Business Strategy Review, 1999, Volume 10 Issue 3, pp 1-16

The Dynamics of Strategy

Kim Warren

In seeking to build and sustain competitive advantage, managers need to develop strategies which take account of likely future changes – and which will themselves change in line with circumstances. This article starts by outlining problems with a non-dynamic approach to formulating strategy and then lays out the initial frameworks of a fact-based method that can help managers understand and take control of the time-path of their firm's performance.

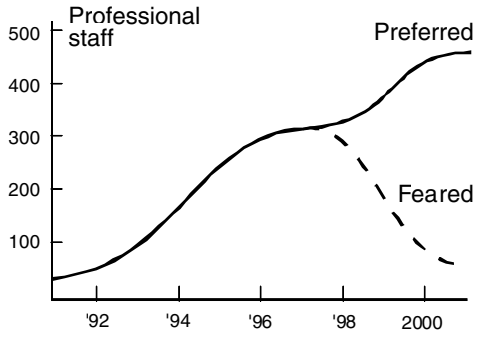
A ubiquitous feature of the strategy challenge facing managers is how to tackle *dynamic* (ie time-related) problems of performance. A typical example is shown on the right (case A – "FundCo") and two more appear overleaf. If strategy analysis is to help in such cases, it should at a minimum provide answers to three basic dynamic questions:

- ***Why*** has business performance followed the time-path that it has?
- ***Where*** is performance heading into the future under current policies?
- ***How*** can we act to alter that future for the better?

Whilst management can do much to adjust short-term financial results, there is unavoidable uncertainty about medium to long-term outcomes. Nevertheless, managers at all levels are expected to commit to

CASE A "FundCo" – The Chief Executive of a major fund management firm had reason to worry about its ability to sustain the exceptional growth rates in earnings and funds under management that it had maintained for more than a decade. Like other professional service firms, it depended critically on a team of professional staff, which not only delivered the firm's services, but also maintained strong relationships with clients. This can be a fragile system, dependent upon good morale and loyalty amongst the staff. The prosperity of the firm in question had been built over many years, and had attracted the very best recruits. However, the Board of this firm was only too aware that certain rivals had collapsed very rapidly, and wished to avoid that fate itself. Figure 1 indicates the time path of this firm's recent history of staff development, and the alternative futures its management felt they might face.

Figure 1
Time-chart for staff-losses feared by a professional service firm

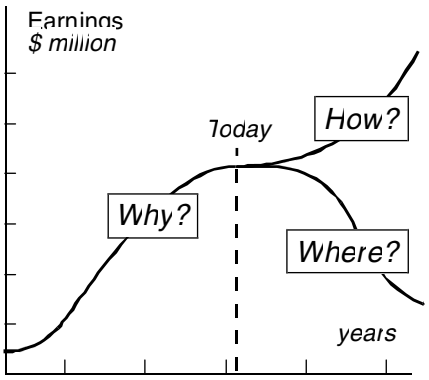


If this time-path for the staff were to arise, it would coincide with a collapse in clients, funds, earnings and, of course, the share price.

Inspection Copy

© Kim Warren

Figure 2
The fundamental dynamic questions in strategy



confident projections. When entrepreneurs seek venture capital or CEOs raise finance for acquisitions, investors expect such time-path forecasts for future earnings. Vague generalisations about roughly what has happened, approximately where the business is heading, and possible thoughts about future plans are not adequate. Senior managers themselves expect no less from subordinates seeking support for budgets, business plans, and new initiatives – executives at all levels are expected to say with confidence what *scale* of performance they will deliver, over what *time-scale* into the future. And this confidence is assumed to be supported by a clear set of intentions as to *what* will be done, *when*, and *to what degree* across all the major functions of the business in order to bring about the promised performance.

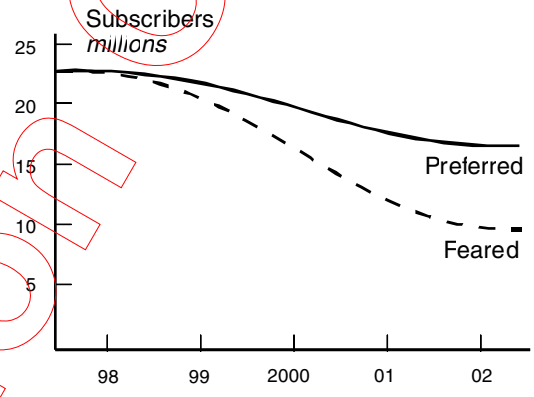
These questions are so fundamental to the responsibility of strategic managers that one might expect leading strategy books to tackle them head-on. But charts such as Figure 2 are remarkably rare. Why? Is it because these questions simply cannot be tackled? This article aims to show that they can. There are fundamental structures at work within any business situation that determine how performance evolves over time. These structures can be understood and captured by formal analysis, and are amenable to management action. The article defines and illustrates the first of a set of frameworks in an approach known as the *dynamic resource-system view* of strategy (DRSV) that makes this possible.

The Time-path of Strategic Performance

Case B and Case C, both drawn from recent work with companies, illustrate the critical importance of the questions in Figure 2. The first question – why we have arrived at today's level of performance – may not be relevant in every case: a new venture has no history. However, for most firms, the trajectory of future performance is highly dependent upon their recent strategic history. Case C in particular raises deep concerns for the managers involved – what are our prospects under current policies, what can we do to improve those prospects, and what lessons and resources can we bring to bear on the problem from past experience?

CASE B "TelCo" – A dominant telecoms firm in a deregulating market fears loss of market share to new entrants. This firm, a formerly nationalised telecoms operator, faces the opening of its market to free competition. Following the experience of British Telecom in the UK, the firm knows that its financial performance will suffer from losing a proportion of its subscriber-base over a few years, but wishes to minimise those losses, and capture any new subscribers that may emerge. Figure 3 indicates alternative future time-paths for this critical indicator.

Figure 3
Time-chart of competitive intrusion facing a dominant telecoms operator



The challenges portrayed in Cases A, B and C are not merely qualitative questions. In each case:

- the threat or opportunity is substantial in scale;
- the strategic issue will evolve over a certain period with speedy response being vital; and
- there is a time-path of progress – the firms' performance will evolve at a varying rate.

Scale of threat/opportunity

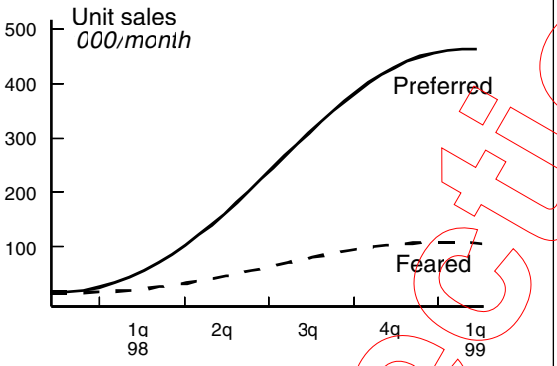
In each of our three cases, the difference between success and failure is considerable. TelCo stands to

Inspection Copy

CASE C "GameCo" – A consumer-electronics manufacturer wishes to exploit a rapidly developing market opportunity before rivals do so. This firm, facing a challenge similar to the launch of the Nintendo 64 against Sega and the Sony Playstation, is at an early point in a new phase of the industry's history, with a consumer-electronics product for which there will be a substantial market. However, it is critical to build sales quickly.

