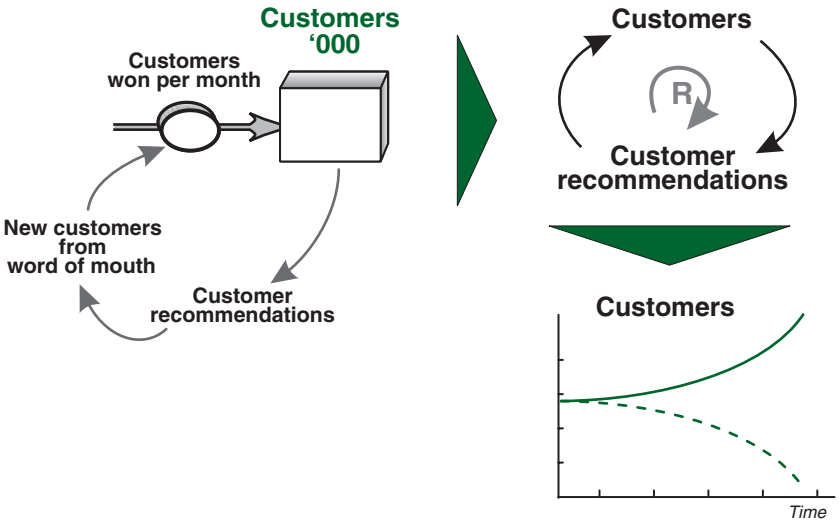



**Figure 4.12: Illustrative reinforcing feedback depiction of word of mouth, and its claimed behaviors.**

- "reinforcing" feedback, in which an initial change in a resource has consequences that continue to push change in the same direction—if the initial change is upwards, then further growth follows
- "balancing" feedback, in which an initial change in a resource has consequences that act to counter that change

We have seen examples of both these kinds of feedback already, in the example of growth for a cellphone business (Figure 4.7). Figure 4.12 offers a generalized depiction of the left-hand section of that model, where word-of-mouth feedback drives growth. Rather than make the *customers* resource explicit, the feedback diagram traces a simplified picture of "what causes what", and adds the "R" in the center to indicate that this feedback loop reinforces its own change. If customers start to increase, more recommendations result, which increases the number of customers further. If it were a true reinforcing structure, a decline in customers would initiate an accelerating decline, as shown in the dashed line of the time chart.

Similarly, the right-hand section of the cellphone subscribers' model can be generalized as shown in Figure 4.13. The feedback loop at right suggest that growth in customers leads to poorer service quality, which causes customers to be lost, countering—or "balancing"—the initial growth. If the situation starts with more customers than its capacity can handle, the system triggers decline (dashed line in the time chart), until the system comes into balance. Since the system behavior

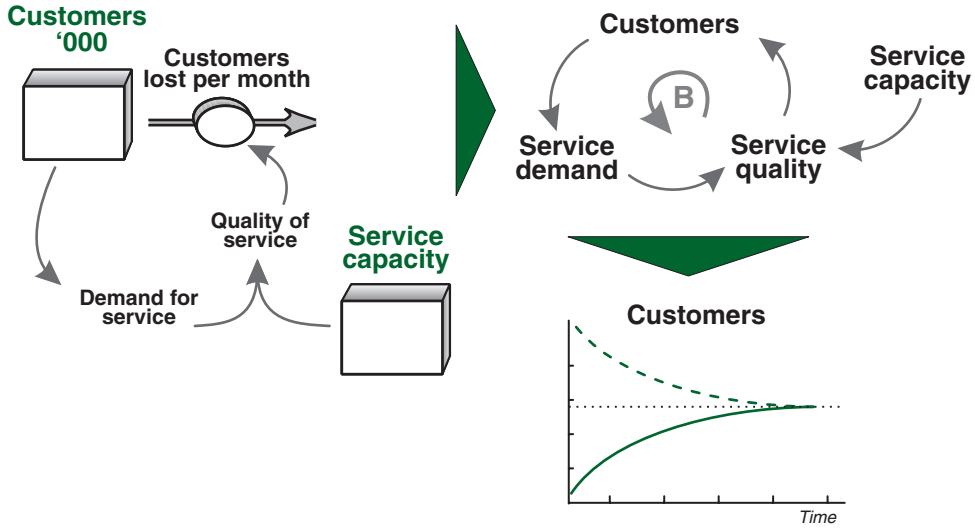



**Figure 4.13: Illustrative balancing feedback depiction of capacity constraints, and its goal-seeking behavior.**

appears to seek out a balance between customer numbers and service capacity, its behavior is referred to as "goal seeking."

Combining these simplified causal loops in various ways enables a quick depiction of many complex situations, resulting in causal loop diagrams (CLDs) of management challenges. Examining these CLDs over a wide variety of cases has identified a number of common structures or "archetypes", which show characteristic behaviors, such as limits-to-growth and success-to-the-successful, in which an organization with an initial advantage accrues further advantages that exacerbate its leadership.

Causal loop analysis based on these principles has become popularized in an approach to problem structuring known as "systems thinking."[15] It is also established as a professional process for mapping problem situations as a precursor to building system dynamics simulation models.[16]

Whilst systems thinking is a quick and powerful means of gaining a qualitative overview of many challenges facing organizations, care is needed in applying the approach. First, the behaviors of the underlying feedback loops are not quite as simple as they seem. In Figure 4.12, for example, while the self-reinforcing growth behavior of the causal loop is quite feasible, there is not any mechanism for the structure to decline. Fewer customers may indeed lead to fewer recommendations, but that implies slower *growth*, not decline. Similarly, the causal loop in Figure 4.13

includes no mechanism for growth, so it cannot exhibit the behavior shown in the solid line of the time chart. Both of these CLDs lack important additional causal mechanisms if they are to produce the behaviors shown. Second, being a qualitative approach, it can be difficult to retain a clear connection between the structures that emerge and the *quantitative* behavior of performance over time that management is seeking to understand and control.

## THE STRATEGIC ARCHITECTURE

Having established the main considerations concerning the drivers of resource inflow and outflow rates, we are now in a position to add these principles to those from earlier chapters in order to assemble a complete diagnosis of a business system. To do this, we will start with a simple case concerning the launch and growth of a consumer brand, such as a premium coffee product. This case will not concern itself with production or distribution issues, but solely with the sale of products into stores and the capture of consumer interest in the brand. For this, three resources are involved:

- consumers, of whom there are 3 million potentially available
- retail stores, of which there are 20 000 potentially available
- the sales force, which starts at zero

Management has three controls over this situation:

- advertising spend, to capture consumers' interest
- sales force hiring
- wholesale price (i.e. the price charged to stores, who add a percentage markup to set the retail price to consumers)

After four years of sales and marketing efforts from its initial launch, the brand's sales and profit statement is as shown in Table 4.2.

The following paragraphs outline the analysis that explains how the product arrived at this position.



### 1. Performance depends on resources

The history of the brand's relatively unsuccessful profit growth is shown in Figure 4.14. Constant advertising of $500 000 per month, and sales effort that built up over the first two years, were unable to drive sales growth quickly enough to generate gross profits that would recover those sales and advertising costs until well into the third year. Even after this break-even point was reached, sales growth slowed

**TABLE 4.2: SALES AND PROFIT STATEMENT FOR A CONSUMER BRAND**

| | | |
|---|---|---|
| **Consumers interested "000** | 1 448 | |
| **Consumption per person** (constant) | 0.8 | units/month |
| **Sales force** | 50 | |
| **Stores stocking the brand** | 5 682 | |
| **Product availability** | 0.60 | fraction of consumers able to find the product |
| **Sales volume** | 691 | 000 units per month |
| | $'000/month | |
| **Sales revenue** | 6 220 | .. at a wholesale price of $9.00 |
| **Product cost** | (4 838) | .. at a unit cost of $7.00 |
| **Gross profit** | 1 382 | |
| **Advertising spend** | (500) | |
| **Sales force cost** | (250) | .. at $5 000 per person per month |
| **Brand profit** | 632 | |

*Note: rounding of values causes small discrepancies.*

and by month 48 is nearly flat. It will take some years more before the losses of the product's launch period are recovered. The product's sales history is explained in Figure 4.15.

Although the number of interested consumers increased relatively well at first, the product was in very few stores. Only after the number of stores stocking the brand started to grow did availability rise to levels that enabled most consumers to purchase the product. The principle that "resources drive performance" is rather simple here:

- sales depend on consumers and stores
- costs depend on the number of sales people



### 2. Resources accumulate and deplete

Figure 4.16 shows the brand's history of resource development. After an initial rapid acquisition of consumers, growth has been slow. Note that the

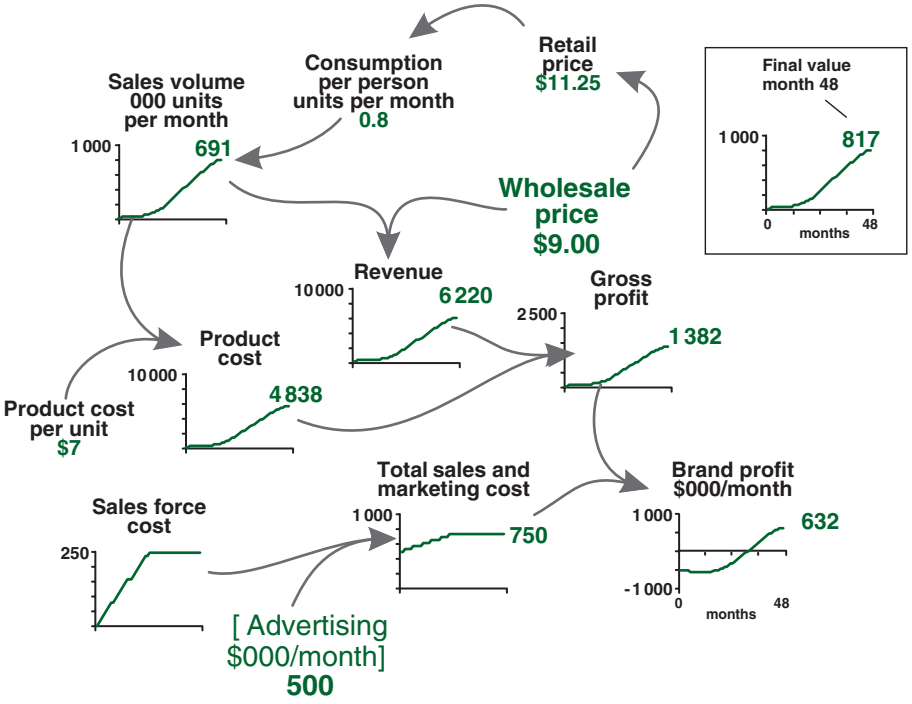



**Figure 4.14:** Slow development of profits for a consumer product.

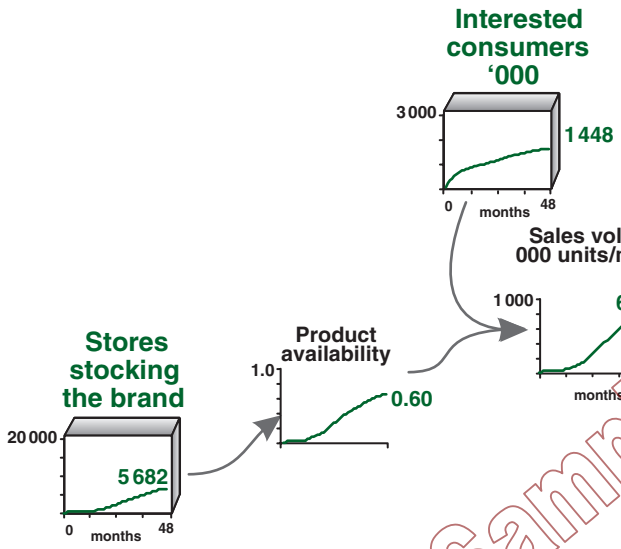





**Figure 4.15:** Sales growth for the consumer product reflects consumer interest and availability in stores.

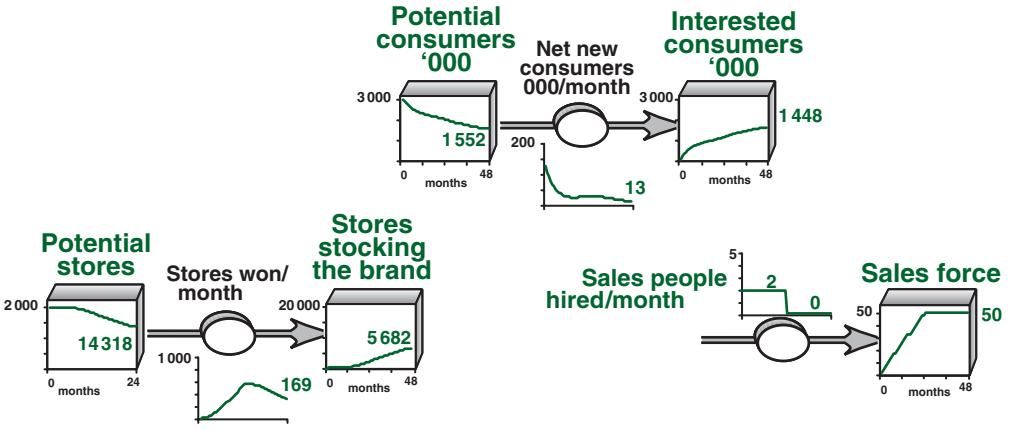



**Figure 4.16:** Resource development for the consumer brand.

flow is the *net* change in numbers of interested consumers, and it will be important to identify whether consumers have been lost at the same time as others have been won. Indeed, it may be that the brand's advertising has done a fine job of winning consumers, only to see them quickly forgetting it again.

After a slow start, the store acquisition rate picked up quite well, but started to slow again halfway through the four-year period. Although growth continued, it was at a progressively slower rate. The sales force grew simply in line with the hiring rate until it had reached 50 people.

### 3. Resource growth depends on the current level of existing resources and management decisions

In this illustrative case there are no direct competitive or exogenous forces to worry about—consumers are won from a fragmented market. This would not be true in a real market for premium coffee, where specific competitor reaction would be substantial. Apart from the direct lever of sales force hiring, the other management decision that affects resource growth is advertising (Figure 4.17).

Initially, this advertising is the main factor driving consumers to become interested in the product.[17] However, its success is enhanced, constrained or negated by four distinct influences from current resource levels. The causal chain for each of these can be traced in Figure 4.17.

