CHAPTER 3

Innovation as a Core Business Process

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LEARNING OBJECTIVES

By the end of this chapter you will:

- Understand innovation as a process not as a single event.
- Recognise the key stages involved in the process.
- Appreciate the different influences which can shape the way the process operates.
- Identify key capabilities involved in managing the process.

3.1 THE INNOVATION JOURNEY

Imagine you are about to undertake a voyage, travelling from where you are to some distant place. Let's assume we are still not in the Star Trek era of instant teleportation and so we need to think ahead, plan the journey, try to anticipate obstacles and challenges which may crop up during our trip. And, of course, the further we have to go and the less well known the landscape along the way the more we need to think about uncertainty and try to plan for it. It's one thing to take a boat trip across the bay, never out of sight of land. But it's quite another to travel to the other side of the world. We need to think about maps for the journey – and how to deal with uncharted waters, unexpected storms, surprises and shocks which might well happen to us.

It's the same with innovation. Creating value from ideas doesn't just miraculously happen – it's not like the cartoon images in which a light bulb flashes on above someone's head. Instead innovation is a journey, a process of moving step by step towards the point where we can create and capture value form that idea.

For the start-up entrepreneur it might be the first journey he or she undertakes. But growing that venture over time means that they will need to plan for many journeys, some simple and others complex and involving high levels of uncertainty. The same challenges face anyone inside an established organization, public or private sector – how to make many different innovation journeys? (See **Research Note 3.1**.)

RESEARCH NOTE 3.1 The Innovation Journey

In an important program of case-study-based research looking at widely different innovation types, Andrew Van de Ven and colleagues explored the limitations of simple models of the process [5]. They drew attention to the complex ways in which innovations actually evolve over time and derived some important modifiers to the basic model:

- Shocks trigger innovations – change happens when people or organizations reach a threshold of opportunity or dissatisfaction.
- Ideas proliferate – after starting out in a single direction, the process proliferates into multiple, divergent progressions.
- Setbacks frequently arise, plans are overoptimistic, commitments escalate, mistakes accumulate and vicious cycles can develop.
- Restructuring of the innovating unit often occurs through external intervention, personnel changes or other unexpected events.
- Top management plays a key role in sponsoring – but also in criticizing and shaping – innovation.
- Success criteria shift over time, differ between groups and make innovation a political process.
- Innovation involves learning, but many of its outcomes are due to other events that occur as the innovation develops – making learning often 'superstitious' in nature.

They suggest that the underlying structure can be represented by the metaphor of an 'innovation journey', which has key phases of initiation, development and implementation/termination. But the progress of any particular innovation along this will depend on a variety of contingent circumstances; depending on which of these apply, different specific models of the process will emerge.

To extend our sailing metaphor we wouldn't just make the journey in the same vessel every time. We'd spend time at the end of each journey refitting the ship, repairing any damage but also adding new features to help us with the next voyage. Over time our ship becomes a resilient craft, able to make a variety of journeys because we've spent time building capabilities into it.

At the heart of this book is the belief that we can learn and build those capabilities and our own experience to enable us to manage a variety of innovation challenges. But the key starting point is to recognize that innovation is a process – and that's what we'll focus on in this chapter.

Of course the journey is not simple or even linear. Most innovation is messy, involving false starts, recycling between stages, dead ends, jumps out of sequence and so on. Various authors have tried different metaphors – for example, seeing the process as a railway journey with the option of stopping at different stations, going into sidings or even, at times, going backward – but most agree that there is still some sequence to the basic process [1–3]. And, as Birkinshaw and Hansen point out, the 'innovation value chain' requires different management inputs at different stages [4].