Not only is it vital to erode the accumulating advantages enjoyed by the rival's established position, it is also imperative to grow the installed base, to drive sales of components and upgrades, to win commitments from suppliers and distributors, and to take the new opportunity before others. Figure 4 indicates two alternative futures for this launch.

Figure 4
Time-chart for rivalry to exploit a new market for a consumer-durable product



Whilst this is clearly an episode of strategic importance for the firm, notice the time-scale over which it has played out – just 12 months. For the Nintendo case, this included a seven-month period in which the price of both its own and Sony's product price fell from £250 to £99. Not much use for five-year plans here!

lose millions of subscribers and hundreds of millions of dollars in revenue. GameCo expects sales of hundreds of thousands of units, and desperately needs an installed base to provide the long-term cashflows from sales of upgrades and accessories. Longer-term, pulling off this plan may determine the entire survival of this multi-billion dollar enterprise. FundCo fears that losing just a fraction of its most critical staff could trigger collapse of a business that is custodian of funds worth over $75bn.

Evolution of strategic issue

In each case, there is also a *time-scale* over which the strategic issue will evolve, and speed of response is vital. GameCo will win or lose its race over a few months, and FundCo could, if it does not act correctly, see staff losses accelerate within a few quarters. Although the competitive threat to TelCo will play out over four or five years, its *immediate* decisions on pricing, service, network development and marketing will be powerful determinants of its future prospects.

Time-path of progress

Finally, each case exhibits a *time-path* of progress – the firm's performance will not just start and end at specific points, but evolve at a varying rate as its future unfolds. TelCo may at first lose few subscribers, then suffer increasingly rapid losses as its rivals build up their capacity. The consumer electronics manufacturer may see little absolute growth in early weeks, before word-of-mouth accelerates the rate of sales. The fund management firm may initially experience little more than a stagnation in its staff population, until disillusioned individuals start to leave, creating ever-faster attrition that could prove catastrophic.

Whilst continuing uncertainties will never permit precise forecasts (and managers will always need the flexibility to change direction as events unfold), strategy analysis should at least lead to *some* indication of such time-paths for future performance. So how might a management team start to tackle such challenges?

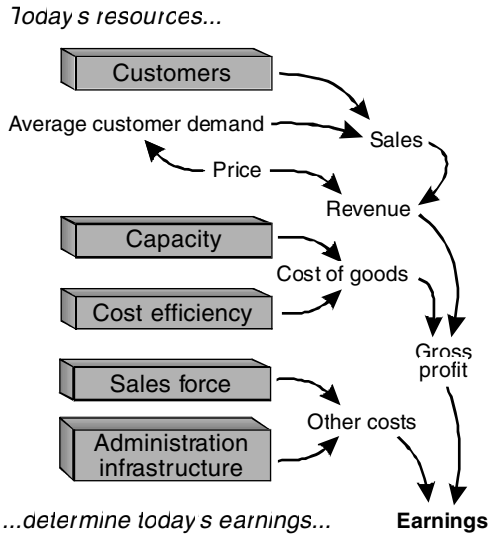
Today's performance depends on today's strategic resources

Most managers understand the importance of building and conserving the resources of their business. These may be 'hard', tangible resources (cash, plant, customers, products etc) or 'soft', intangible factors (product quality, staff morale, or service standards). Furthermore, managers know that resources are interdependent – consistent product quality can be used to build reputation with customers, and a strong client base may help attract the best recruits. 'Ranking' resources by importance misses the point – if *any* key resource is in bad shape, the whole business is endangered.

Writers on strategy have long recognised the importance of strategic resources (eg Grant 1995,

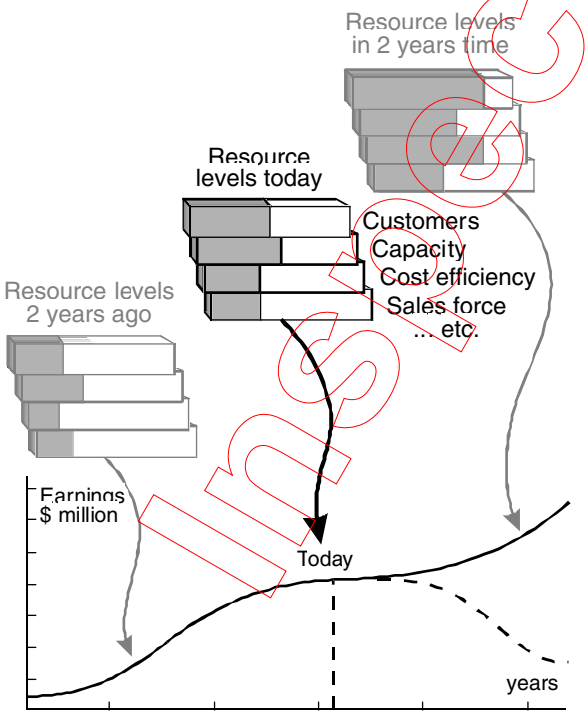
Unsolicited Copy Only

Figure 5
Strategic resources and firm performance: the simple, immediate connection



Note: 'Word-and-arrow' diagrams, common in contemporary management writing, often feature items and connections with a wide variety of meanings. In contrast, each element in the figures in this article has a specific meaning. The boxes simply denote containers holding a certain amount of resource. The curved arrows do not mean merely that there is some vague relationship between two items: they state that one item can be immediately calculated from another, just like a formula in a spreadsheet cell.

Figure 6
Strategic resource levels determine performance at any time – past, present and future



Wernerfelt 1984, Mahoney and Pandian 1992, Peteraf 1993). They have also identified the critical management challenge that arises in trying to build and maintain the level of each resource (Dierickx and Cool 1989). It is in this process of resource-building that the essence of the strategy dynamics problem lies.

There is a puzzle in this 'resource-based' view of strategy. If we boil it down to its bare essentials, it appears that today's performance can be precisely calculated from only a few resources (mostly tangible) and some external conditions: Figure 5, admittedly a caricature, shows how today's revenue depends on today's customer-base and price, through the sales volume that arises, and so on. The implications seem quite profound – we do not need *anything* else (intangible resources, capabilities, strategic vision or leadership) to explain the performance of the firm. Yet this is clearly nonsense: such items *must* make a difference, so we need to understand how they impact on the simple observation in Figure 5.

The solution to this puzzle lies in the fact that the type of analysis represented in Figure 5 is merely a snap-shot of the firm at a moment in time. If these few tangible resources explain precisely our profitability *today*, then their scale *yesterday* explained our performance then, and their scale *tomorrow* will explain precisely our profitability at that moment too (Figure 6). The missing element in a rigorous understanding of the dynamics of performance is therefore an explanation of *how* the level of each resource changes over time.

An example: BrandCo

The approach to using this insight in practice can be illustrated with a further illustration, again drawn from recent case-work (Glucksman et al 1998).

As explained above, the earnings from this brand-launch at any point in time will depend on the resources the firm has then. To simplify, the analysis here will focus on just three key resources for this business – consumers, stores, and sales force (see Table 1).