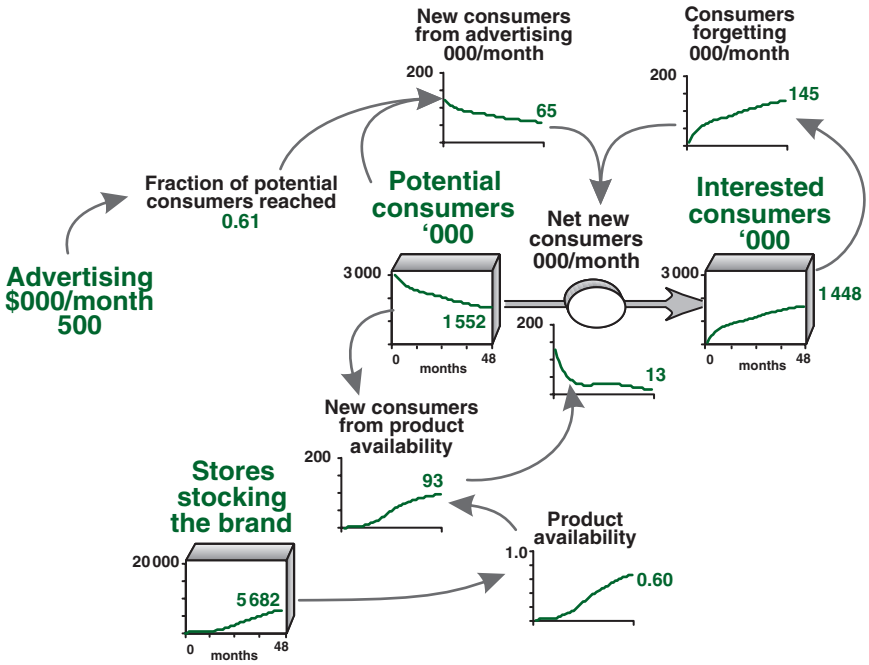



**Figure 4.17: Current resource levels determine growth of consumers interested in the brand.**

- As people become interested in the product, the falling number of potential consumers who remain to be won constrains the advertising-driven win rate, which therefore declines.
- As the number of stores increases, the product's availability in those stores raises the consumer win rate. However, this win-rate is constrained by the falling number of potential consumers. The rising number of stores sustains this source of growth in spite of the diminishing potential, although this win rate would ultimately start to decline.
- A fraction of consumers forget the brand each month, so as more consumers become interested, this fraction represents an increasingly large number of lost consumers, partly negating the two growth drivers.

Note that in this case, there is not believed to be a significant word-of-mouth feedback effect from the existing number of interested consumers driving further consumer acquisition.

Figure 4.18 shows how stores are won and highlights four dependencies on existing resource levels:

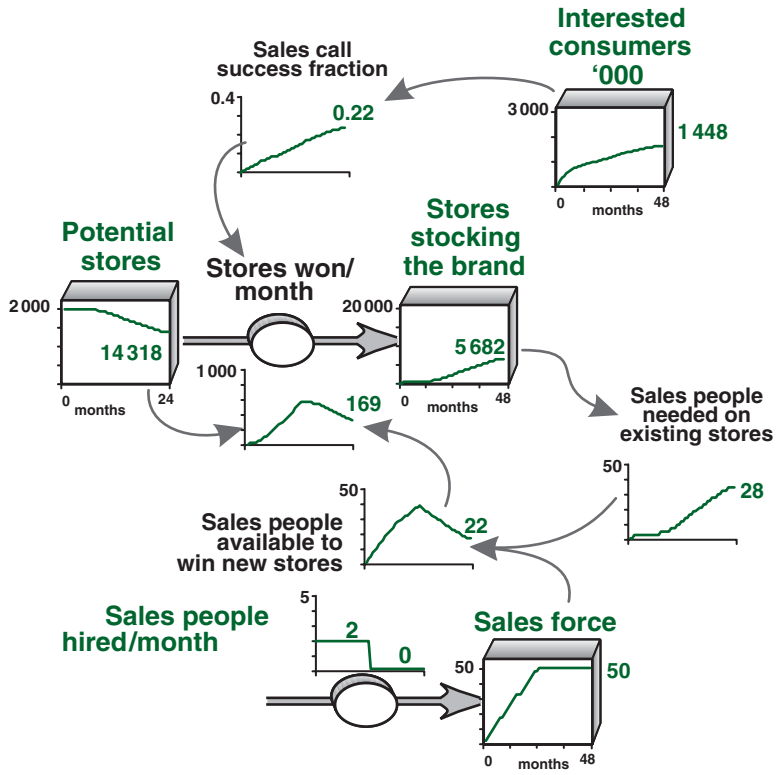



**Figure 4.18: Current resource levels determine growth of stores stocking the brand.**

- Stores can only be won if called on by sales people, so the size of the sales force is clearly a direct driver of this win rate.
- Those calls will only be successful if a sufficient number of consumers are interested in the product to make it likely that stores will achieve significant retail sales. Therefore, the number of interested consumers constrains growth of stores.
- As more stores are captured, sales people have to spend more time maintaining relationships with those stores, leaving less time for winning new relationships. Therefore, the existing stock of stores also constrains the win rate.
- The remaining stock of potential stores remains sufficiently large that it does not significantly constrain the number of stores sales people can call upon, although the sales force's success declines somewhat since the most promising prospects are pursued first.

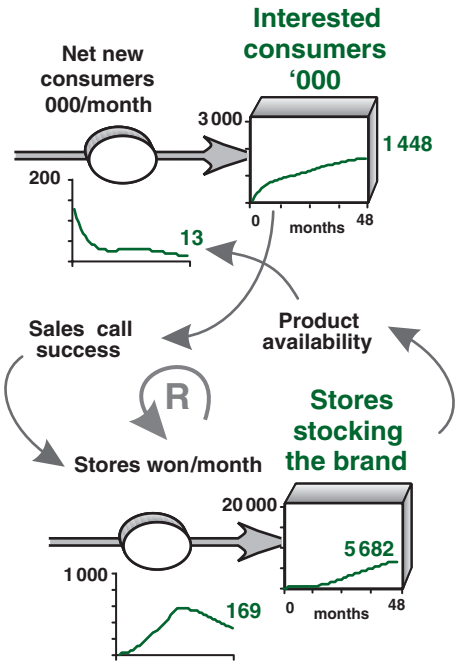



**Figure 4.19: Reinforcing feedback between a brand's stores and consumers.**

This illustrative example demonstrates the principle of resource interdependence:

- the consumer win rate is enhanced by the number of stores at any time (lower section of Figure 4.17)
- the acquisition of stores depends on the level of consumer interest (upper section of 4.18)

Figure 4.19 extracts these causal mechanisms. The reinforcing growth that arises from this interdependence can be confirmed by tracing the consequences of any positive value for either of the two win rates—for consumers or stores. Winning more consumers increases the fraction of sales calls that are successful, raising the store win rate, which increases product availability, which raises the win rate of new consumers once again.

Note the warning mentioned earlier regarding reinforcing feedback. A decline in either of these resource win rates does *not* result in a decline in either resource, nor in the system as a whole, since there is no mechanism in this structure for either resource to be lost. A fall in the consumer win rate still results in an increase in the *number* of consumers, and hence increases in sales call success. Even a one-off fall in consumer

numbers still leaves a positive contribution to sales call success, so store numbers would increase, raising product availability and enhancing the win rate of consumers.

While the power of such reinforcing feedback mechanisms to drive growth is limited, this complementarity among resources is fundamental to the power of business systems to develop and sustain themselves. Consequently, there is little possibility of explaining business performance unless such mechanisms are included in the analysis. Having established the basic concept of interdependence in the functioning of an organization's system, two important implications become apparent:

1. **Some minimum input is required to achieve any positive performance.**
2. **There is a limit to the sustainable performance that can be extracted from a finite set of resources (although this limit may be exceeded temporarily).**

In the scenario summarized in Figure 4.20, management has tried to minimize the cost of the brand's launch by limiting the advertising spend to only $300 000 per month. Although some consumers are interested in the product, growth has been very slow and has reached a very low level. Even with the same sales effort, stores have not been won in significant numbers, because the low consumer interest promised too little value to the stores for them to stock the product. As a result,

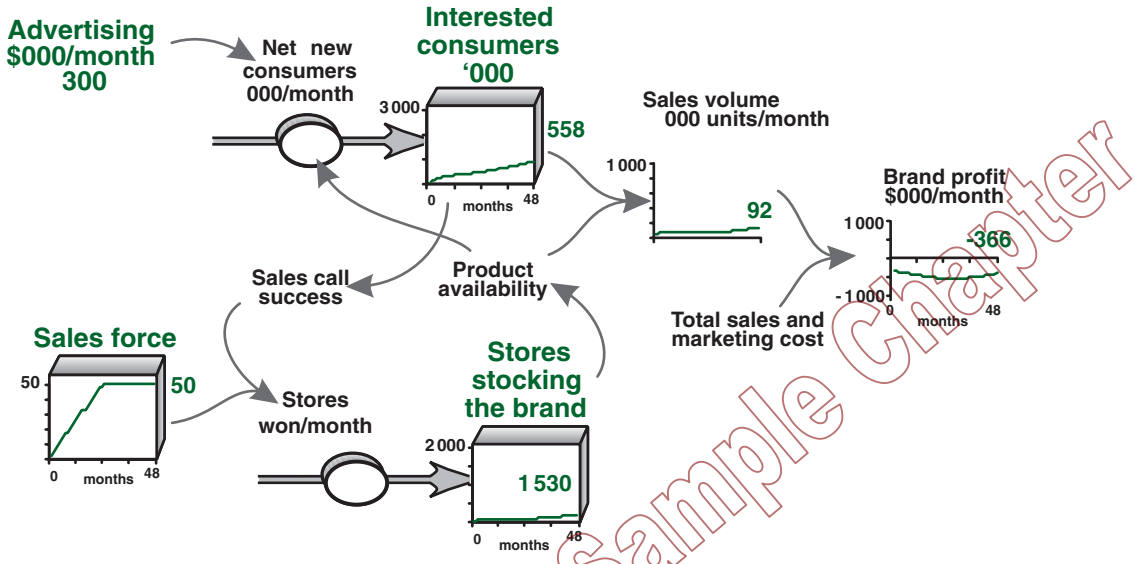





**Figure 4.20:** Brand performance fails to be achieved, due to insufficient input.

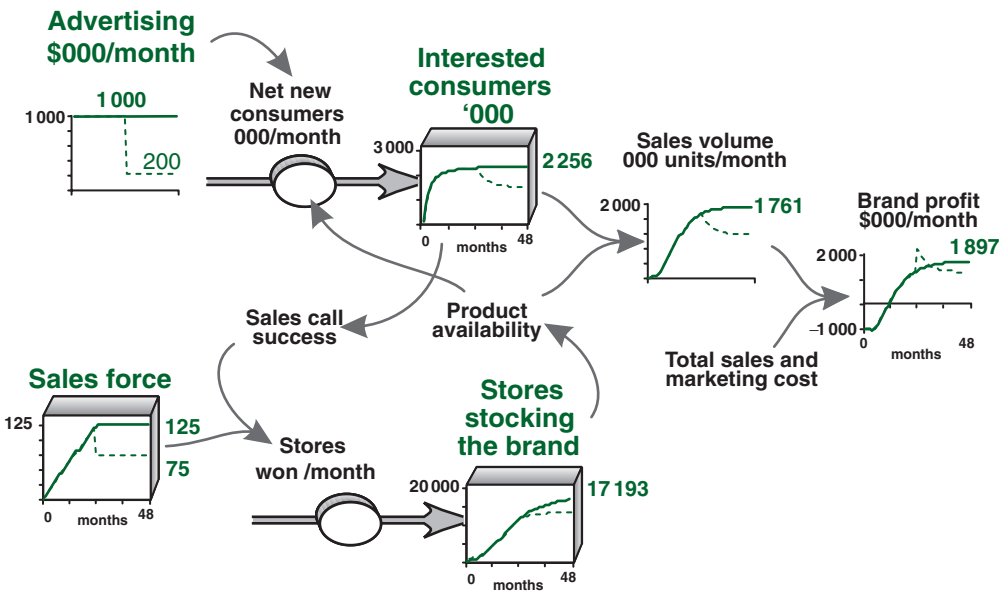



**Figure 4.21: Maximum limit to performance that can be extracted from the brand's finite resources.**

sales volume grows at only a very low rate, generating insufficient gross profit to cover the reduced costs. Although it appears that performance is heading towards positive profit rates, the consumer-forgetting rate will ensure that point will take years to reach, if ever.

Figure 4.21 (solid lines) shows a much more attractive result, in which heavy advertising and growth of a larger sales force pushes consumers and stores to high levels, resulting in strong sales volume and profit. However, most of the opportunity has now been used up, with most consumers captured and most stores stocking the product. Pushing advertising higher, or adding more sales people, is at or near a point where the extra cost of more spending does not result in any further increase in profits, as Table 4.3 demonstrates for rising rates of advertising spend.

Varying both advertising and sales force may generate some slightly higher profit rate, but there will be an absolute limit that cannot be exceeded—at least not sustainably. The dashed line in Figure 4.21 shows a strategy of cutting both advertising and sales force after the brand has reached nearly its full potential. The monthly savings amount to $800 000 from advertising and $250 000 from the sales force, but these total savings of $1 050 000 are immediately wiped out as consumer numbers fall sharply. This loss, combined with poor success of winning new stores, leads to a lower ultimate profit outcome.

**TABLE 4.3: ULTIMATE BRAND PROFIT AS ADVERTISING SPEND INCREASES, FOR THE SALES FORCE PLAN IN FIGURE 4.21**

| | | | | | |
|---|---|---|---|---|---|
| **Advertising spend:** $000/month | 800 | 1 000 | 1 200 | 1 400 | 1 600 |
| **Interested consumers** 000 | 2 045 | 2 256 | 2 450 | 2 587 | 2 661 |
| **Incremental consumers for +$200 000 advertising spend** 000 | | 211 | 194 | 137 | 74 |
| **Brand profit in month 48:** $000/month | 1 757 | 1 897 | 2 005 | 2 020 | 1 938 |

Examining real organizations' performance suggests that errors arise frequently from ignoring these two fundamental features of finite resource systems. It seems that numerous business opportunities that were perfectly worthwhile end up failing because they never received the initial input that could have pushed them over the viability threshold. Many other cases arise where management commits far more resources and expenditure than is worthwhile, in a determined effort to push more performance out of the system than it can deliver. Finally, yet other cases feature underperformance that results from cost cutting that is intended to boost profits but that instead damages the system, destroying more profitability than the cost saving provides.