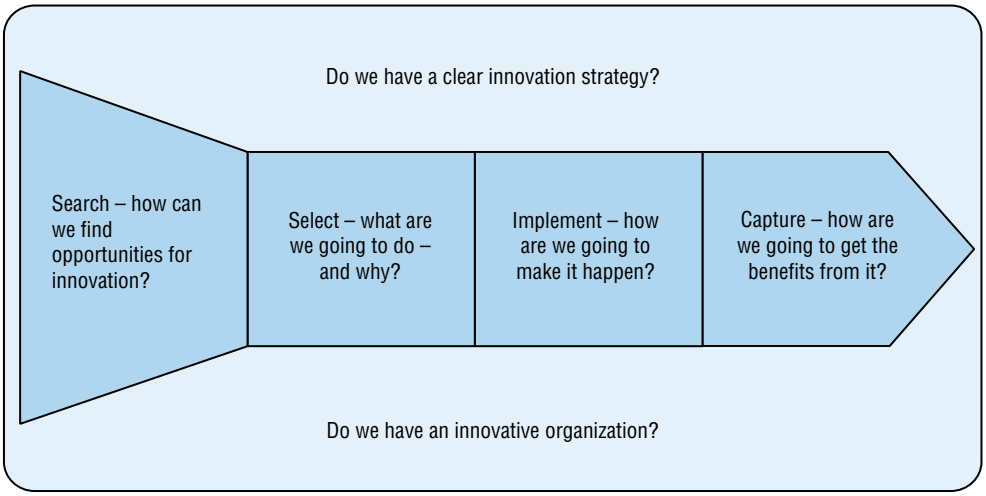

FIGURE 3.1 A model of the innovation process

Whilst there may be many variations in the actual shape of the innovation journey it's helpful to focus on some core common stages and to try and understand the management challenges associated with each of them. At its heart, innovation involves

- **Searching** Scanning the (internal and external) environment for and processing relevant signals about threats and opportunities for change.
- **Selecting** Deciding (based on a strategic view of how the enterprise can best develop) which of these signals to respond to.
- **Implementing** Translating the potential in the trigger idea into something new and launching it in an internal or external market. Making this happen is not a single event but requires eventually acquiring the knowledge resources to enable the innovation, executing the project under conditions of uncertainty (which require extensive problem-solving) and launching the innovation into relevant internal or external markets.
- **Capturing value from the innovation** Sustaining and growing the market and ensuring widespread adoption and diffusion, together with ensuring that value is captured for the innovator.
- **Learning** from progressing through this cycle so that the organization can build its knowledge base and can improve the ways in which the process is managed.

In this chapter, we'll explore some of the influences on this core process and the different variations on the core innovation theme.

Figure 3.1 reproduces the model of the innovation process that we'll be using throughout the rest of the book.

3.2 DIFFERENT CIRCUMSTANCES, SIMILAR MANAGEMENT CHALLENGES

Innovations vary widely in scale, nature, degree of novelty and so on – and so do innovating organizations. But at this level of abstraction, it is possible to see the same basic process operating in each case. For example, developing a new consumer product will involve picking up signals about potential needs and new technological possibilities, developing a strategic concept, coming up with options and then working those up into new products, which can be launched into the marketplace.

In a similar fashion, choosing to install a new piece of process technology also follows this pattern. Signals about needs – in this case, internal ones, such as problems with the current

equipment – and new technological means are processed and provide an input to developing a strategic concept. This then requires identifying an existing option, or inventing a new one, which must then be developed to such a point that it can be implemented, that is, launched, by users within the enterprise – effectively by a group of internal customers. The same principles of needing to understand their needs and to prepare the marketplace for effective launch will apply as in the case of product innovation.

Despite these variations, the underlying pattern of phases in innovation remains constant. In this chapter, we explore the process nature of innovation in more detail and look at the kinds of variations on this basic theme. But we also want to suggest that there is some commonality around the things that are managed and the influences that can be brought to bear on them in successful innovation. These 'enablers' represent the levers that can be used to manage innovation in any organization. Once again, how these enablers are actually put together varies between firms, but they represent particular solutions to the general problem of managing innovation. Exploring these enablers in more detail is the basis of the following chapters in the book.

Central to our view is that innovation management is a learned capability. Although there are common issues to be confronted and a convergent set of recipes for dealing with them, each organization must find its own particular solution and develop this in its own context. Simply copying ideas from elsewhere is not enough; these must be adapted and shaped to suit particular circumstances.

3.3 VARIATIONS ON A THEME

It will be useful to look more closely at some of the ways in which the experience of innovating varies across different sectors and contexts. Different circumstances lead to many different solutions to the challenge of organizing innovation. For example, large science-based firms such as pharmaceutical companies will tend to create solutions that involve heavy activities around formal R&D, patent searching and other tasks, while small engineering subcontractors will emphasize rapid implementation capability. Retailers may have relatively small R&D commitments in the formal sense but stress scanning the environment to pick up new consumer trends, and they are likely to place heavy emphasis on marketing.