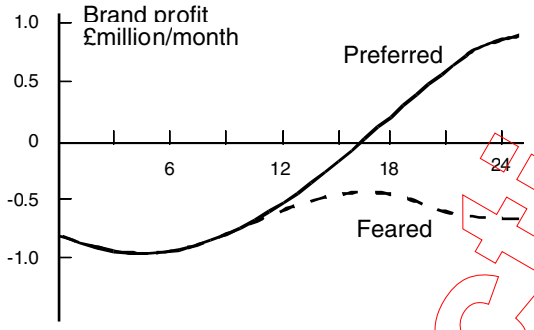
Early on, the product will have few consumers and few stores, so the sales revenue will be limited and more than outweighed by the costs of its salesforce and other expenditures, notably advertising. Later – perhaps, if things go well, by month 18 – consumers and stores will be sufficient in scale to provide revenues that exceed the brand's costs, and the product will be into profit.

Insight in action

CASE D "BrandCo" – ***a consumer-products firm has developed a new style of spirits and wishes to build a powerful brand***. A sound strategy for this product launch needs a clear view of the time-path that might be achievable, and a clear statement of the strategic resources involved. From experience with comparable products, the firm believes that about five million consumers might like the product, and about 50,000 stores may feasibly stock it in due course. Typical consumption is about 1 litre/month per person. Retail prices of about £11/litre ($16) are common in this sector, wholesale prices are around £8.50, and direct product costs are about £7.

Figure 7 shows a time-chart of the hoped-for earnings path, and Table 1 defines just three key resources: consumers, stores and sales force.

Figure 7
Expected time-path for profits from a new product launch



Capturing the likely time-paths in Figure 7 therefore requires analysis of the mechanisms that will explain those resource-levels over time.

Resources build and deplete over time

Resources accumulate as new resource 'flows' into the current stock of what we possess – winning customers adds to the level of a customer-base, advertising increases the level of market-awareness, training raises the average level of staff skill. Resources also deplete or decay by flowing out of the stock – customers defect to rivals, resignations reduce employee numbers and skills, and technological progress devalues current staff skills. A frequently used analogy for these processes is to think of a resource as liquid flowing in or out of a tank. This helps explain why it takes time to detect changes in strategic performance. Even substantial changes to the in-flows and out-flows have little visible impact on the levels of liquid in the tank. Only after some time does it become apparent that change has occurred, and is continuing to do so.

Managers usually want more resources, so wish to raise the inflow to the stock and minimise the outflow. These imperatives are directly captured by the 'stock-and-flow' framework (Figure 8 overleaf) at the heart of the method known as system dynamics (Forrester 1961). The time-path of the resource level for 'customers' is shown on the graph inside the central tank. Customers are being won by an in-flow through the 'pipe' entering from the left, and the initial *rate* at which this resource is growing

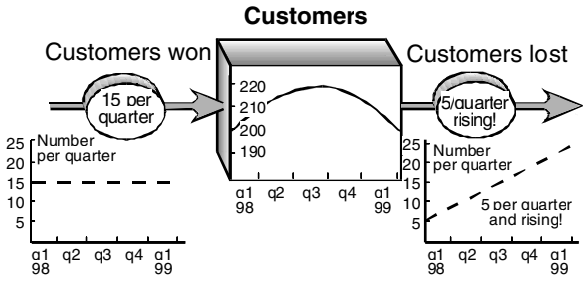
Table 1
Core resources to build a brand

Resources	Units	In-flows and out-flows	Units of in- and out-flows	Typical drivers
Consumers interested	people	new consumers aware	'000 people per month	advertising, product availability
		consumers losing interest		interest in other products
Stores stocking the brand	stores	new stores stocking the brand	stores per month	consumer-demand, sales force, price
		stores de-listing the brand		more valuable use for the shelf space
Salesforce	people	new hires	people per month	salaries, hiring effort
		resignations		pressure of work, sales commission

Inspection Copy

is shown in the oval window onto the pipe. The time-path for this rate of in-flow appears on the time-chart below the pipe, and is a constant 15 customers per quarter. Similar diagram elements capture the out-flow of customers from the right of the stock – this loss, though starting at a low rate of five per quarter, is rising steadily.

Figure 8
Building, and losing, the customer-base resource



(The units of in-and out-flow are always the units of the resource 'per time-period' and the time-slope of the resource at any moment is the net of in- and out-flows).

Figure 8 starts to explain why the time-path of performance is rarely intuitively obvious – it takes only simple changes to gains and losses of resources to generate a quite complex trajectory for any resource-level. Here we start in quarter 1, 1998, enjoying a *net* gain of ten customers per quarter, by quarter 3, losses equal gains, and our customer-base is static, and by quarter 1, 1999 we are suffering net *losses* of ten customers per quarter – 25 minus 15.

Bearing in mind that accumulation and depletion are happening constantly and simultaneously to *all* the firm's resources, a wide variety of behaviours may readily arise – exponential growth or collapse, limits to growth, boom-and-bust, cyclicality, and so on.

Whilst Figure 8 may seem unfamiliar, the process it describes is very common and well understood. If you start the month with £2,000 in your bank account, receive payments of £5,000 during the month, and pay out £4,000, it should be no surprise that you end the month with a balance of £3,000.

This simple process applies to anything that accumulates and depletes, whether cash, customers, staff, capabilities, reputation or morale. It has profound implications for explaining firms' performance:

- ***If performance depends on resource-levels, and these accumulate and deplete over time, there is no way to explain performance at any time except by knowing all gains and losses to all resources over the entire history of the firm (Forrester 1961; see also equation 2 in the Technical Appendix).***
- ***There is similarly no way to produce a confident view of future performance without estimating how those gains and losses will develop.***
- ***There is no way for management to alter the strategic performance of the firm except by actions that impact on resource-flows*** *(though short-term performance can be changed by making simple allocation choices, especially between expenditure and declared profits).*

The first observation is not as daunting as it may seem. First, we generally know, or can find out, the levels of resources at relatively recent points in our history, so it is not necessary in practice to go back to the origins of time! Second, it is often possible to estimate the gains and losses of the key resources over the recent past. All that is needed then is the effort and patience to calculate the net gains or losses, and today's resource-levels and performance are explained. Furthermore, estimates of future rates of gain and loss for strategic resources will give good forecasts of resource-levels and earnings – indeed, this is the *only* means to obtain such forecasts.

Characteristics of strategically valuable resources

The characteristics that resources must possess if they are to provide sustainable advantage are well-established in published research on strategy (see references). Resources must be *durable,* should not be *mobile* or *tradeable,* should not be easy for rivals to *replicate* or to *substitute* with alternatives. Finally, they should be *complementary*, ie capable of working well together – for example, a great new technology product is not much use if the firm's distributors lack the skills to support it and have no access to the customer segment that may want it.

These may seem reasonable tests of whether any strategic resource will offer advantage, but they suffer two problems. First, none of the criteria is black-and-white – each applies *to some degree.* Few resources are totally durable, absolutely non-tradeable, never replicable or impossible to substitute. Second, whether a resource is durable, mobile, replicable and substitutable is fundamentally a *dynamic* question: firms always face the problem of the *rate* at which

Microfiche Copy

they, or rivals, may be able to change resource-levels, in the manner described in Figure 7.