**Exploring the consumer brand model**

You can explore these interactions between consumers and stores in the Brand Management microworld. (This is available from www.strategydynamics.com. Note that the market parameters and relationships differ somewhat from the model developed in this chapter.) This PC simulation gives control over price, advertising and sales force, and offers extensive information in the form of tables, reports and time charts. The game includes a number of management challenges, such as stimulating an underdeveloped brand, and turning round a business that is in decline. Figure 4.22 provides a sample screenshot of the game.

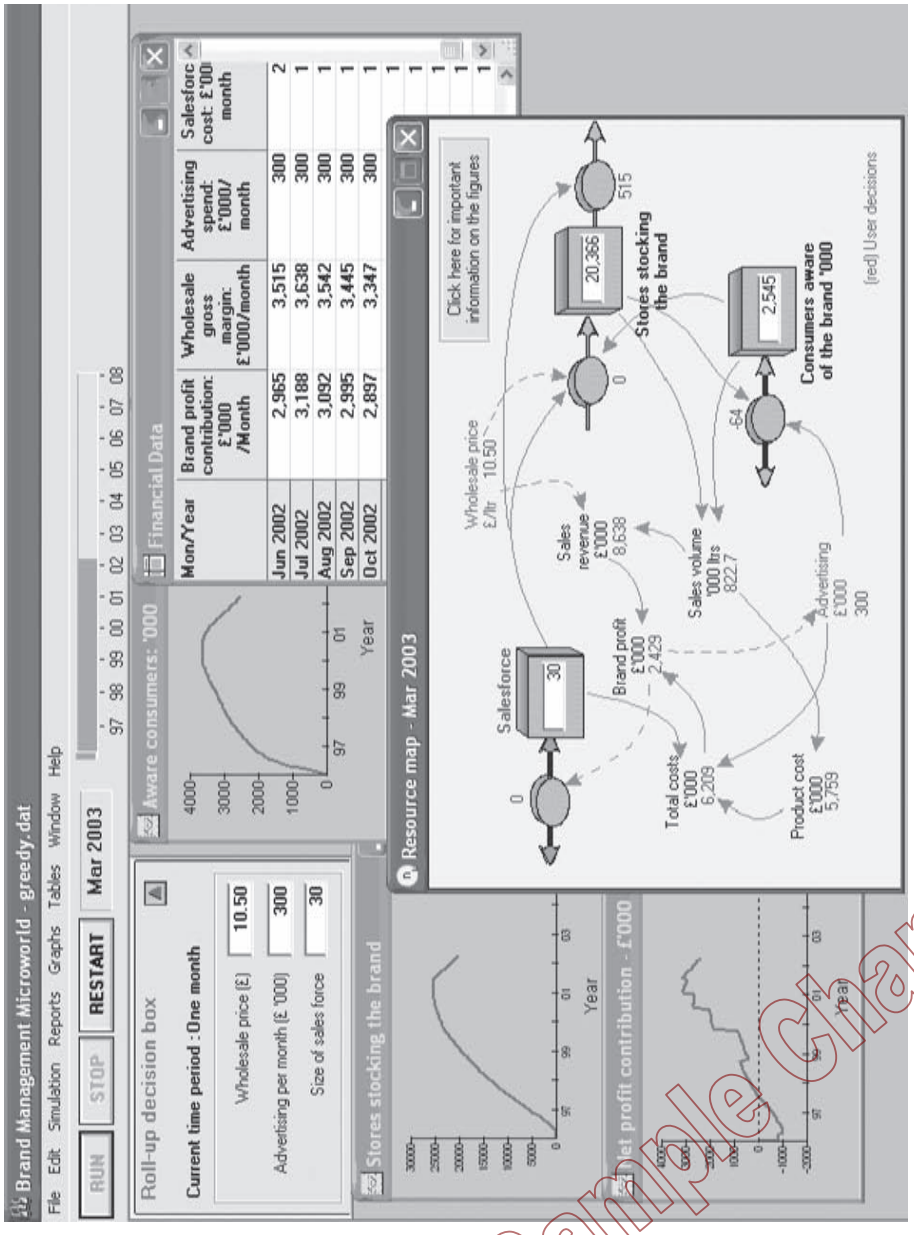



**Figure 4.22:** Screenshot of the Brand Management Microworld PC game.

## A "SPREADSHEET" VIEW OF THE STRATEGIC ARCHITECTURE

Chapter 3 explained how resource accumulation can be understood in familiar spreadsheet language (Table 3.2). From this foundation, it is possible to develop a standard spreadsheet layout that mimics the logic of a strategic architecture and the three underlying equations. The start point is to note first that we need to explain resource flow rates, because they determine where the business is heading next period, and second, that the factors at the origin of what causes those flow rates are current resource levels, management decisions and external factors. Since it is the resource levels that will be changed, put those at the top of the spreadsheet, followed by the management decisions and other factors. Next, calculate the performance values. Finally, calculate the resource flow rates at the bottom as the *last* items required to enable to next period to be started.

Table 4.4 shows how this is applied to the brand architecture, with the values at the beginning and end of month 48. Note first that the data reported on the diagrams above are all taken at the final instant of the 48th month. As explained in Chapter 2, the exact value of the various performance numbers for month 48 are some average of the opening and closing values. For example, at the start of month 48, revenue is made at the rate of $6014000/month, and by the end of the month, at a rate of $6224000/month. The monthly steps of this model are small enough to take the average of these two values safely as an accurate figure for the actual revenue made during the month.

Some examples of how causality runs through this structure are shown to the left and right of the month 48 column:

- *Resources, decisions and external factors drive performance*: e.g. the dotted black connections show that sales volume depends on the resource of interested consumers, the availability of the product due to the stores resource, and on consumers' consumption rate.
- *Resources accumulate and deplete*: e.g. the solid green lines show that the number of interested consumers at the start of month 49 (end of month 48) is given by the number at the start of month 48, plus the number of new consumers won since the start of that month. Similarly, the number of *potential* consumers is reduced by the same number. The dashed green links show the same logic for stores.
- *Resource flow rates depend on existing resources, decisions and external factors*: e.g. the rate of new consumers depends partly on the number of stores making the brand visible, and on the reach of advertising spend, which is limited by the remaining stock of potential consumers. Note that this same logic carries on from the start of month 49 to determine how things will be in future periods.

## TABLE 4.4: A "SPREADSHEET" VIEW OF THE BRAND STRATEGIC ARCHITECTURE IN MONTH 48

| | | Start of Month 48 | Start of Month 49 | ... the future | Units |
|---|---|---|---|---|---|
| **RESOURCES** | | | | | |
| | Stores stocking the brand | 5509 | 5682 | | stores |
| | Interested consumers | 1435 | 1448 | | 000 people |
| | Sales force | 50 | 50 | | people |
| | Remaining potential stores | 14,491 | 14,318 | | stores |
| | Remaining potential consumers | 1565 | 1552 | | 000 people |
| **DECISIONS** | | | | | |
| | Advertising spend | 500 | 500 | | $000/month |
| | Sales force hired per month | 0 | 0 | | people/month |
| | Wholesale price | 9.00 | 9.00 | | $/unit |
| **EXTERNAL AND CONSTANT FACTORS** | | | | | |
| | Total consumers | 3000 | 3000 | | 000 |
| | Total stores | 5000 | 5000 | | number |
| | Fraction of consumers forgetting | 0.1 | 0.1 | | fraction/month |
| | Consumption per person | 0.8 | 0.8 | | units/month per person |
| | Product costs | 7.00 | 7.00 | | $/unit |
| | Maximum stores per sales person | 200 | 200 | | stores/person |
| | Maximum new store call rate per person | 50 | 50 | | stores/person per month |
| | Cost per sales person | 5.0 | 5.0 | | $000/person per month |
| **PERFORMANCE RESULTS** | | | | | |
| | Product availability | 0.582 | 0.597 | | fraction |
| | **Sales volume** | **668.2** | **691.5** | | 000 units per month |
| | Sales revenue | 6014 | 6224 | | $000/month |
| | Product costs | 4677 | 4840 | | |
| | **Gross profit** | **1336** | **1383** | | |
| | Advertising spend | 500 | 500 | | |
| | Sales force cost | 250 | 250 | | |
| | Total sales and marketing costs | 750 | 750 | | |
| | **Brand profit** | **586** | **633** | | |
| **CAUSAL CHAIN AMONGST RESOURCES** | | | | | |
| **Consumer win-rate** | Product availability | 0.582 | 0.597 | | fraction |
| | New consumers from availability | 91 | 93 | | 000/month |
| | Fraction of unawares reached by advertising | 0.04 | 0.04 | | fraction |
| | New consumers from advertising | 66 | 65 | | 000/month |
| | Consumers forgetting | 143 | 145 | | 000/month |
| **Stores win-rate** | Net consumers won | 13 | 13 | | 000/month |
| | Sales people needed on existing stores | 27.5 | 28.4 | | full-time equivalent people |
| | Sales people available on new stores | 22.5 | 21.6 | | full-time equivalent people |
| | New stores called on per person calling | 36.2 | 36 | | stores per person per month |
| | Fraction of sales calls successful | 0.213 | 0.218 | | fraction |
| | Net stores won | 173 | 169 | | stores per month |

The principal observation that we should focus on from this spreadsheet view of strategy—albeit for this very simple business—is of paramount importance:

**"It's all about the flow rates"**

Put simply, if the flow rates here were zero, and we changed nothing else, nothing would change from month to month. If we *did* change something else, and later reversed that decision, performance would revert to where it was. This is why resource flow rates are of such importance. They are the factors that determine our path into the future, and it is the influence of management's decisions and choices

on flow rates that *change* that trajectory. If we don't change decisions, and nothing else changes, then the trajectory carries on in its present direction.

It rapidly becomes impractical to show all the interdependencies in this table, which is one of the principal problems with relying on spreadsheet thinking and analysis to carry out more than the most trivial of performance analyses. You *could* construct a monster spreadsheet for a complex business, but you can draw out a clear causal structure, including performance over time, with tools better suited to the task. This is not the only problem in using spreadsheet thinking for strategy. Others include:[18]

- *Fragmentary planning.* Plans are frequently put together by function, with the bottom lines of each being extracted to arrive at a "complete" analysis. With no formal means of capturing interdependency a coherent plan is hard to achieve.
- *Inconsistency with the past.* Plans for the future make hidden assumptions that things are going to work quite differently than they have done until now—sales success is going to jump, service problems drop, and so on, with no rationale as to why such shifts should occur. It may certainly be possible for an improved *trajectory* to start, but not a discontinuous shift.
- *Fragmented and implicit assumptions.* Plans are full of assumptions—about how customers will react to new marketing efforts, how staff will improve performance with training etc.—yet those assumptions are not evident, and cannot be seen from a spreadsheet table. Often, having not worked through the causal logic in detail, even the author is unaware of the implicit assumptions behind her estimates.
- *Neglect of competitive and other external effects.* With no structure to incorporate the impact of competitor behavior or changes in customer preferences, spreadsheet performance projections simply bury such effects in assumptions about changes in market share. Part 2 will deal with this issue in some detail.
- *Top-down: bottom-up disconnects.* Spreadsheet analysis is the customary "business case" for plans and proposals. With only linear spreadsheet models to reference, people jump to conclusions. Promoters make optimistic assumptions, and skeptics challenge the analysis. Without a fact-based causal logic available, views are reconciled by some political or social process.

## THE BRAND ARCHITECTURE AND MANAGEMENT TEAM CONTROL PANEL

Figure 4.21 offers a high-level summary of the resources, interdependencies and management policies driving performance of the consumer brand—a picture that can be thought of as a summary "strategic architecture" of the business. The full

architecture would include all the detail of Figures 4.14, 4.18 and 4.19 and would be rather more extensive than can conveniently be displayed on a single regular page.

While there can be value in displaying the full detail on a single figure, depicting both the summary and the subdivided elements offers advantages. Figure 4.21 provides a summary picture that the whole management team can understand and discuss quickly. However, that team will likely consist of people with specific responsibilities—the financial controller trying to help make profits out of the product's sales, the head of marketing seeking to build consumer interest, and the head of sales trying to win and retain stores.

The more detailed diagrams for each major section of the architecture are of specific value to each of these individuals, showing what is hindering or contributing to success in their own part of the system. Crucially, the diagrams also show how their success relies on others, and thus become a tool for truly shared understanding and decision making. They would know, for example, when advertising has achieved its purpose of winning maximum realistic consumer interest, and how much additional spending is needed to sustain that level. They would also know how many sales people would likely win stores at certain rates, and how many are needed to maintain those stores' loyalty to stocking the brand once it has penetrated the market. They also would share an understanding of the trade-off between spending to sustain consumers and stores and keeping the resulting costs down in order to deliver strong profits.

Therefore, the strategic architecture helps answer, from month to month, the three questions introduced in Chapter 1—why are we performing as we are, where is our performance going under current policies, and how can we adjust strategy and decisions to improve those prospects? The summary architecture provides a powerful "control panel" for the business, each chart of which can be readily populated with the next month's data point. The summary can be displayed on the wall of the management team's main meeting room, and the detailed subsections on the walls of each department head's office.

We need only add in the third key management lever—price—(which we have held constant in the assessment above) to see that the answers to these questions might become quite complex, even for what is a rather simple business structure. In reality, this team would have several more dimensions of complexity to consider, such as the behaviors of different consumer groups, their aims and performance in different store categories, and the impact on the brand's performance of rival products. Yet each of these issues can be handled by replicating or extending the brand's core strategic architecture in various ways, allowing the team near-total understanding and control over performance.

## THE STRATEGIC ARCHITECTURE FOR AN AIRLINE AND OTHER EXAMPLES

Figure 4.6 showed the principal dependencies of Ryanair's customer base growth on its other resources—routes, aircraft and staff—plus the dependency on the current level of that customer base itself. This is the most involved piece of the company's strategic architecture, since most other parts are under direct management control. Figure 4.23 summarizes the relationships in the strategic architecture for an airline by adding these other elements to the structure around the customer base.