These established but static criteria for resource advantages limit the usefulness of another common idea in strategy, namely that owning resources creates 'barriers to entry' against rivals. Characterising resource-ownership as a barrier to entry is a poor description of reality – firms frequently participate in an industry to some extent with *a little* of each strategic resource, compete more strongly with *more* of each resource, and build competitive advantage by *building up* these resources. Strategic resources are therefore not so much barriers to entry as 'hills' of varying height and steepness, which firms must climb and from which they can compete to a greater or lesser degree, depending on how far they have climbed.

Complementary Resources

The last of the conditions given above for strategic resources to provide advantage – that they work well together – is particularly challenging, not least because the nature of 'complementarity' is not well specified, and analytical methods for capturing interdependence between resources are not well developed.

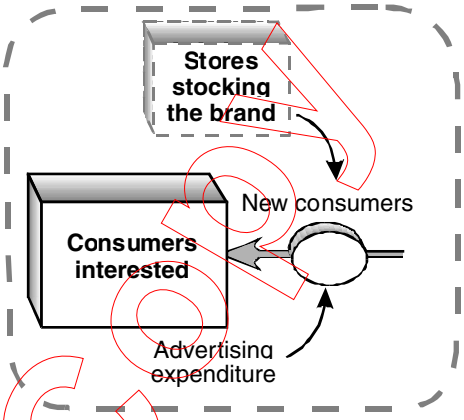
It is possible to shed some light on this question, however, once it is appreciated that ***managers use resources they already have to develop others they need***. This is not an expression of choice on the part of managers – it is unavoidable. There is no way to build any resource without making use of others that already exist. Marketing staff need a credible product to build a customer base, sales people cannot sell a product unless cost-effective production capacity enables them to offer a competitive price, recruiters need a good reputation in the employment market if they are to hire the necessary staff, and so on. Even for a start-up, the entrepreneur appears to start with nothing, but nonetheless depends upon some vital intangible resources, such as credibility with investors.

This process of interdependence can be illustrated by returning to the case of BrandCo. It is possible that the sales force devoted to this product can be allocated or reallocated quickly; so, unlike other resources, its level can be adjusted immediately. So just two resources remain to be built – consumers and stores. Consumers are stimulated by advertising expenditures, but also by the brand's visibility in stores as distribution widens (Figure 9).

Simultaneously, the rate at which new stores are won over to stocking the brand depends on the size of

Figure 9

The rate at which consumers become interested in a brand reflects advertising and availability



the sales force, but also upon the number of consumers who are interested in the brand - no consumer interest implies no retail sales, so no profit opportunity for stores (Figure 10).

Figure 10

The rate at which stores stock a brand reflects sales effort and consumer interest

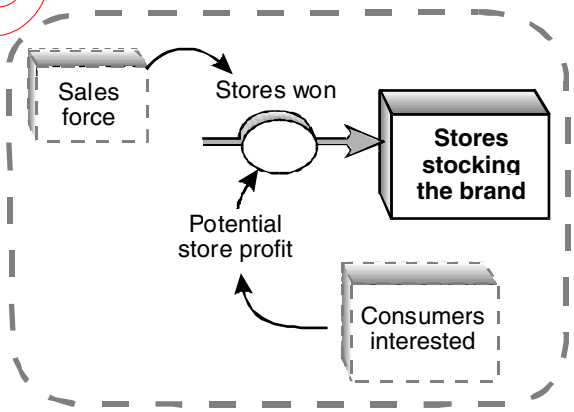


Figure 11 combines these dependencies in brand-building to create a composite 'system' for the business. Although the picture may look daunting at first, each connection has the precise and practical meanings described with Figures 5 and 8 – the thick flow-arrows (stores won, new consumers) indicate that the resource stocks are increased by in-flows, whilst the thinner connections mean simply that one item can be estimated from others. So, for example, the number of stores next month is the number this month plus any gained during the month, whilst sales volume can be estimated from the number of consumers

Insight Copy

interested in the brand and the availability of the product in stores.

Figure 11
Interdependence between resources in building a brand

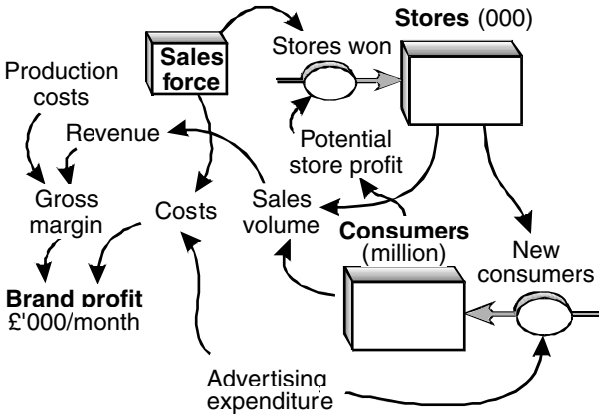


Figure 11 is known as the '*strategic architecture*' of the firm, or more formally as a '*dynamic resource system view*'. The performance of this particular brand-building system will be explained in more detail later, but before doing so, two features of interdependence between resources need to be clarified.

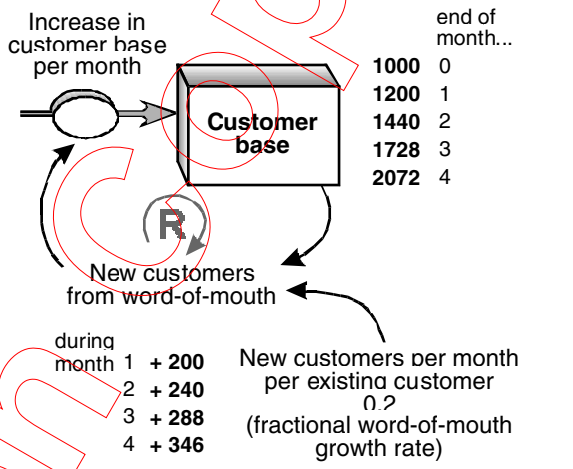
Complementarity between resources – type R: reinforcing feedback

Figures 9 and 10 offer the means to put some precision on the notion of 'complementary' resources. Each describes separately how the *rate* of growth for each resource depends on the current *level* of other resources in the system. Such systems have an interesting and powerful new characteristic to add to the accumulation and depletion of resource-stocks. Since the growth of each resource is accelerated by the existence of the others, the system is capable of *reinforcing its own growth*.

The power of such feedback can be illustrated with a simpler structure concerning just a single resource – the subscriber-base for an internet-service provider (ISP). Although it has been noted that resource growth-rates depend upon the levels of other resources, it is also possible for growth to be driven by the current level of the *same* resource. For an ISP, the mechanism at work is 'word of mouth', by which customer-base growth depends on the current level of that same customer-base.

Figure 12 lays out this reinforcing feedback for the ISP, and shows how its dynamics can be quantified. Each month the number of new customers is calculated from the current stock of customers, multiplied by the word-of-mouth fractional growth rate (0.2 per month). The values on the right record how the stock accumulates by simply adding these new customers to those already in place.