The items highlighted in green are the key choices that constitute management's strategy, and determine the airline's performance (together, of course, with competitors' choices on the same issues and other exogenous factors). These items include:

- adding airports gives access to additional potential customers and increases the number of routes that could feasibly be served
- opening new routes expands the choice of destinations to which customers from any location can travel

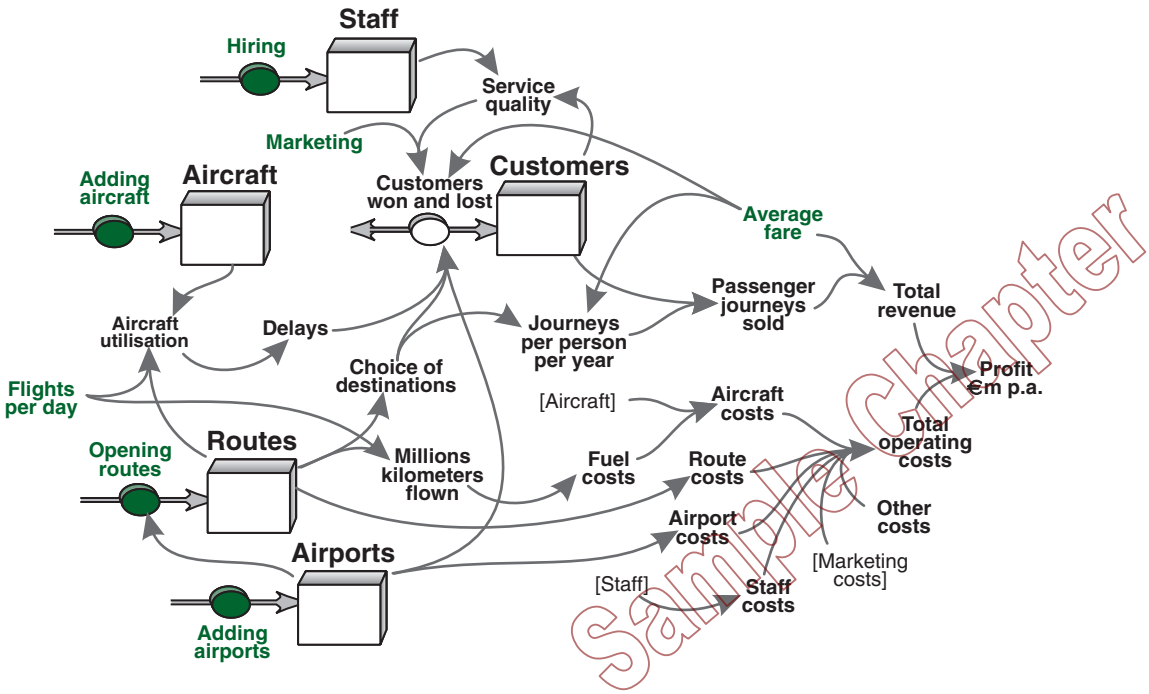





**Figure 4.23:** The core strategic architecture for an airline.

- expanding the number of flights per day, together with increased numbers of routes, increases the utilization of the aircraft fleet
- adding aircraft keeps that utilization down to levels that minimise delays
- choices on fare levels and marketing are the key controls of customer acquisition and retention, as well as the frequency with which customers travel
- hiring decisions provide the staff numbers needed to ensure customers are not lost through poor service

When populated with time chart data, Figure 4.23 becomes, like the brand architecture, a summary control panel for the business. It can be subdivided into more detailed sections, focusing, for example, on customer acquisition, on airport and route expansion, on fleet operations and on financial performance. Management does not *have to* use such diagrams. The teams that head Ryanair and Southwest Airlines have these relationships clear in their heads, and are quite capable of making good strategic and operational decisions without the need for such a picture. Yet that is a key advantage of operating an essentially simple business model, targeting a clear customer group with a highly simplified service and a single compelling value proposition, delivered by an equally simple infrastructure and capacity model. Few companies of any scale manage to find and develop such a large enterprise without encountering greater complexity, at which point it becomes increasingly difficult for any individual or team to keep everything in their heads and to understand and manage the complexity.

**Try out strategy with the LoFare Airline Microworld[19]**

Some of the issues raised by the airline architecture can be explored with the LoFare Airline Microworld, which gives control over pricing, marketing, fleet, and route development (see Figure 4.24). This PC game provides extensive information in the form of tables, reports and time charts. The market's development is not hardwired into the game, but develops as your enterprise succeeds in stimulating demand by offering services on increasing numbers of routes. The game includes a number of management challenges, such as the struggle to overtake rival low-cost operators who are pursuing the same growth opportunity as you.

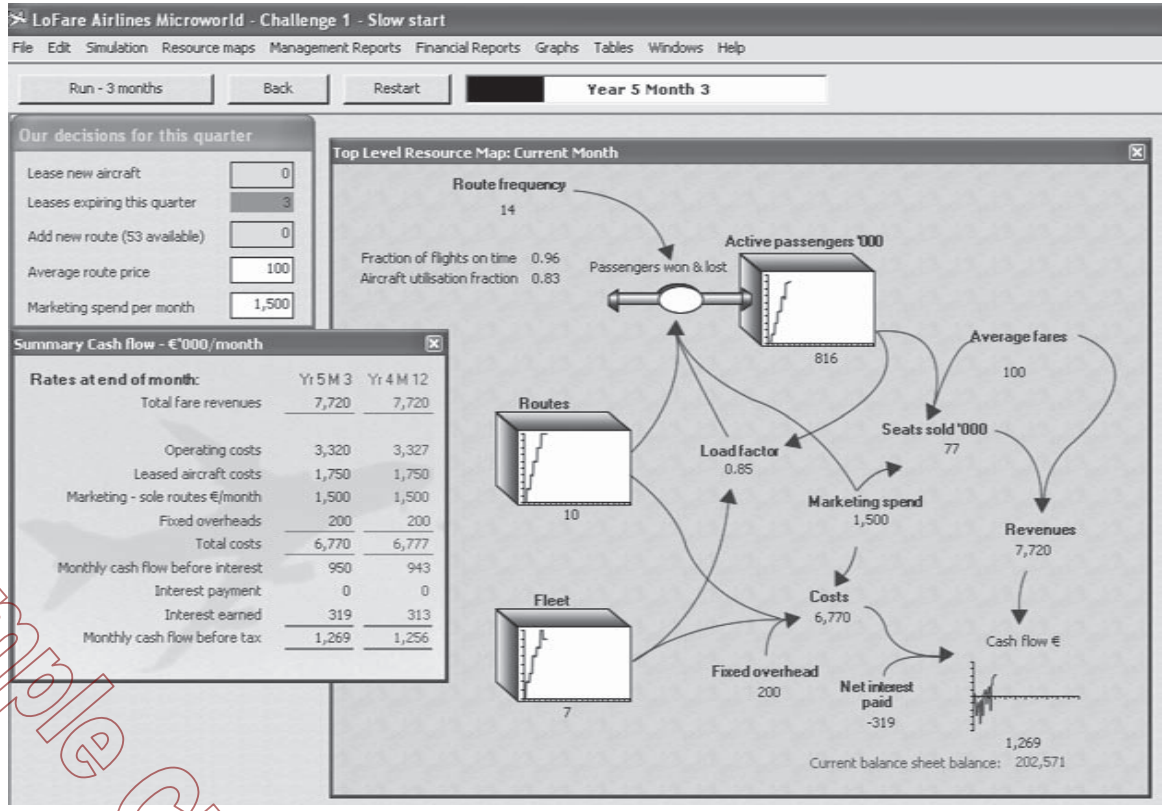



**Figure 4.24:** Screenshot of the LoFare Airline Microworld.

**"Where to compete? How to compete?"**

These architectures for the brand and airline demonstrate an approach to *implementing* strategy. In each case, management has implicitly already made the two major choices in *developing* strategy:

"Where to compete?" is an important choice, since it defines the types and number of potential customers to be pursued. Chapter 2 explained how the value curve can clarify the particular needs of separate customer types, so that the company can design its service proposition to most closely meet the needs of one or more groups. For the airline, the simple segmentation is between business travelers and leisure travelers. However, Ryanair has also made other choices about where to compete. It does not offer long-haul services, for example, where its highly efficient ground operations would be of less competitive value than on short-to-medium haul routes.

Management in the consumer brand case has also made implicit choices about where to compete. The brand's characteristics make it appealing to a potential audience of three million consumers who share particular characteristics and preferences. In addition, the brand is being pushed through a large number of stores, starting with the largest. In practice, such a company would also have to choose among different categories of retailers, from the large multiples like Walmart to the specialist and smaller independent stores.

"How to compete?" is a separate question, but one that must be answered in the context of the choice about where to compete. The value curve is quite explicit about this point also, in regard to Ryanair (Figure 3.16). The company will compete by offering the lowest possible prices between the largest possible range of destinations, and deliver these profitably by relying on ultra-cheap airports, implementing simple operational methods and driving down costs. The proposition is also clear about what it will *not* offer—services between main city airports, flight connections and many other services. Even the simple brand architecture implies some clear choices on how to compete. Although a premium product, it is aimed to be attractive to a broad market segment, rather than targeting a select niche or being sold through a narrow category of retail stores.

## GENERIC INDUSTRY ARCHITECTURES

While the case example developed through Chapters 2 to 4 has focused on the performance of one specific company, Ryanair, the architecture developed is essentially the same for any passenger airline. For less focused airlines than Ryanair or Southwest, the architecture would feature added complexity caused by issues such as multiple customer groups, short-haul versus long-haul services, multiple aircraft types and so on. Nevertheless, it is not the *structure* of the business system that gives rise to widely differing outward characteristics and performance among companies—it is the set of *choices and policies* used to direct the strategy of that structure. Choices include decisions about which customer segments and needs to serve, the exact proposition of products and services to offer, which channels to employ, which activities to undertake within the company and which to outsource.[20]

It is rare for companies to radically revise the strategic architecture of an industry, and notable when they do. Often such revision involves removing the need for some key resource, such as intermediaries from the system, as illustrated by Dell's bypassing of retailers and the emergence of direct-to-consumer sale of insurance, banking and other services. Of course, the radical technological change introduced by the Internet has also spawned new business architectures, but even there common structural opportunities have been identified by several companies—eBay is not the only online exchange and Amazon.com is not the only online supplier of books and DVDs. Several enterprises have created systems such as Elance to enable service providers to bid for projects posted by would-be clients for their services (www.elance.com).

To illustrate, Figures 4.25 and 4.26 show summary architectures for a car manufacturer and magazine producer respectively. The car firm's sale of vehicles depends on the appeal of its product range, the intensity and effectiveness of its marketing, the number of dealers to reach potential car buyers, and competitive prices offered by its models' value proposition. It can only sell as many vehicles as it has the capacity and production staff to produce, and these resources are two dominant drivers of cost (apart from the cost of raw materials and components).

The magazine producer enjoys revenue both from sale of its editions and from sale of page space to advertisers. It has an advertising sales force to promote that revenue source, and journalists to produce its content, in addition to other groups of staff not shown. It has to balance the temptation to fill the magazine with advertising space with the need to ensure a good proportion of content to keep each edition attractive to readers.

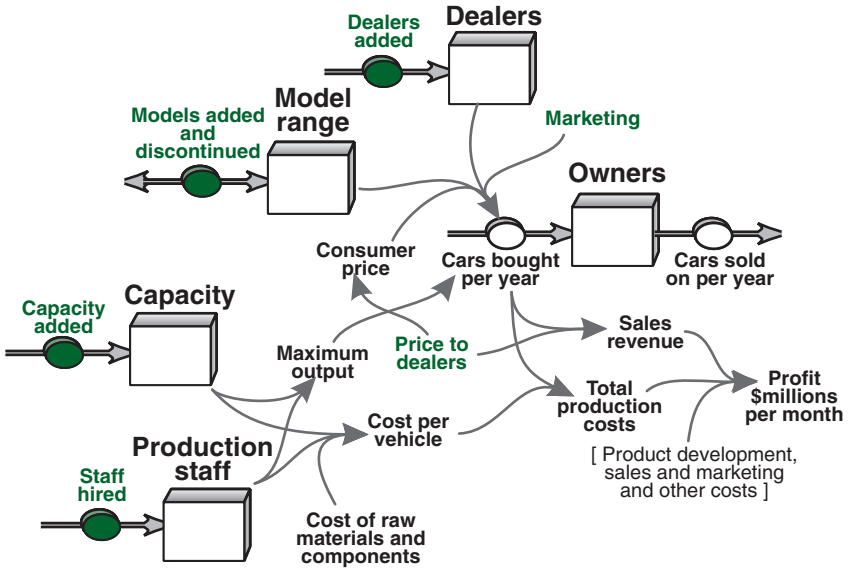



**Figure 4.25:** The core strategic architecture for car manufacturer.

Each of these architectures can, like the airline structure, be applied with little modification to many firms in the same industry. Indeed, with little more change, they also apply to closely adjacent industries. A producer of motorcycles, buses, or even earth-moving equipment will not look substantially different

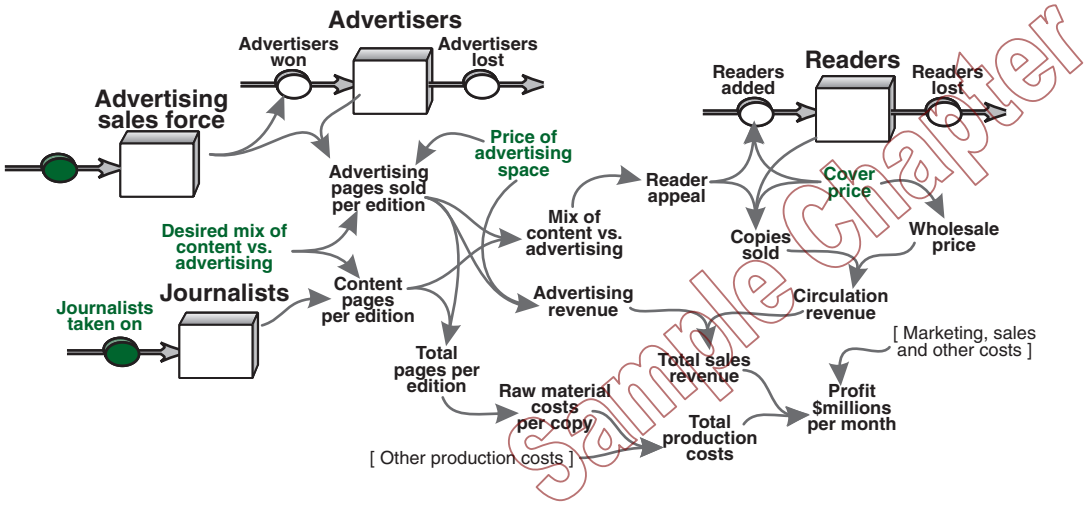





**Figure 4.26:** The core strategic architecture for a magazine.

from the car manufacturer. Even a TV channel shares many features of its architecture with that of the magazine, such as the possibility of revenue from advertisers and from viewers and the need to balance content with advertising. Other common architectures will feature later in this chapter, as well as in Parts 2 and 3.