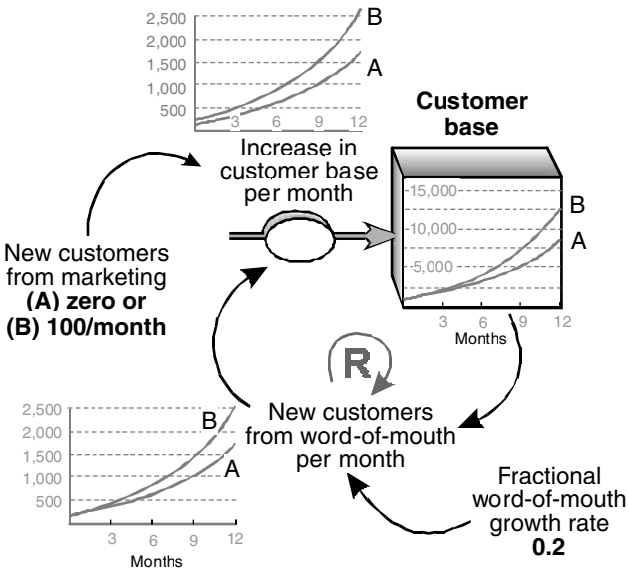
Figure 12
Reinforcing feedback grows the customer base of an internet service provider



Note: The 'R' inside the feedback loop denotes that the structure 'reinforces' its own growth – once it starts increasing, growth will accelerate.

This system is capable of accelerating quite quickly, exhibiting exponential growth. However, such a firm would be unlikely to rely solely on word-of-mouth, so it may be interesting to see the effect of marketing

Figure 13
The time-path of reinforcing growth for an ISP



Inspection Copy

efforts too – say sufficient to bring in 100 new subscribers per month. Figure 13 shows how this customer-base will grow, either with word-of-mouth alone (line A) or with this additional in-flow of new subscribers from marketing (line B).

This experiment offers an interesting observation – using marketing to bring in 100 new subscribers per month may not seem important in the context of what has become a firm with 12,500 customers. However, without it, there would have been fewer than 9,000 – an increase of 3,500, although marketing only *directly* added 1,200 customers during the year.

Although this example has demonstrated the power of reinforcing feedback around a single resource, the same consequences can arise from positive feedback within a multi-resource system, such as the brands example. However, self-reinforcing feedback also has a dark side to its character – it is just as capable of driving exponential *decline* as it is of causing growth.

What happens, for example, if the number of BrandCo's consumers declines for some reason? The potential profit available to stores falls, causing some to stop stocking the product. The brand is then less visible to consumers, and still more of them forget about it. Lower revenues force the firm to cut advertising and the brand collapses until both consumers and stores have forgotten it (Figure 14).

The contrast between these two behaviours of reinforcing feedback is most starkly demonstrated where there is close interdependence between two types of resource, one of the most common being the ties between staff and clients in professional service firms. Whilst, say, an advertising agency is driving forward on a growth path, great creative staff are joining and great clients are signing up for their service. A small reversal, however, such as losing a major client, can trigger key staff to leave, taking further clients with them, and so on. The histories of the advertising agency and public relations sectors are replete with dramatic cases of this process.

Complementarity between resources – Type B: balancing feedback

Whilst the existence of certain resources can enable others to grow, complementarity may also arise in the form of one resource constraining the growth of others. Consider what happens to our ISP if it under-invests in capacity – servers, bandwidth and so on. Assume we can specify this capacity in terms of the 'maximum number of subscribers who can be provided with good service', without worrying about the details of hardware requirements.

Figure 15 shows how this firm might perform during the early months, with no word-of-mouth, when marketing is bringing in a steady new stream of subscribers to utilise the initial capacity, capable of serving 10,000 subscribers.

Figure 14
Contrasting behaviours of reinforcing feedback

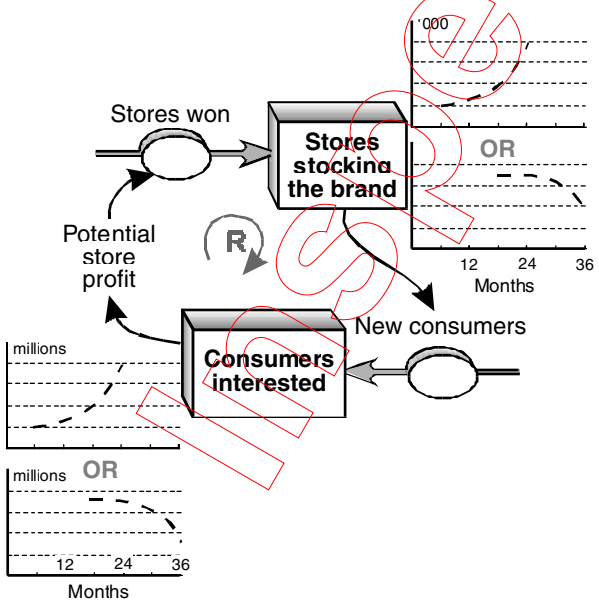
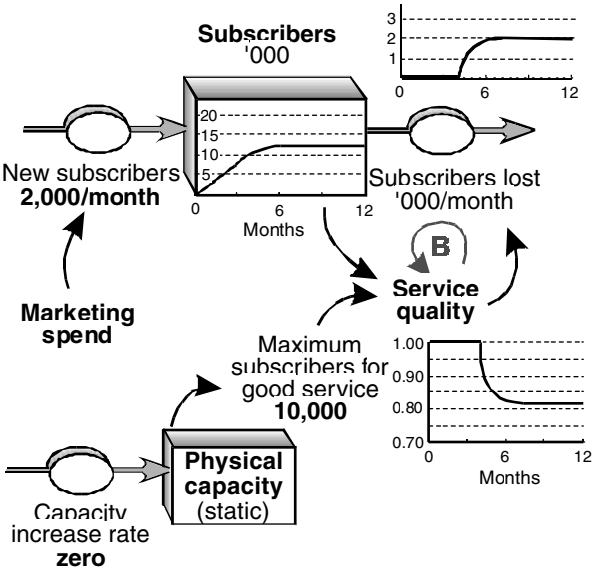


Figure 15
Resource-balance for an Internet service provider



Inspection Copy

Any increase in subscribers to a level above the firm's capacity causes service quality to drop, so subscriber-losses rise, thus reducing the subscriber base back towards a level nearer to the capacity limit. This form of interdependence is known as 'balancing feedback' – hence the 'B' in the middle of Figure 15 – so-called because, unless prevented, it brings resources into balance.

It may seem puzzling that the resource level has stabilised *above* the firm's level of service capacity. But with no excess resource, there would be nothing to cause an out-flow to occur! Taken to an extreme, this mechanism explains why some firms manage to sustain customer-numbers well beyond their capacity to cope for extended periods of time – the excess is simply 'churned' through the system continuously, with angry customers who leave being immediately replaced by others who do not yet know how stretched the firm is.