## HOW MARKETS EMERGE

Mutual dependency between supply and demand does not operate only at the level of individual companies, as shown in the sample business architectures above, but also determines the development of entire markets or industries. The clearest cases concern simple buyer/seller markets, such as that operated by eBay. This service clearly requires the existence of both a population of sellers to provide goods for the marketplace, and another population of buyers to create the demand for those goods. But what determines the rate at which a market might grow?

One case that illustrates how the resulting market dynamics might be assessed concerns the emergence of iMode Web-browsing service for cellphones in Japan. Unlike the United States or Europe at that time, PC penetration in households was limited, and Japanese language browsing facilities were poor. As shown in Figure 4.27, new subscribers flocked to the new offering, subscribing to iMode cellphone services and choosing compatible handsets. This clearly offered providers of many consumer services a great opportunity to capture those consumers by developing Web sites compatible with iMode.

Or did it? Just as clearly, the development of iMode-enabled Web sites made the iMode attractive to potential subscribers, who then sought out cellphone

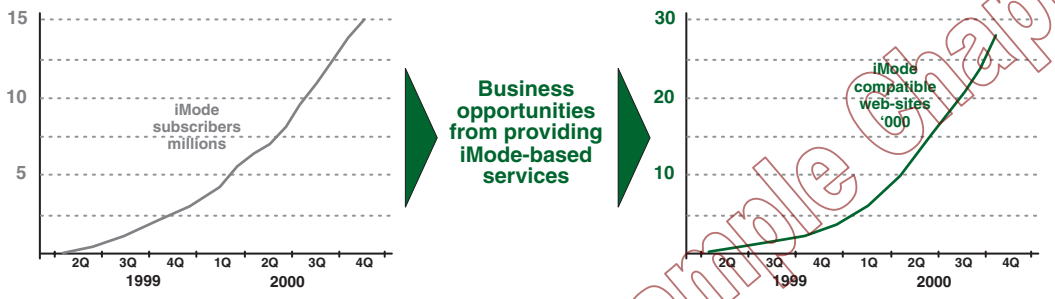





**Figure 4.27: Subscriber growth drives Web-site development for Japan's iMode service.**

Source: NTT-DoCoMo: see www.nttdocomo.com/services/imode/.

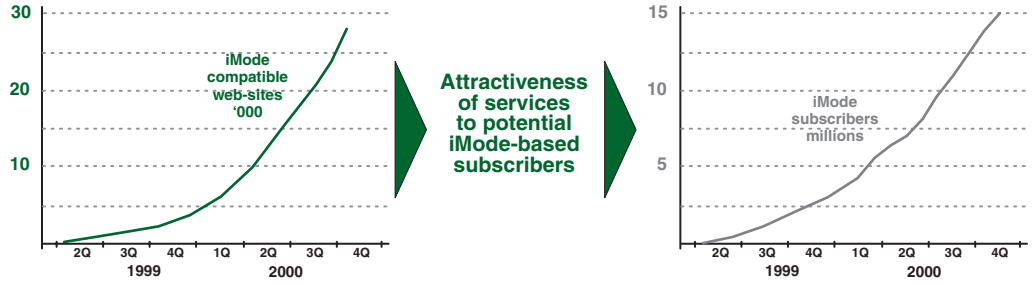



**Figure 4.28:** Web site development drives subscriber growth for Japan's iMode service.

subscriptions and handsets that would allow them to enjoy the new related benefits (Figure 4.28).

So which was it? The answer is: both. The uptake rate of iMode subscriptions reflected the number of Web sites that offered the services, *and* the development rate of Web sites reflected the number of subscribers. Figure 4.29 shows the system in this case.

But while the mechanics of this situation may be clear enough, how might we estimate the *rate* at which the system is changing? On both sides of the equation we

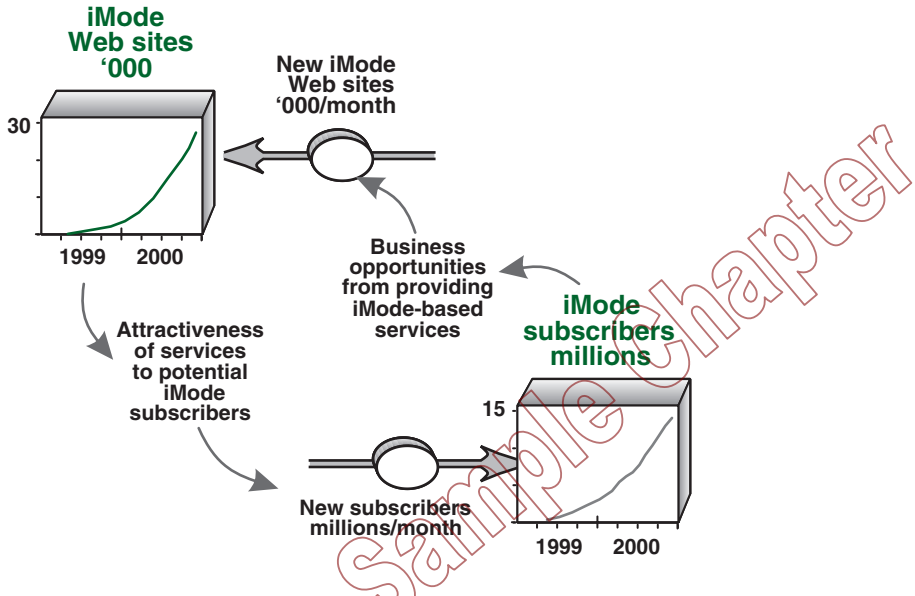





**Figure 4.29:** The core architecture capturing mutually dependent growth of Japan's iMode service.

need to consider both the potential, and the feasible rate at which that potential might be developed. In any month, a number of cellphone subscribers were likely to renew their subscriptions, of which we could estimate a fraction that would choose an iMode service. Given the size of that fraction in the third quarter of 1999, for example, and increases in the range of iMode web sites available, we could estimate the fraction, and hence the number, likely to choose iMode in Q4. To this number could be added the rate of first-time subscribers and the proportion of those who would choose the service, perhaps informed by a Bass diffusion approach to the word-of-mouth effect.

On the other side of the equation, we could examine the number of service providers starting iMode-compatible services in the third quarter of 1999, by sector (restaurants, cinemas, airlines etc.). This gives the fraction of each sector adding iMode facilities each month, and another Bass model of uptake would give an estimate of the number of new sites in Q4.

This story stands in stark contrast to the hoped-for launch of WAP services in Europe at around the same time. In contrast to Japan, domestic PC penetration was already high among those interested in browsing the Web. The fraction of cellphone subscribers wanting to choose a WAP enabled phone when renewing their subscription would therefore be limited. Service providers already enjoyed a good stream of interest from their existing Web sites, so saw little incremental benefit from adding WAP compatibility. The initiative was also hampered by the fact that the facility did not work well with then-current technological capabilities of 2G mobile phone services. Even by 2006, when cellphone Web browsing had become slick, and little tailoring of Web sites by was required, usage was still limited relative to at-home activity.

Similar principles can be applied to the emergence of other markets. Insurance companies long ago relied upon salaried sales forces to sell their products to consumers. New entrants wishing to sell into this market could not afford the large sales force needed, so required independent sales people, but unfortunately those people mostly worked for the established firms. However, competitive pressures pushed some incumbents into releasing their employed sales staff, who were pleased to offer their private clients products not only from their former employers but also from the new entrants. As the possibility of making a living by selling insurance from multiple suppliers became more evident, more sales people saw this as an alternative to salaried employment, and the number of independent financial advisors grew. Ultimately, a market emerged in the selling of insurance products between the insurance company providers and the independent resellers.

## TIPPING POINTS: REINFORCING FEEDBACK, THRESHOLDS, AND DISCONTINUITIES

The idea of "tipping points", where modest change in a situation can suddenly tip over into rapid growth, has become popular in recent years, as examples have emerged of explosive growth in markets and in organizations' performance.[21] Care is needed, however, to be clear about what exactly is causing any such phenomenon.

Note first that reinforcing feedback itself does *not* represent a tipping point. If customer numbers for a product or service grow from 10 to 50 to 250 to 1 250 in successive quarters, the quarter-on-quarter growth multiple is constant. The numbers may look impressive, but there is no tipping point (see comment on percentage rates of change in Chapter 1). If the quarterly numbers go from 10 to 50 to 200 to 600, the growth still looks impressive, but the multiple is actually declining each quarter. The cases where tipping points are observed concern situations in which previously modest growth rates suddenly escalate. At least four mechanisms can bring this about.

Segmentation is the first possible cause of tipping points. Chapter 3 explained how an average growth rate for a market can disguise a combination of a large, low-growth segment and a small (at least initially), high-growth segment. As the smaller segment overtakes the larger, it can appear that the overall market has suddenly switched from low growth to high.

The second common cause of tipping points arises from the role of key groups in a population, sometimes known as role models or key opinion leaders. While a few "ordinary" members of a population are the only people seen to be customers or followers of whatever behavior is of interest, few others will take any notice. However, when key individuals do so, other members of the general population suddenly want to join. Medical practitioners can be (thankfully, we may feel!) a conservative community, reluctant to change medications or procedures they know to be reliable. When, however, they see that experts in a particular therapeutic area are endorsing some new treatment, uptake can escalate sharply. Similar mechanisms clearly operate in many fashion-based businesses, which explains the effort such organizations go to in order to gain celebrity endorsement.

A third situation in which tipping points can arise is where win and loss rates are both strong and almost evenly matched, but where the win rate itself is increasing modestly. In Figure 4.30, a small customer base of 100 is churning over at a high rate of 49/month, but is also growing at 50 % per month, due, for example, to strong word-of-mouth from the few customers that are not immediately leaving. Many people looking at the stock of customers in this case would agree that there appears

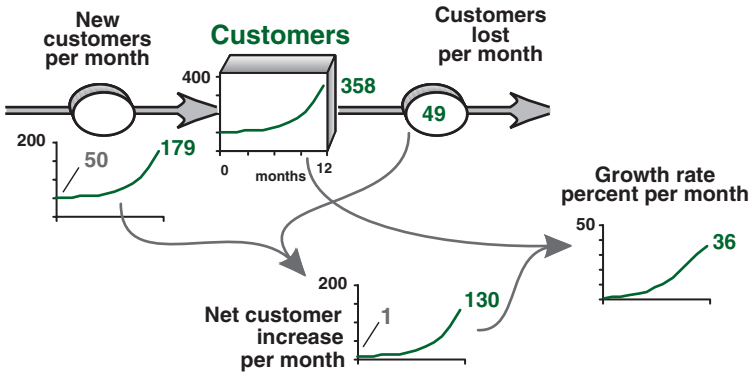



**Figure 4.30:** Tipping point in customer growth as win rate overtakes losses.

to have been a tipping point, and locate that point perhaps some time during the third quarter. However, all that has happened is that a strong growth mechanism is gradually escaping from a counter-effect that is not growing to the same extent.

The last type of situation in which tipping points can occur was mentioned briefly in Chapter 3, namely when "thresholds" are crossed. In Figure 4.31, a product's

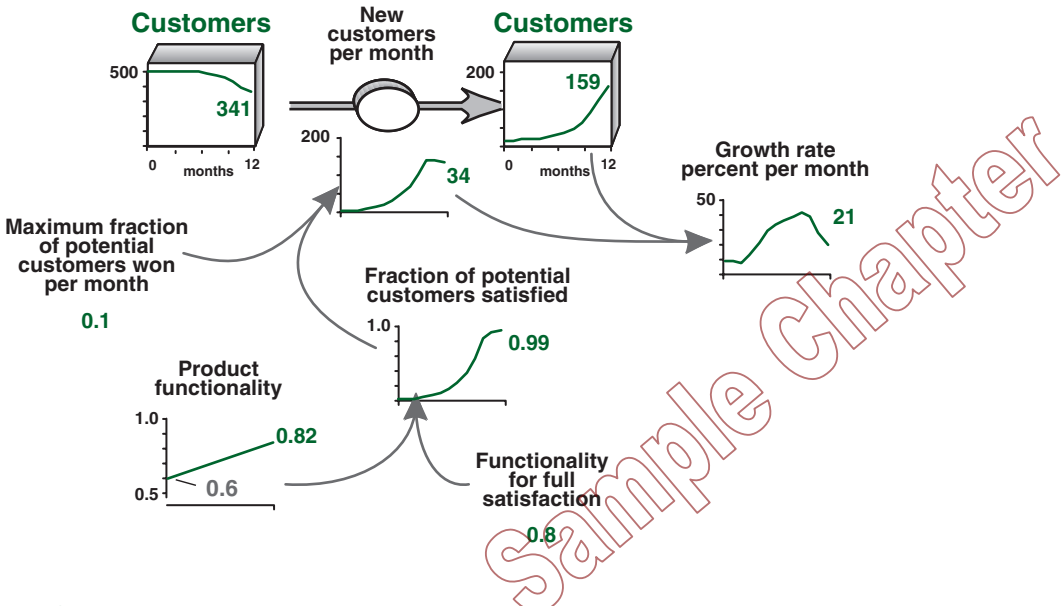





**Figure 4.31:** Tipping point in customer growth as threshold of acceptability is crossed.

functionality is being steadily improved by the company's product development efforts (similar to the kind of rating given by consumer magazines to electronics products). While the product's rating is well below 80 %, few people are sufficiently satisfied to want it, but as it approaches that rating, the fraction of potential interested customers rises sharply.

There are still constraints on the fractional rate of uptake. The company may, for example, need time to develop distribution, or its marketing may reach only a fraction of possible customers. In the case of durable products, uptake is often constrained by customers' normal frequency for replacing such products. Like the previous tipping point mechanism in Figure 4.30, observation suggests a sudden shift in the trajectory for customer numbers in quarter three, although the percentage growth rate clearly rises rather earlier. So note the warnings regarding excessive attention to percentages discussed in Chapter 1. In month six, for example, there is growth of 35 % on a current number of 23 customers, while in month 11, the customer base of 123 is growing at "only" 29 %.