(Those who examine Figure 15 very closely might conclude that there is actually no feedback at all – the connections go from subscribers to service quality to subscribers lost, but no further. The only connection from subscribers lost to subscribers appears to be the flow-arrow, but this is going the wrong way! In fact, the causality implied by the flow-arrow does go the right way, since any outflow causes a decrease in the resource-stock – 'subscribers today = subscribers last month minus subscribers lost and plus subscribers gained')

Self-limiting resources – a special case of balancing feedback

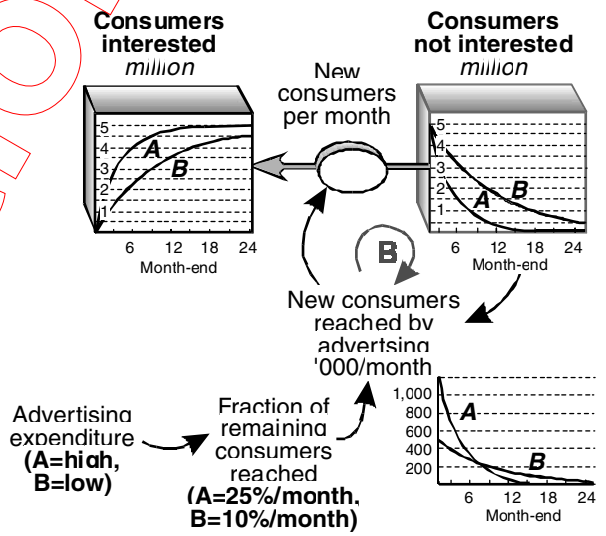
The ISP example above illustrated the special case of reinforcing growth – when it concerns only a single resource. Balancing feedback too can apply to a single resource, constraining its growth. Returning to our brand-building example, consider what happens if the advertising efforts are successful for a number of months. At some point, nearly all the consumers who *might* like the brand actually *are* interested in it. Advertising comes up against diminishing returns, and it takes ever-greater efforts to reach the dwindling pool of potential consumers.

This notion of 'potential' resources can be used to quantify the growth-limiting effect. Actual consumers can be developed only from the potential population, so the smaller that pool becomes, the slower is the rate at which we can develop them. Figure 16 shows this effect for two different rates of advertising expenditure (assuming both that store-presence is not helping to build awareness, and that consumers do not lose interest once they are won).

Similar limiting mechanisms constrain many resources, from tangible items such as customers, qualified staff, or distributors, to the soft, intangible items such as staff skills, cost-efficiency, morale, or reputation (eg, the higher one's reputation, the harder it becomes to drive it any higher).

This observation that there is nothing more to be gained from further efforts, once all potential has been achieved, begs the question as to why BrandCo cannot simply stop its advertising, training, or other resource-building efforts. Usually, such efforts must be sustained, because there is continuous decay of these resources. BrandCo cannot simply stop advertising, because all the time that it is making these efforts to push new consumers into the 'interested' category, others are losing interest again and flowing back along the pipe in Figure 16.

Figure 16
Balancing feedback limits the growth of a single resource



Adding such attrition to resource-building time-paths has two implications. First, the higher the stock of the resource, the greater in absolute terms is the back-flow – eg if 10% of consumers lose interest each month, we lose 500,000 from a consumer-base of 5 million but only 100,000 from a consumer-base of 1 million. Secondly, the faster such 'forgetting' takes place, the more effort must go into replenishment. This is why, for example, staff training consumes considerable, continuing effort and costs in sectors such as fast-food, where

Inspection Copy

staff attrition is high, since departing staff take their skills with them.

Performance of the resource-system

Figure 11 is more than just a picture of links in the firm's strategic architecture – it is an active tool to which numerical estimation can be applied. To illustrate, Table 2 and Figure 17 quantify the story of a specific brand launch strategy in the context described earlier. (The scenario includes further effects, not covered in detail here, notably: diminishing returns to advertising; diminishing returns to sales efforts as the largest stores are exploited by the sales force leaving only smaller stores to be won; consumers losing interest in the brand and some delay for advertising reach to build up.)

At first, the firm invests in advertising, but allocates only a small salesforce, believing that consumer pull alone should make the brand take off. However, after nine months (*A*), there is little sign of up-take by stores, so management doubles the salesforce allocated to the brand. This increases costs somewhat, keeping brand losses at approximately £0.5m per month.

By month 15 (*B*), stores are starting to take the brand on, but the salesforce complains that low consumer demand provides too little retail profit for stores to find the brand attractive to stock. Since the brand is becoming profitable by this point, management decide it is worth the risk to double advertising to £0.8m/month. Growth in consumer interest is stimulated once more, enabling the salesforce to continue gaining stores.

By month 24, (*C*) management decides that consumer interest is getting about as high as they might hope to sustain, and looks to improve profitability by cutting advertising spend to £0.5m/month. In spite of this reduction, consumer interest does not fall, being supported by the brand's increasing presence in stores. (The mutual reinforcement between growth of consumers and stores is now working strongly enough to counteract the tendency of either consumers or stores to lose interest in the product.) The brand stabilises, with substantial awareness and store-penetration delivering profits of £1.7m per month.

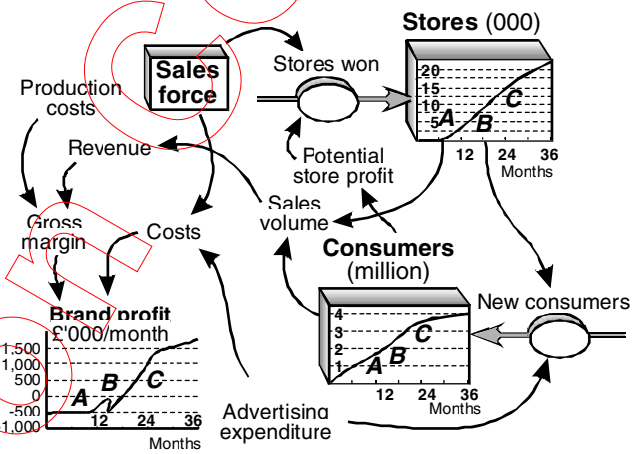
Two key issues arise from Figure 17.

- First, this strategic architecture reflects the earlier observations about financial performance - the profits of this product 'hang off the side' of the brand's strategic architecture, rather than being a part of it. (For this firm, the cash-flows from this one product are not a life-and-death matter. Where cash-flow is genuinely critical – not just important – as for an entrepreneur's new venture or a desperate turn-round case, cash can and must be included. Cash is treated with the same stock-and-flow framework used for all other resources.)

Table 2
Advertising and sales effort scenario

Time-period	Advertising £'000/month	Sales force people
Months 1-9	400	25
10-15	400	50
16-24	800	50
25-36	500	50

Figure 17
Quantifying the rate at which a brand builds, depending on advertising and sales policies



- Second, the time-paths for consumers and stores don't seem to show any interesting or important dynamics – they just grow over time. However, this is an inevitable feature of resource-stocks, given that any change is incremental to what has been accumulated previously. It becomes clear that several important things are indeed happening to these resources when one looks at the *flow-rates* (Figure 18).

Experience in applying the dynamic resource-system view (DRSV) method to solve real strategy challenges has exposed the fact that very few firms have good information on these rates of gain and loss, not just over history, but even currently. For many

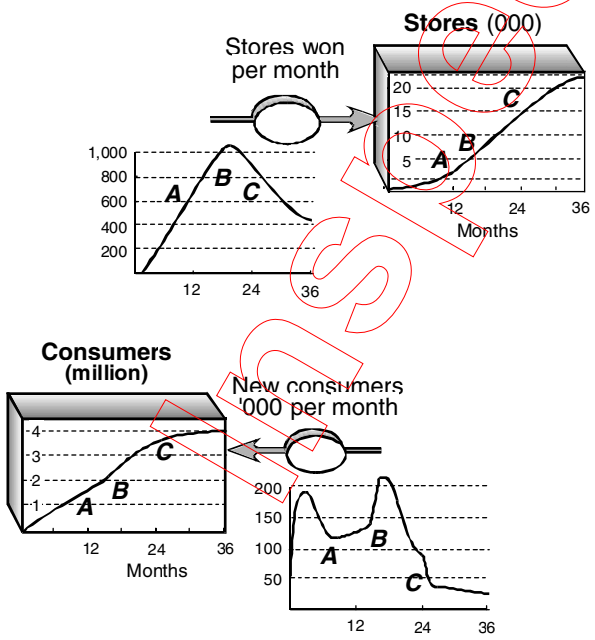
Uncorrected Copy

resources there may be two or more important flows (one or more inflow and one or more outflow). Lack of good information on flows thus becomes still more serious: if we know only the history of our total customer-base, but have no idea what happened separately to gains and losses, we are in no position to make well-reasoned policy choices to start to improve this resource over time.

These two issues together explain why managers can typically do little to alter underlying performance in the short term. It is difficult to make substantial changes to the levels of strategic resources, and without substantial change, underlying performance simply reflects these 'sticky' resource levels. The only immediate discretion is to allocate revenues between expenditures and declared earnings (the financials to the left of Figure 17). Any such allocations will, of course, have *long-term* implications for future resource-levels, since they affect rates of accumulation and depletion. (Incidentally, this is a worrying aspect of the increasing pressure on managers to keep declaring improved earnings – short-term financial reallocations are always possible, with little immediate effect on resource levels, and hence underlying performance. However, if such inattention to resource-depletion continues for an extended time, the underlying resource-base is damaged, and performance becomes unsustainable.)

Figure 18

Understanding performance dynamics is highlighted by tracking resource *flows* through time



The time-paths of consumers won and stores won in Figure 18 show with great clarity why the two dominant resources have followed their specific trajectory over the product's 36-month history.

Finally, note that every number reported here is a reflection of the specific, quantified relationships that apply only to the case of BrandCo. There are no general conclusions that can be transferred to other situations from this or any other model (eg 'it is always best to invest first in heavy advertising, then commit sales effort later'). This observation may seem dispiriting, since check-lists of best practice, drawn from high-profile case-stories, are so often offered to demonstrate standard solutions to widespread problems. DRSV suggests instead that every case is unique, and has *its own* high performance solutions (Glucksman et al 1998). Therein lies a liberating message – if every firm's situation is unique, and the performance differences between good and not-so-good strategies are considerable, opportunities for radically-improved performance may be found from mastering the strategic architecture and using it to seek good strategies for the future.

How to apply this approach

The principles illustrated above can be applied to any type of profit or not-for-profit enterprise. Whilst the strategic architectures for the ISP provider and the brands business were chosen for their compactness, it is possible in most cases for relatively simple, high-level architectures to capture the essence of firms' performance over time. Indeed, the *dynamics* such architectures highlight can provide more insight than even the most detailed and sophisticated spreadsheet planning models.

The major steps in applying DRSV to practical cases are as follows:

- Specify clearly the time-path of the strategic challenge confronting the firm, whether an opportunity to be taken or a problem to be confronted (eg see figures 1-4 above).
- Identify and define the strategic resources that must be developed, defended and connected if the challenge is to be met.
- Select from this list the three or four tangible resources at the core of the business model that must be built and sustained (see Table 1). Making this selection can be tricky. One tip is to avoid abstract or obscure items – 'customers', 'staff' and 'products' are much more concrete, useful items than 'brand',

Inspection copy

'commitment' or 'focus' (which are hard to define as resources in any case). A second tip is that the selection is likely to include one or two resources associated with *supply* of the product or service (production-capacity, staff etc) and one or two resources determining *demand* (customers, clients, dealers, etc) Whilst it is not possible to provide here a precise list for every eventuality, Table 3 offers some resource-selections that may apply in typical cases.

- For each item, specify and measure the inflows and outflows, if possible separating these two items and collecting recent history on each.
- For each resource, identify which of the other resources drive or constrain its gains or losses (see Figures 9 and 10), and identify two or three other key forces driving these flows, whether policy choices, such as spending on training or advertising, or exogenous items such as disposable income or final-product demand.
- Combine these pictures into a composite resource-map (as in Figure 11).
- Add the time-charts for as many items on the resource-map as possible, seeking to identify in particular the *dependency* of each item on those that feed it (see Figures 17/18, but with time-charts for additional items in the picture). This stage of agreeing with the management team the reasons why items change as they do can be challenging – a typical reaction is 'how can you possibly know why customer-gains or staff losses behave as they do?' The response is simple – every time a manager makes a decision about pricing, marketing, hiring, product development and so on, she is making implicit assumptions about exactly such relationships: all we are doing here is getting those assumptions out in the open. Not only is this often a novel experience for the team, it is often novel also for the individual, so no-one should feel embarrassed at having no instant answers to such questions.
- Identify the key decision-levers in the system. For BrandCo, these include advertising spend, salesforce and pricing. For the ISP, levers include marketing and increases to capacity. Evaluate alternative 'stories' of co-ordinated sequences of decisions through time, as in the example under 'Performance of the system' above, and Figure 17. In the process, look out for unintended consequences, such as stimulating customer-

Table 3
Typical core resources for a range of sectors

	Resources	Drivers of gains and losses
Publishing/media	Readers/viewers	Quality of content from editorial staff
	Advertisers	Readership number and quality
	Editorial/production staff	Editorial policy
Capital equipment manufacturing	Installed base	Reputation for equipment performance
	Production capacity	New capital expenditure
	Installation capacity	Pressure on installation staff
Professional services	Clients	Quality of current work, reputation
	Professional staff	Pressure of work, advancement
	Services	Knowledge acquired from clients
Banking	Account-holders	Interest rates, quality of service
	Branches	Financial viability
	Service staff	Pressure of work, training support
	Products	New product development efforts
Insurance	Policy-holders	Sales staff, quality of policy administration
	Agents	Potential customer-base
	Policy administration staff	Hiring and training
Telecoms	Subscribers	Call tariffs, switching costs
	Network capacity	Obsolescence, new investment

Insight Publishing

demand that cannot be fulfilled, or building up work that staff cannot cope with.

It is vital throughout this stage that the team continues to focus on the *scale* and *timing* of this emerging story, both for the decisions that will be taken and the consequences of the plan. By this we mean: who will do what, when, and how much, watching out for which indicators that their part of the plan is on track, and with what resulting time-path of business performance (Figures 8 and 17).