Thresholds of this kind may arise in regard to issues such as the acceptability of a product or service, its availability or price. They are rarely clear cut—i.e. at $100 no one is interested, while at $99 everyone is—but span a range, For example, only 1 % might be interested at $120 and rise increasingly to 50 % at $100, and approach 99 % at $80. In this example, this effect is handled with a "lookup" relationship, explained in Chapter 2, between functionality and customer satisfaction.

Threshold effects can arise with resources other than customers. A company's attractiveness as an employer can remain modest while it is small and not apparently doing anything special, so it struggles hard to find the staff it wants. As it becomes noticed more—as, for example, happened with Google in the early 2000s—would-be employees multiply rapidly until the company is receiving a veritable tidal wave of applications from highly qualified and motivated applicants. Similar phenomena can also arise at the level of entire industries. One peculiar example in recent years concerns the increase in applications for would-be pathologists as the visibility and romance (!) of the job has been built up strongly by popular TV series.

Note that tipping points can also be negative and unhelpful. In the case of customer losses, a rising rate of service problems may be tolerated up to a point, but once those problems exceed a threshold of acceptability, customer churn can escalate. Similar issues arise with staff—work pressure is tolerable up to a point, but then gets too much for many staff and fractional attrition rates jump.

# THE STRATEGIC ARCHITECTURE AND OTHER APPROACHES TO MAPPING STRATEGY

A number of other approaches exist for decomposing business performance to identify where strategy should be changed in order to bring about improvements. This section will briefly explain some of these and the connection with the resource-based architectures that form the core of the strategy dynamics approach.

## ISSUE-TREE ANALYSIS

The issue-tree approach is widely used in consulting firms to identify early on in a project where investigation of a client's business challenge should focus. The approach fits into a typical project process as shown in Figure 4.32.

Starting from a statement of the problem that the study intends to solve, the issue tree itself should be a rigorous causal chain explaining why that problem exists. This brings the process very close to the causal analysis of performance described in Chapter 2. The factors at each stage in an issue tree should be "mutually exclusive, and collectively exhaustive" (MECE).

- *mutually exclusive* means that no two statements should overlap in describing all or part of the same thing
- *collectively exhaustive* means that, taken together, all the statements should cover all possibilities

In the simple example in Figure 4.33, a company is concerned that its profit growth is slowing. Its sales growth is still strong, so its profit margins *must* be reducing. Since its sales growth is still strong and it is winning customers more quickly, those

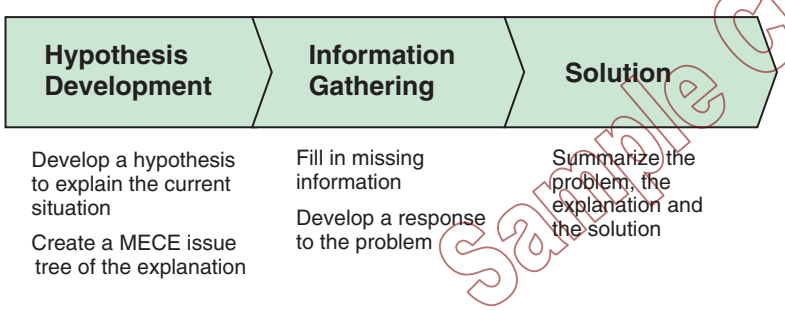





**Figure 4.32:** Simplified consulting project process.

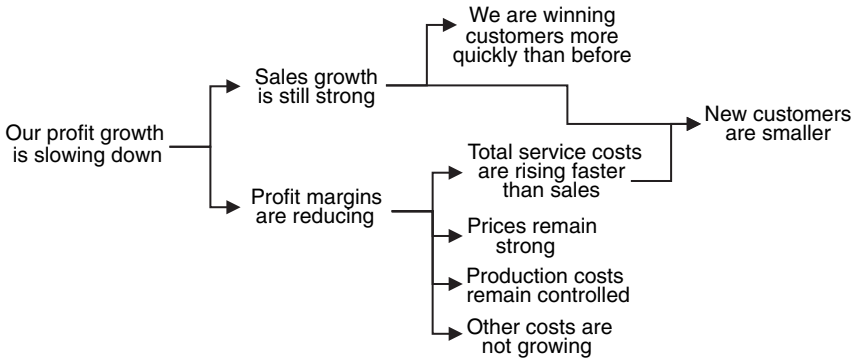



**Figure 4.33: An issue tree explaining a company's slowing profit growth.**

new customers *must* be fewer than previously. Prices are still strong, production and other costs are under control, but service costs are rising faster than sales, which are also explained by the smaller size of customers.

There is clearly a connection between issue trees and the strategic architectures generated by the strategy dynamics approach. An issue tree could simply summarize the relationships between key changes that are seen to be taking place when a strategic architecture is inspected. The causal structure for Ryanair's profit history in Figure 2.20, for example, shows fare revenues continuing to grow strongly, even though average fares dropped significantly. Passenger journeys, therefore, *must* have grown faster to compensate for this decline. However, the strategic architecture contributes three features that issue-tree analysis frequently misses:

1. The fundamental difference between "A causes B" and "A accumulates and depletes", i.e. the resource accumulation issue. If a company's customer base was stable, it would be easy to conclude that this factor is OK and move on to other questions, without spotting that customer win and loss rates were both rising.
2. The often long timescales over which causality plays out, due to the accumulation process. A company finding itself short of experienced engineers, for example, may be experiencing little turnover among those it has, but its shortage is traceable back to hiring it did not do 5–10 years ago. Similar considerations will arise when working out solutions to a problem—as the telecoms example in Chapter 1 demonstrated, actions taken to address a shortage of key staff today may only contribute business benefits in the future.
3. The interdependence and feedback that arise from "the quantity of B drives the rate at which A is growing." This has the quite severe consequence that the

same observation can be a good thing under one set of conditions, and a bad thing under others. It might be thought, for example, that winning customers is always good—but if you cannot supply the product or service support those customers want, it can become a bad thing.

Finally, issue-tree analysis is, as its name implies, primarily concerned with helping deal with an "issue", i.e. a problem to be solved or an opportunity to be taken. While a strategic architecture is a powerful tool for such one-off studies, it is also effective for continuous management of the business from month to month and year to year.

## VALUE DRIVER ANALYSIS

Value driver analysis is closely related to the issue-tree view of problem solving, and is a major theme in the value-based management approach to controlling business performance.[22] The philosophy behind this view is that, if we can identify the key factors on which profitability ultimately depends, these must be the "value drivers" for the business. Management can then set targets for those factors and put systems in place for monitoring and control, confident that any improvement will result in increasing profitability.

In Figure 4.34, prices drive operating margins, cash profit, operating cash flow and ultimately, business value. Inventories drive changes in working capital, which is an investment that reduces operating cash flow, once again affecting business value. This example encompasses factors that impact on investment requirements, as well as on the cash profit outcomes that has been the focus of our attention thus far.

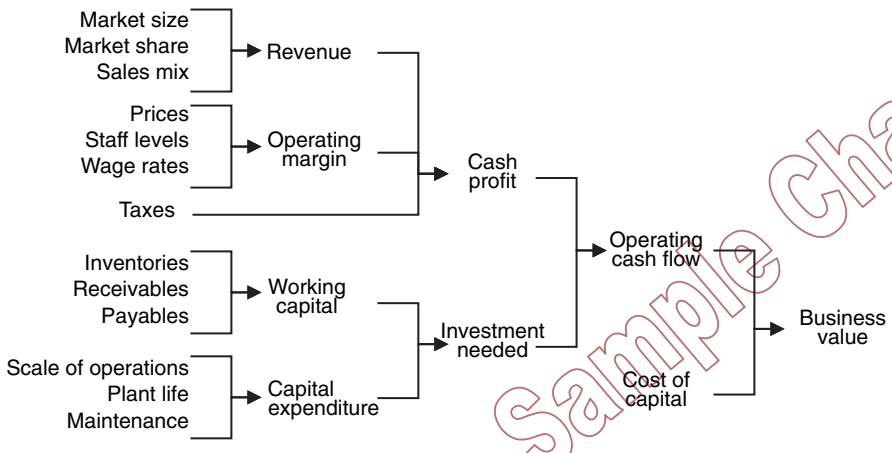





**Figure 4.34: Example of value driver analysis.**

Given this logical "MECE" causal structure, management can identify where it may be possible to intervene to drive up the value of the business. If we can improve market share (while everything else stays in its current healthy state), then market share, revenues, cash profit, operating cash flow, and business value will all improve. Less obviously, if we can extend the life of our plant, then capital expenditures can be lower, again improving operating cash flow and business value.

Again, there are clearly connections with the strategic architectures that emerge from the strategy dynamics approach. To populate such a value driver tree with time-based information extracted from a strategic architecture would require two extensions. First, working capital levels would need to be identified. Three items—inventories, receivables and payables—are all asset stocks, and their change over time will relate to such issues as customer growth, changes in product range, terms of trade with suppliers and customers, and the effectiveness of management control. Secondly, the capital expenditure required would be driven by changes in the production capacity resource. Plant life and maintenance are issues related to the productivity and reliability of equipment, an issue that will be dealt with in Part 2. The only remaining item is the company's cost of capital, an important issue concerning the financial structure of the business, beyond the scope of our concern with the operating performance of the business.

Value driver analysis is widely used as the basis for identifying strategic priorities and for setting performance targets that go beyond the high-level measures of profit and return on capital. Like issue-tree analysis, however, it does not deal with the implications of accumulating factors, and it again has difficulty dealing appropriately with long lead-time factors. Note also that typically value driver analysis resorts to market forecasts and market share estimates to arrive at revenue projections, rather than the specifics of customer numbers and size.

A further difficulty arises from the omission of interdependence and feedback. At the heart of value driver analysis is the assumption that total value can be subdivided down into more detail until we know how much value is created by each separate element of the business. Interdependence invalidates this assumption. As noted under issue tree analysis above, changes that may be good under one set of conditions (for example, winning customers) but may be bad under others. Similarly, a change that "adds value" in one situation can destroy value in other circumstances. It is the *system* that creates value, not individual components of the system. Nevertheless, value driver analysis has moved many organizations beyond a simple focus on "growing sales and controlling costs" to identify powerful options for performance improvement.

## BALANCED SCORECARD

The balanced scorecard has transformed the way in which many types of organization track and steer their performance, and is now a popular tool among large companies.[23] The method recognizes that management needs to track a range of measures if it is to be in good health and sustain strong performance, so includes measures in four categories:

- financial: e.g. revenue growth, margins, profitability, return on capital
- customers: e.g. satisfaction, retention, market share and share of business
- internal processes: e.g. delivery systems, service response, and new product introductions
- learning and growth: e.g. employee expertise and staff development

The balanced scorecard offers important advances over traditional reporting approaches, both in recognizing the interconnectedness within the business and the importance of measuring and managing soft issues. Increased training of support staff about a company's products, for example, will improve sales effectiveness, which will, in turn, improve sales and margins. Yet a particular challenge arises in assembling a balanced scorecard for a business—the choice of exactly which factors are important in each of the four domains and what measures to adopt to monitor and control them. An example shows how a strategic architecture can form the basis for identifying metrics for the four domains.

Figure 4.35 shows a core strategic architecture for a consulting firm. It makes one particular simplification in treating all professional staff as a single resource, rather than the several distinct levels of experience and seniority that exist in reality. This feature will be explained in Part 2. It also adds an intangible factor in *staff expertise*—Part 3 will show how to deal with intangible resources of this kind. If the strategic architecture for this firm were populated throughout with time chart data, as it should be, it can provide the rigorous, integrated numerical measures that a sound balanced scorecard requires. Measures for the financial domain of the scorecard can clearly be extracted from the revenue, cost and profit region of the architecture, and several more financial measures would be tracked than are included in this limited picture. The customer domain can extract data and movements in customer-related measures from the top section of the architecture, safe in the knowledge that those measures are entirely coherent in their causal relationships.

The architecture needs to be expanded somewhat to properly populate the scorecard domain concerned with internal processes, but the figure illustrates how

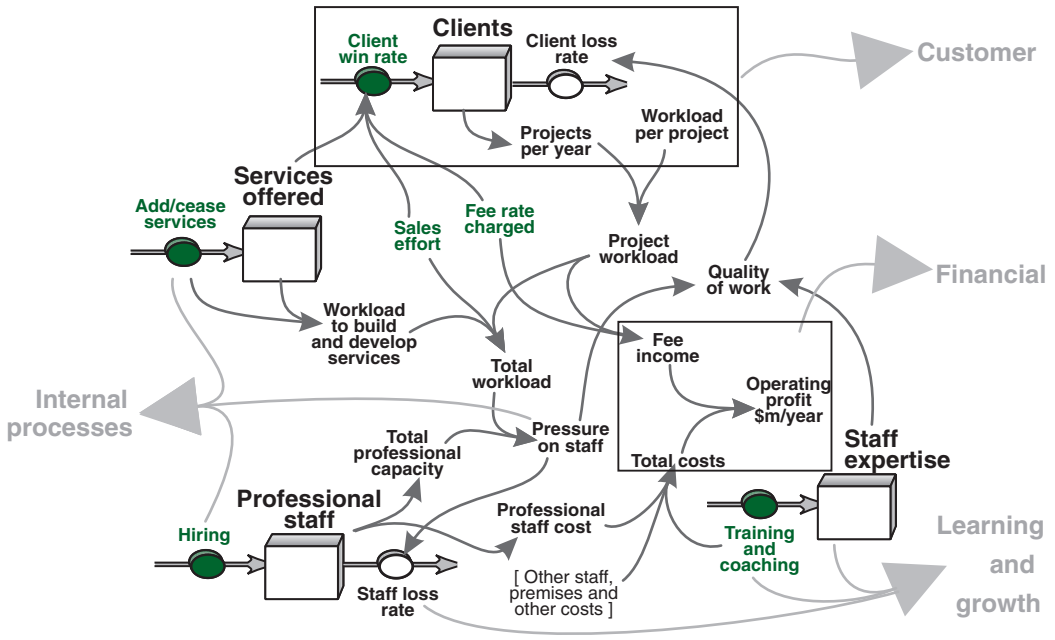



**Figure 4.35: Extracting balanced scorecard measures for a consulting firm.**

processes concerned with service development, hiring and the management of staff pressure can be extracted from separate locations in the architecture. Finally, learning and growth measures should be tracking training and coaching inputs to staff expertise, as well as the experience gained from staff involvement in current projects (not shown). Note also the need to track factors that may be undermining expertise, such as staff losses—a mechanism of "organizational forgetting" as opposed to the more common focus on organizational learning alone.