> ***Warning!***
> *It is imperative to beware of a serious risk – capturing the current strategic architecture inevitably focuses attention on the status quo, so the team may fail to explore possibilities to adapt or redesign that architecture into a new form capable of radically improved performance. In every case, the team should challenge whether the strategic architecture that emerges from this process is indeed the best architecture to deal with the issues and opportunities they face. If it seems that it may not be the best, the stages listed above can be repeated for novel architectures and tested 'on paper' before committing to radical, possibly risky innovations.*

Wider implications and further developments

From the core frameworks described above, a wide array of further developments become possible:

- ***The dynamics of rivalry can be captured and quantified*** in order to improve the firm's influence over explicitly competitive challenges. These include the race to develop and capture new customers, to encourage rivals' customers to switch, and to win the battles for other contested resources, such as staff and distribution channels. For fragmented industries, firms may be grouped into clusters with similar resource-attributes and policies in order to capture evolving competitive conditions and industry structures.
- ***The critical influence of certain intangible items on firm performance can also be captured and assessed***. Examples include 'quality' features of tangible resources, such as customer-value, staff-experience and product-functionality. Other intangibles, though, are more independent, such as morale, reputation and investor-support. A further 'soft' category concerns the firm's *capabilities* in key resource-building tasks, such as marketing, product-development and training. These and other soft variables are increasingly being captured by firms. They are essential elements of the strategic architecture, and their impact on performance dynamics can be estimated.
- ***A robust structure for the firm's strategic architecture points strongly to both the high-leverage decision points and key indicators of future performance*** (often resource-flows). The business resource-system can exhibit complex and often counter-intuitive behaviours. Consequently, choosing appropriate performance measures, both overall and for individual components, becomes tricky. It is similarly difficult to arrive at simple goals and policies for growth of the firm and its parts. DRSV offers an integrated picture of the whole enterprise, enabling the key performance indicators to be identified, and pointing to goals and policies that are likely to realise the potential of the business.
- ***Finally, DRSV can be readily extended to deal with issues that cross the multiple activities of larger corporations***. For clarity, this article has focused entirely on capturing the mechanisms driving performance dynamics for a single-business firm. However, diversification, vertical integration, mergers and acquisitions, alliances and geographic expansion, can all be tackled, along with the control and co-ordination mechanisms that direct the strategies of such complex corporate entities.

Conclusion

This article illustrates the core concepts of the dynamic resource-system view of strategy using some simple cases. It is nevertheless hoped that some of the potential power of this rigorous, fact-based approach to developing strategy is apparent. Even this core of the strategic architecture is capable of capturing two critical features of business reality for many organisations:

- that performance depends upon strategic resources, whose behaviour over time depends on rates of gain and loss, and
- that performance of the entire system reflects what can be a complex web of interdependencies between these resources in a manner specific to each case.

Strategic plans and reports often fail to capture either of these fundamentals. That many companies do,

Inspection Copy

somehow, manage to perform reasonably well is a tribute more to the skill and intuition of experienced managers than to the value of many strategy tools. It is no longer sufficient to rely on the intuition of airline pilots to take us safely between the continents. Similarly, managers now need to adopt the dynamic approach to strategy more formally than in the past if they are to guide the enterprises on which people's livelihoods and careers, even their health and family stability, depend.

Kim Warren is a Teaching Fellow in Strategic and International Management at London Business School. He is indebted to his colleague Professor John Morecroft for introducing him to the concepts on which DRSV is built, and for long-sustained support, encouragement and contribution to the ideas in this article.

References

Barney, J.B. (1991) Firm Resources and Sustained Competitive Advantage, *Journal of Management,* 17: 99-120.

Dierickx, I. and Cool, K (1989) Asset Stock Accumulation and Sustainability of Competitive Advantage, *Management Science*, 35, pp1504-1511.

Forrester, J.W. (1961) *Industrial Dynamics*, Cambridge MA: Productivity Press.

1 Glucksman M., Driek, D., Finskud, L., Marshall, N.H., Reyner, M.J. and Warren, K. (1998) The End of Voodoo Brand Management, *McKinsey Quarterly*, August 1998.

Grant, R.M. (1995) *Contemporary Strategy Analysis,*. 2nd Edn (Chapter 5), Cambridge MA: Blackwell.

Mahoney, J. and Pandian, J.R. (1992) The Resource-Based View within the Conversation of Strategic Management, *Strategic Management Journal* **13**: 363-80.

Peteraf, M.A. (1993) The Cornerstones of Competitive Advantage: a Resource-Based View, *Strategic Management Journal* 14: 179-192.

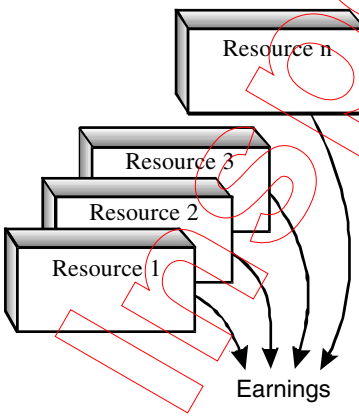
Wernerfelt, B. (1984) A Resource-Based View of the Firm, *Strategic Management Journal, 5, 171-180*

Technical appendix

The principles outlined in this article can be formalised mathematically, as follows:

1. **'Profitability Π at time T depends on the levels of strategic resources R_1 to R_n, to which the firm has access at that time.'**

Diagrammatically:

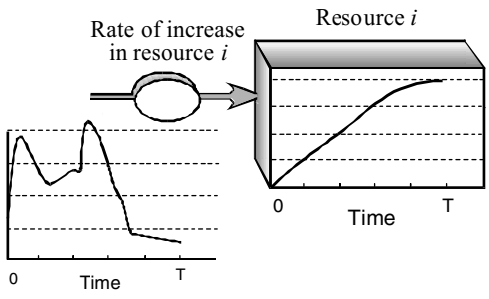


Mathematically:

Eq.1 $$\Pi(T) = f\left[R_1(T),..,R_n(T)\right]$$

2. **'The current level of any resource R at time T reflects its historic rates of accumulation r since time t=0'**

Diagrammatically:



The value of resource *R* at time *T* is equal to the total *area* under the curve for its net inflow since time *0*.

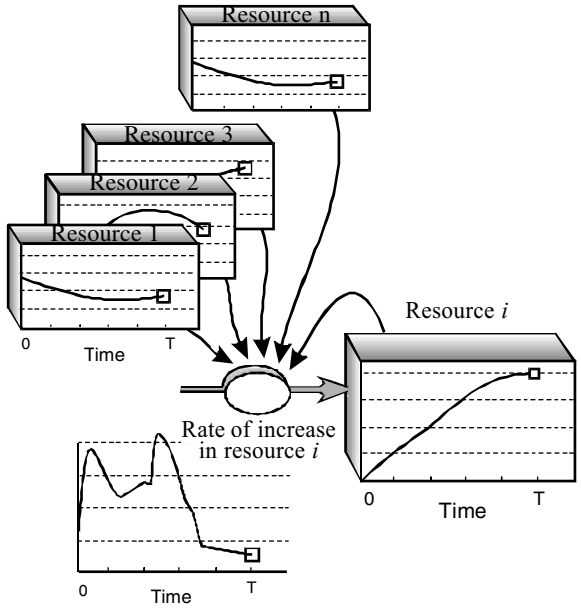
Mathematically:

Eq.2 $$R_i(T) = \int_0^T r_i(t)dt + R_i(0)$$

Inspection Copy

3. **'The rate of accumulation r_i of resource R_i at time T is a function of all resources to which the firm has access at that time, including R_i itself.'**

Diagrammatically:



Mathemetically:

Eq.3 $$r_i(T) = f_i\left[R_1(T),..,R_n(T)\right]$$

These three equations taken together specify the simplest representation of the firm as a dynamic resource system. A more complete representation requires additional formulations to capture rivalry and capabilities. The values of the variables at the points where curved connecting arrows meet is given by the single composite function for that variable (Eqs 1 and 3). For ease of estimation, these functions may be broken down into further sub-functions – eg

earnings = revenue – costs

where:

revenue = a function of certain resources …

and:

costs = some function of other resources

This build-up of the functions determining resource-flows is captured diagrammatically by intermediate variables in the structure, such as 'potential store profit' in Figure 11.

Inspection Copy