The most important contributions that a sound architecture can make to a balanced scorecard view of performance are exactly those on which issue tree and value driver methods are limited. It highlights the need to focus on rates of change—in this example, these are clients won and lost, staff hired and lost, services added, and input to staff expertise. While many company scorecards include such items, they are often not comprehensive in this coverage and do not give them sufficient priority.

An architecture highlights and quantifies interdependence and may even call into question the appropriateness of certain targets. In Table 4.5, for example, the firm is pleased to have exceeded its target for winning new clients, but its staff are overloaded and risk delivering poor work, so was it wise to set this client acquisition

**TABLE 4.5: QUARTERLY BALANCED SCORECARD REPORT FOR THE CONSULTING FIRM, WITH ILLUSTRATIVE VALUES**

| Strategic objectives | Target | Actual | Variance % |
|---|---|---|---|
| **Financial** | | | |
| F1: Fee income $millions | 15.0 | 15.6 | +4 |
| F2: Fee rate $/staff-day | 800 | 820 | +2.5 |
| F3: Staff cost $millions | 10.0 | 10.0 | – |
| F4: Profit $millions | 5.0 | 5.6 | +12 |
| Etc. (more financial metrics in practice) | | | |
| **Customer** | | | |
| C1: Clients | 60 | 59 | −1 |
| C2: Clients won | 8 | 10 | +2 |
| C3: Clients lost | 5 | 8 | +3 |
| C4: New projects | 70 | 75 | +5 |
| **Internal processes** | | | |
| I1: Pressure on staff | 0.95 | 1.1 | +0.15 |
| I3: Staff hired | 25 | 15 | −10 |
| I3: New services added | 3 | 4 | 1 |
| **Learning and growth** | | | |
| L1: Staff loss percentage | 15 | 16 | +1 |
| L2: Training days per person | 3 | 3.5 | +0.5 |
| L3: Staff expertise assessment | 0.85 | 0.87 | +0.02 |

Areas of concern



target in the first place? Another difficulty with the balanced scorecard is how to manage lead times. For example, if the hiring target had been met, would it have alleviated pressure? Possibly not, because having new staff actually diverts established staff from their current workload. It might take a quarter or two for new

hires to contribute more than they subtract from the organization's capacity to deal with client projects. Yet, taking a longer term perspective, this hiring cannot be slowed for many quarters or the organization will in five years' time find itself with a shortfall in the availability of staff with five years' experience.

One last observation on balanced scorecards—at least as they are commonly implemented—is that they pay too little attention to external factors. Merely adding market share to the customer domain in this example is quite inadequate, for reasons explained in Chapter 1. Most companies should be tracking the availability of potential customers and their success in both winning and retaining those customers, relative to competitors. This is not always easy, although in many industries relative competitive performance on various measures is available. Even in cases where it is not, a marketing function that is doing its job should know the competitive makeup of its market, and sales people are often quite well aware of customers they and their competitors are winning and losing. If this is not the case, the question arises as to how they know where to direct their efforts. In the consultancy case above, just as in the law firm example from Chapter 3, competitive issues also arise in relation to staffing—success at hiring new professionals, loss of staff to other firms and so on. A balanced scorecard for any organization that competes for particular staff should also include measures of this important performance driver.

Part 2 will have more to say on the topic of rivalry for customers, staff and other scarce resources.

## STRATEGY MAPS

An evolution of the balanced scorecard has been the development of Strategy Maps,[24] which add a sense of causality to the four domains.

Figure 4.36 offers a strategic architecture for a simple consumer insurance company. The success of its sales force in selling new policies depends on the balance between the risk the company is willing to accept (taking only the safest customers reduces the success rate) and on the premium charged (higher premiums reduce their success). The annual premiums paid by these policyholders are the source of the company's premium income—its revenue. In practice, those premiums are invested to provide an additional income stream not shown here. The higher the risk level the company accepts, the larger the proportion of policyholders who make claims, which drives the total rate of claims received. A higher risk level may also lead to a larger proportion of claims being rejected, which is not popular with policyholders. The company's ability to deal with claims from policyholders depends

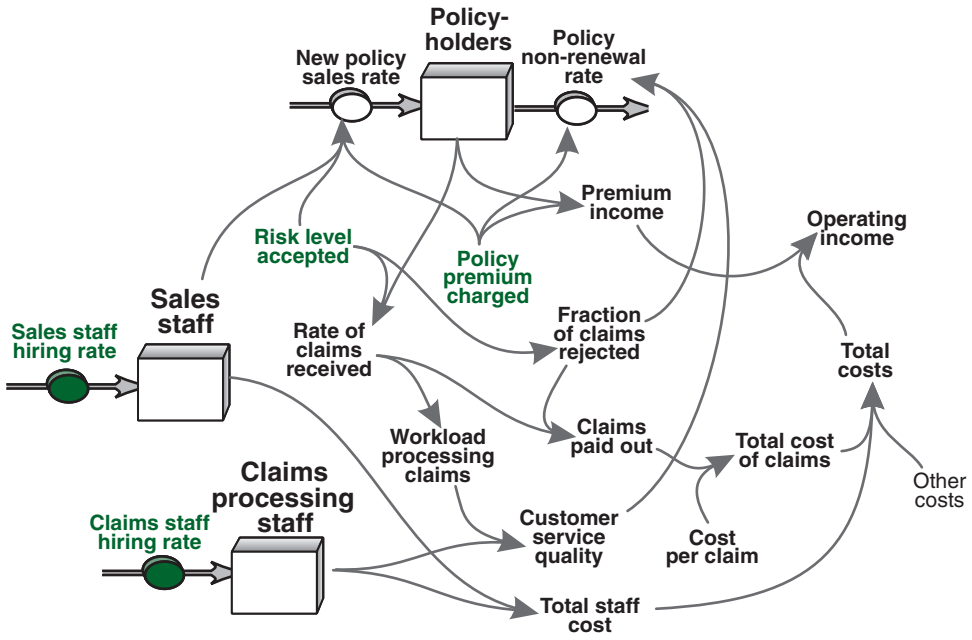



**Figure 4.36: A strategic architecture for a simple consumer insurance company.**

on having enough people to process those claims; otherwise customer service suffers, which again risks driving policyholders away.

This example also includes a number of simplifications and omissions. It does not, for example, capture the size of policies and the resulting impact on premium income or size of claims, nor does it show the need for claims assessors (although that activity may be outsourced). In many developed markets, of course, this kind of product is increasingly sold direct by phone or over the Web, but personal sales models persist in less developed markets.

Importantly, premium income, risk level and claims rates all reflect the *history* of the company's decisions, although this simple architecture does not show exactly why this is the case. Imagine that the company had long pursued a strategy of accepting only low-risk customers, charging low premiums and experiencing a low rate of claims. It then switches to a strategy of accepting high-risk customers, charging higher premiums and accepting a higher claim rate. From the moment of that change, the stock of policyholders continues to reflect the low-risk history for many years, as the previous population is gradually replaced. Premium income would therefore not jump to a new high rate but would move upwards over some years. At

the same time, the claim rate and fraction of claims rejected would also gradually transition from low to high rates, with important implications for the company's service capacity. The risk, premium income and claim rate are all *attributes* of the population of policyholders, an important issue that will be addressed in Part 2.

This company may face a number of opportunities for improving performance in addition to adding higher risk customers. It might wish to improve the speed of customer response and quality of service by enhancing its claims processing systems and instilling a new customer-oriented culture among its staff. It may wish to reduce errors in claims processing by improved training and staff retention. Or it may wish to reduce the rate of nonrenewal by policyholders by adding customer retention to the responsibilities of its sales force, maintaining the view that time spent on customer retention is more effective than the same time spent on customer acquisition. A strategy map for such a strategy shift is shown in Figure 4.37.

This strategy map adds important dimensions to the architecture in Figure 4.36 in identifying *activities* to be undertaken and *processes* that need modification in order to implement the change. It also addresses subtle issues of culture and attitude. At the same time, the architecture adds important dimensions to the strategy map, including the ability to *locate* exactly where in the business system each initiative will act (reduced errors in claims handling will reduce the policy holder outflow, for

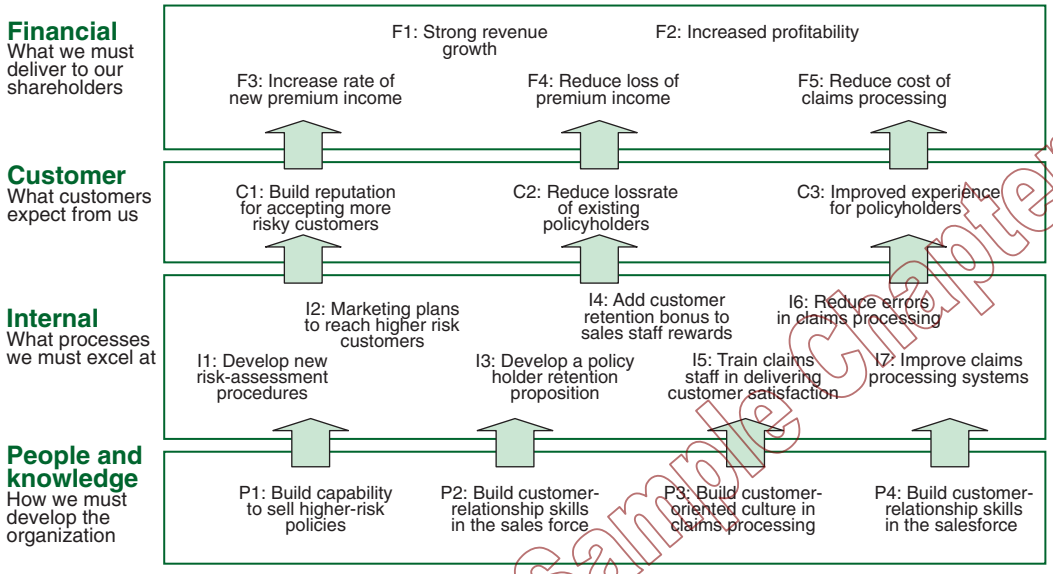





**Figure 4.37: A strategy map for performance improvements in a simple consumer insurance company.**

example), and *quantify* the probable impact of that change. This quantification goes beyond putting a single number on the benefit, such as "reducing the error rate from 4 % to 1 % should cut customer losses from 400/year to 50/year", by displaying the time profile over which the improvement can be expected to occur. This means we can see how quickly revenues and profits will change, not just the before-versus-after comparison. Furthermore, the rigorous numerical causality of the strategic architecture ensures that any interactions among the initiatives are captured and quantified, ensuring that benefits are not double counted, e.g. the impact of *both* reduced errors *and* sales force effort on reducing customer losses.

**Summary of Chapter 4**

Earlier chapters have identified that performance depends on the resources available, on certain key management decisions, and on competitive and other external factors. These same items also determine how quickly resources grow and how effectively they are retained. The items on which the *development* of any resource depends may be the *existing level* of that resource itself, and quantity of *potential* resource that is available.

The interaction between existing and potential customer resources gives rise to the characteristic S-shaped pattern of growth as markets emerge, develop and mature. The Bass diffusion model captures this pattern for new technology products, and can be adapted to reflect the behavior of many kinds of market. For consumable products, the stock of customers drives revenue, whilst for durables revenue reflects the customer acquisition rate.

Powerful reinforcing feedback can arise when resources drive their own growth or the growth of other resources. Conversely, balancing feedback that extinguishes growth can arise when limited resources prevent others from developing, often as an unintended result of management policy. Extensive study of the many feedback structures in an organization gives rise to causal loop diagrams that provide a qualitative explanation for performance.

Completing the interactions amongst tangible resources, management decisions and external factors gives rise to a quantified diagram of performance that forms the core of a "strategic architecture" for an organization. Intangible, competitive and external factors will add to this core architecture in Parts 2 and 3. Enterprises engaged in similar activities share common architecture

structures, with performance differences arising from the wide range of choices available to management regarding the specific characteristics of resources they choose to develop within the general structure, and the policies they adopt to do so.

Mutual interdependence between demand-side and supply-side resources explains the rate of development of entire markets, as well as individual companies. Discontinuities can arise in the development of resources for a number of reasons, giving rise to "tipping points" where growth or decline can suddenly accelerate.

Other approaches to mapping performance are in widespread use. Issue-tree analysis traces the fundamental causes of challenges that an organization may be facing. Value-based management relies on identifying the factors that drive financial value. The balanced scorecard and strategy maps are closely related approaches for controlling strategy that emphasize the need to target, monitor and respond to customer-related measures, internal processes and the organization's learning and growth. These methods can all be informed by strategy dynamics analysis, which handles interdependencies within the business system, as well as the lead times involved in resource development. Otherwise, there is the risk that hitting a target can be good under one set of circumstances at one time but problematic in other situations and at other times.

## SUGGESTED QUESTIONS AND EXERCISES

1. What are the three categories of factor determining the rate at which any resource develops?
2. Explain why it may be important to know the quantity of a potential resource, and to know how that potential is changing.
3. List the three principles that together explain how an organization's performance is changing over time.
4. What are the principal mechanisms captured by the Bass diffusion model of market development, and how does each mechanism affect the market's growth rate over time?
5. Explain the differences between the way in which revenues arise for durable, consumable and semi-durable products. Give two examples of each product type.
6. What are the two main forms of feedback that arise amongst resources, and what characteristic patterns of performance over time arise from each?
7. State the two implications for performance that arise when a business system depends on developing finite quantities of potential resources.
8. How should a spreadsheet be organized to follow the logical causality of an organization's strategic architecture?
9. For the sample company you identified for the exercises in Chapters 2 and 3, follow the instructions on the next pages for Worksheet 4 and 5 to develop a core strategic architecture of your case.
10. Follow the steps recommended in Chapters 2 to 4 to construct outline architectures (no data) for one or more of the following examples:
    (a) a retail chain, such as Starbucks
    (b) a company manufacturing and servicing elevators
    (c) an online dating agency
    (d) a voluntary organization providing medical centers in locations that have no alternative provision.

# USING WORKSHEETS 4 AND 5

Worksheets for stages 4 and 5 of a strategy dynamics analysis are provided below. Stages 1 to 3 should already have been completed, including (a) in Worksheet 1 a clear chart of how one or more performance measures have been changing over time (b) in Worksheet 2 a causal chain from performance back to tangible resources, and (c) in Worksheet 3, repeated for each resource, diagrams showing how resources are accumulating and depleting.

# WORKSHEET 4

This Worksheet lays out the causal connections that explain why a resource is changing as it is. It is not required for resources whose changes are simply decided by management choice, such as adding or closing capacity or launching new products (see Figure 3.14). The process is demonstrated in detail for Ryanair's customer base in Figures 4.1 to 4.9.

Worksheet 4 is likely to be necessary in most cases to explain why customers, and possibly staff, are being won and lost. For each such resource:

- copy the resource and its inflow and outflow from Worksheet 3 into the structure in the middle of Worksheet 4
- connect factors that directly drive the resource's in-flow, e.g. product appeal, contact with existing customers
- work back along the causal chain from each item until reaching either a decision (e.g. price) or a resource (e.g. product range, existing customers)
- it may be necessary to add the potential resource to the left if this constrains the inflow rate
- complete the same process to lay out the explanations for the resource's outflows

## TIPS

- It may be necessary to complete Worksheet 4 for more than one customer group, or for hiring or retention of more than one staff group.
- The **my**strategy software is a more flexible and powerful method for completing the inflow and outflow analysis of Worksheet 4. The **my**strategy software version of this Worksheet is available from www.strategydynamics.com/smd4.

# WORKSHEET 5

This worksheet combines Worksheets 1 through 4. Its purpose is to generate the core strategic architecture, as illustrated in the full picture of the consumer brand from this chapter shown in Figure 4.38, following Worksheet 5.

- Copy the causal structure that explains how resources drive performance from Worksheet 2 into the right-hand side of the Worksheet 5.
- For resources to the left of the diagram whose flows are simply decided upon by management, add those flows and decisions.
- For resources whose flows are caused by more complex mechanisms, add the causal structure you have just developed on Worksheet 4. It may be necessary to add potential resources to the left of a resource if that potential constrains its growth.
- Check that all interdependencies between resource flows and existing resources or decisions are captured. You should be confident that you can explain why every resource has behaved as it has over time from other items on the architecture, and hence explain how overall performance has come about.

## TIPS

- It is likely that analysis will become more complex than this regular page-size template can accommodate. Use larger paper to develop more extensive diagrams.
- It is especially effective if teams work together to generate the strategic architecture on a wall board, capturing the result with a digital camera.
- The resulting diagram can be simplified by (a) summarizing a high-level view, as has been done for the consumer brand in Figures 4.20 and 4.21 and (b) keeping detail of major sectors of the architecture on separate diagrams, as in Figures 4.14, 4.17 and 4.18.
- Alternatively, the **my**strategy software is a more flexible and powerful method for completing Worksheet 5. The **my**strategy software version of this worksheet is available from www.strategydynamics.com/smd4.

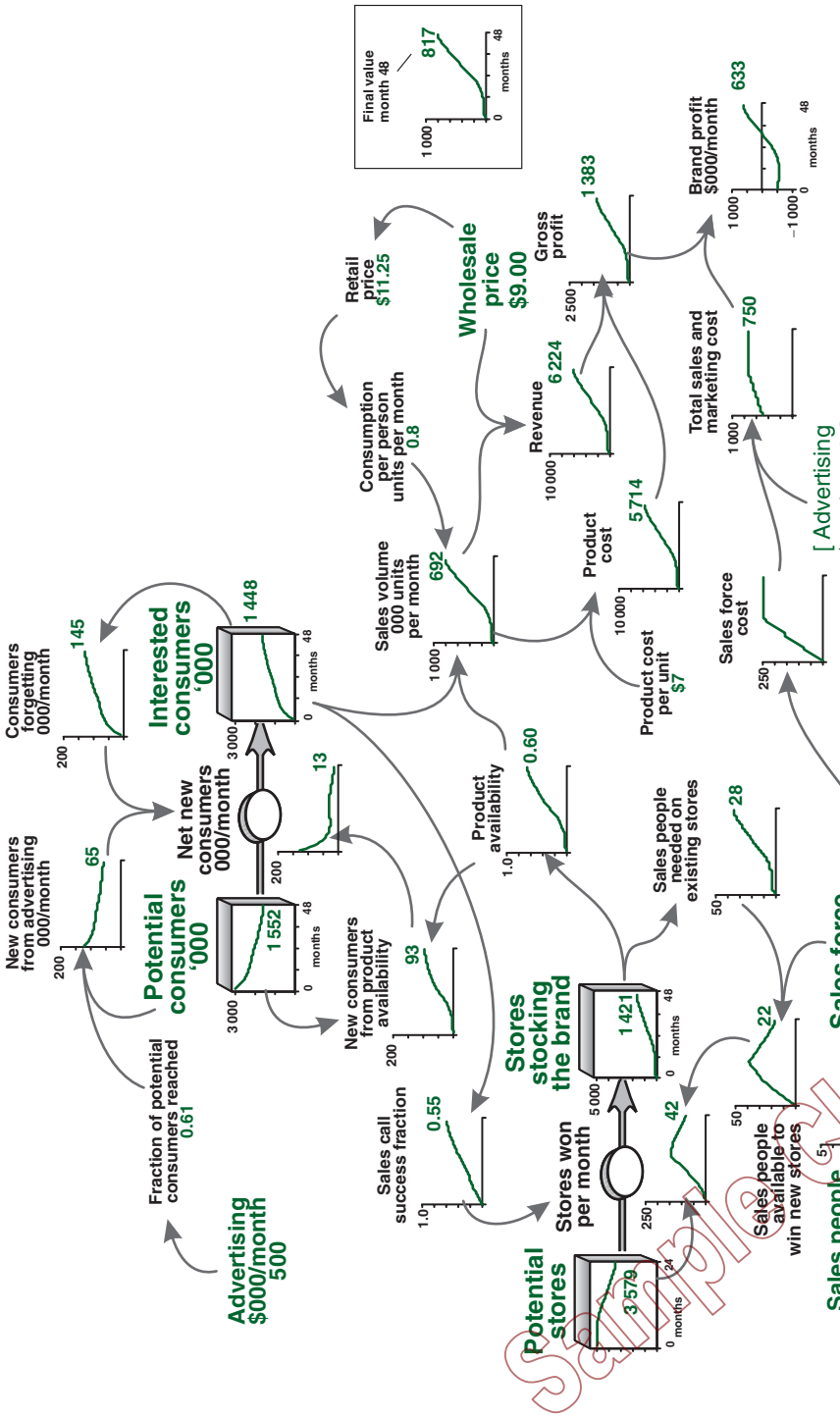
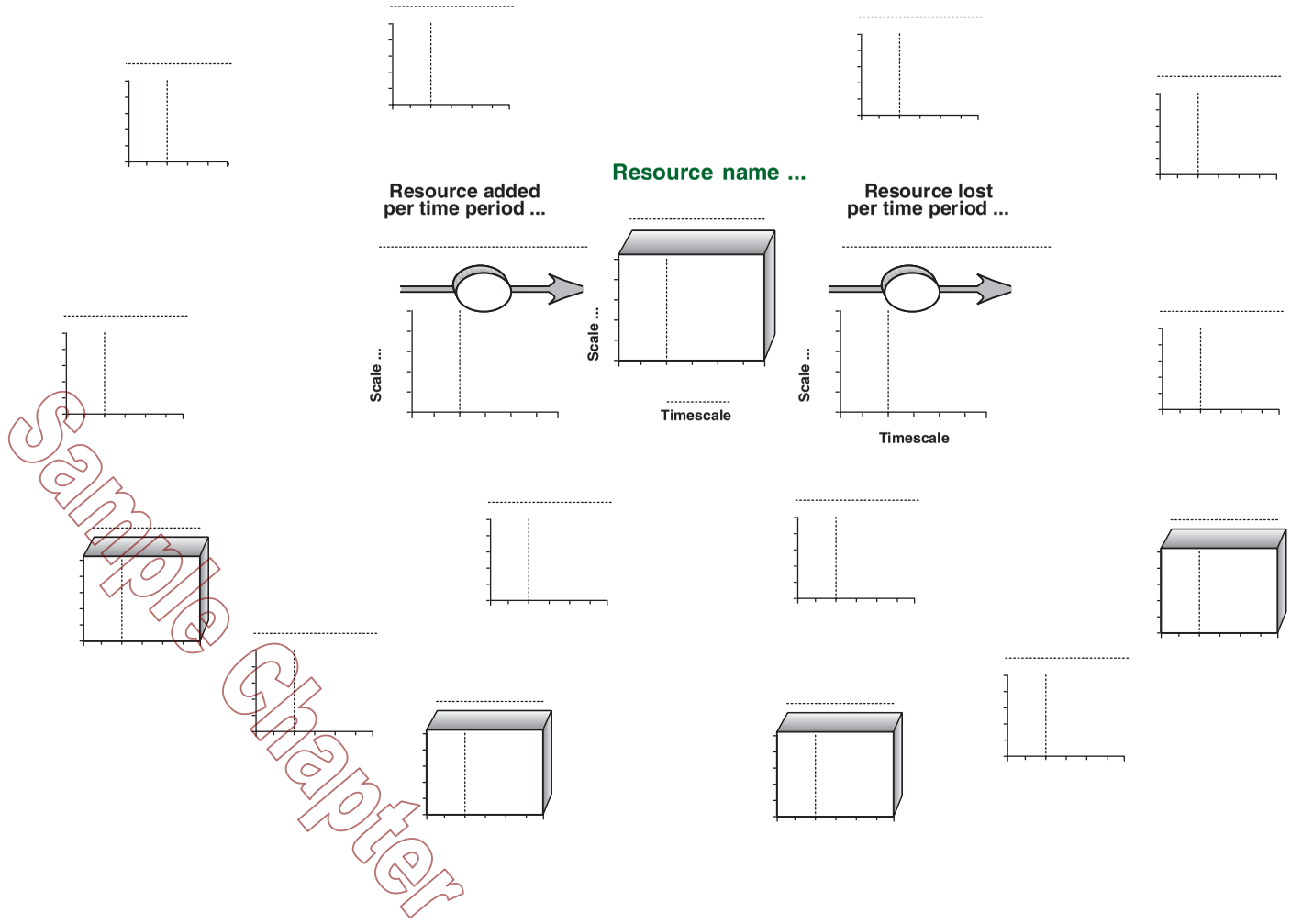
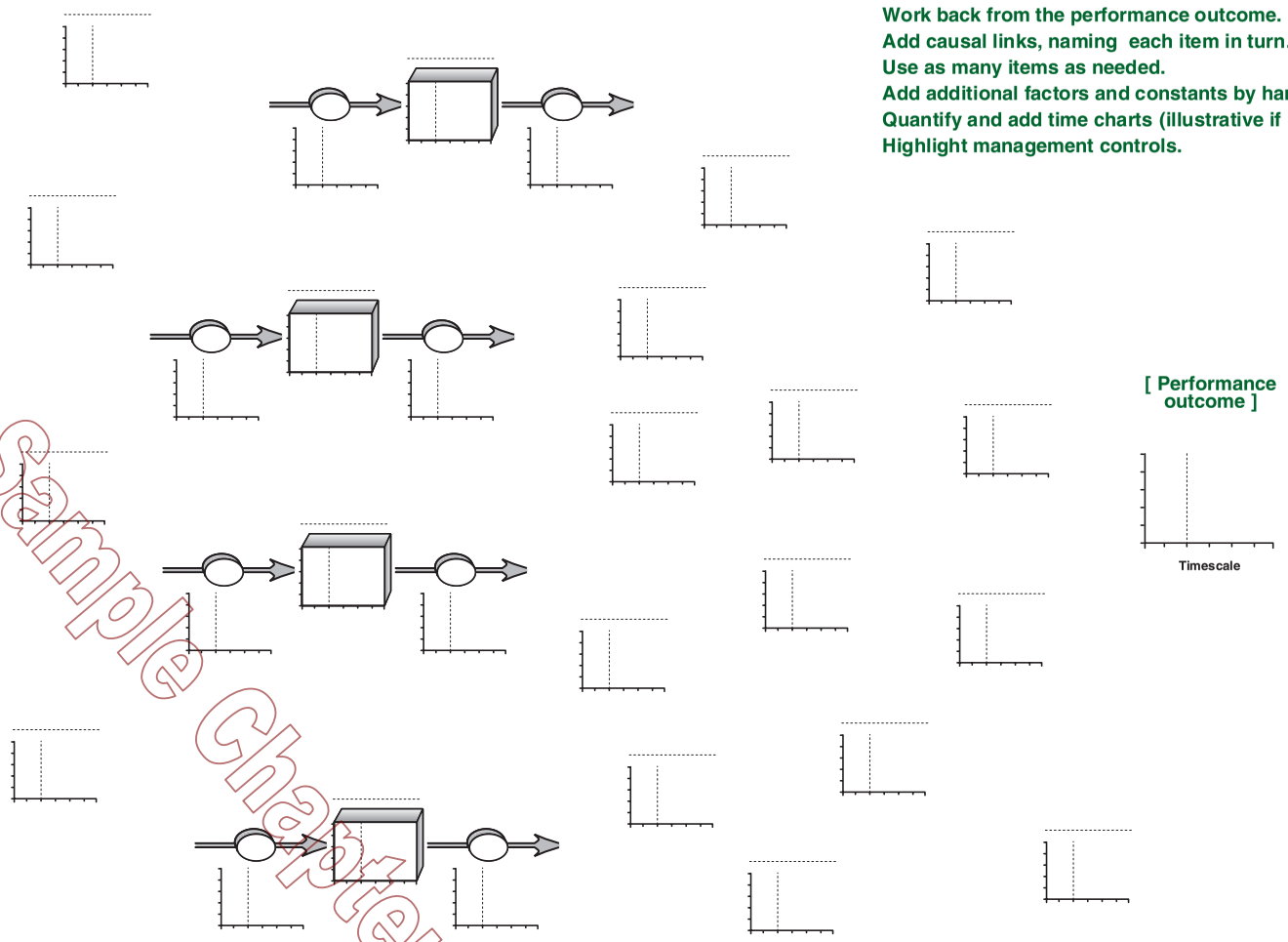



Figure 4.38: Strategic architecture for the consumer brand.

# WORKSHEET 4: DRIVERS OF RESOURCE WIN RATES AND LOSS RATES



# WORKSHEET 5: THE CORE STRATEGIC ARCHITECTURE



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4. The passenger journeys booked in Figure 4.5 are the year-end rates, reflecting the estimated year-end number of customers rather than the average number reported in Chapter 2.
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17. This two-stage representation of customer acquisition is a considerable simplification of reality in such cases. In practice customer development goes through multiple stages of awareness and interest, a process that will be examined in detail in Chapter 6.
18. I am indebted to Alan Graham of PA Consulting for his observations on these issues.
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