Consumer goods producers may be more concerned with rapid product development and launch, often with variants and repositioning of basic product concepts. Heavy engineering firms involved in products such as power plants are likely to be design-intensive and critically dependent on project management and systems integration aspects of the implementation phase. Public sector organizations have to configure it to cope with strong external political and regulatory influences.

SERVICES AND INNOVATION

There are plenty of examples where innovation has led to competitive advantage in services. Citibank was the first bank to offer automated telling machinery (ATM) service and developed a strong market position as a technology leader on the back of this process innovation, while Bank of America is literally a textbook case of service innovation via experimentation with new technologies and organizational arrangements across its branch network. The UK's First Direct bank was established back in 1989 as one of the first telephone banks offering a range of client services on a 24 hour, 365 day basis. It was very successful, attracting over 100,000 customers in its first six months of operation and continuing to grow. Thirty years later and it is still a strong player, having broadened into online banking; it now has around 1.5 million customers and regularly scores amongst the top three banks in terms of customer service, loyalty and other measures. Many other examples can be found in the worlds of insurance, legal services and finance, highlighting the considerable scope for innovation, both from existing players renewing their approaches

(e.g., First Direct was an internal venture of what is now HSBC Bank) and from entrepreneurial approaches such as Zopa (opening up peer-to-peer lending).

Southwest Airlines achieved an enviable position as the most effective airline in the United States despite being much smaller than its rivals; its success was due to process innovation in areas such as reduction of airport turnaround times. This model has subsequently become the template for a whole new generation of low-cost airlines whose efforts have revolutionized the once-cosy world of air travel. In the accommodation sector there is a long history of innovation-driven competition including Hilton and Holiday Inn pioneering the idea of 'system' hotels as packages, through the emergence of 'boutique' offerings (like Citizen M [6]) to today's explosion of home-sharing options like Airbnb.

Retailers such as Benneton and Zara owe much of their success to sophisticated information technology (IT)-led design and production networks ('fast fashion'), which they have innovated over decades. Amazon's disruption of the sector was essentially innovation-led, first through moving to online retailing and then expanding the innovations within that category, pioneering recommendations, delivery services, customization and third-party fulfilment. Having built a huge platform it was then able to leverage entry into other businesses, notably home entertainment and now home automation. The value of big data as a resource with which to innovate was recognized early on by players like UK supermarket Tesco whose loyalty card system paved the way for many of todays 'customer relationship marketing (CRM)'. In fact, as **Case Study 3.1** shows, it was in the retail sector that computers were first applied in business.

CASE STUDY 3.1 The Lion That Roared

It is an interesting reflection that the world's first application of computers in business actually took place in the service sector. In 1947, two managers, Oliver Standingford and Raymond Thompson, working for the UK food company J. Lyons, visited the United States to look at new business methods. They were particularly interested in the potential of computing and met Herman Goldstine, one of the original developers of ENIAC, the world's first general-purpose electronic computer. They saw the potential of using such technology to help solve the problem of administering a major business enterprise and, on returning to the United Kingdom, made contact with a UK team working at Cambridge on a project similar to ENIAC. They summarized their ideas in a report to the Lyons' Board, which recommended that the company should acquire or build a computer to meet their business needs. An immediate outcome was for Lyons to support the Cambridge team with some development money, and on the back of promising results, the Board then committed to the construction of their own machine, which was christened Lyons Electronic Office or LEO. The first business application to be run on LEO in 1951 was a financial assessment program for Bakery Valuations, but its role was soon extended to include payroll and inventory management. It was also used for what we would now recognize as an integrated business information system linking order intake (daily orders were phoned in every afternoon by the shops) and business planning (the order information was used to calculate the overnight production requirements, assembly instructions, delivery schedules, invoices, costings and management reports). As a result of their success with the technology, Lyons were soon involved in outsourcing capacity to other businesses – for example, doing payroll calculations for Ford – and eventually, the company formed a specialist division manufacturing computers, writing software and offering bureau services.

Importantly, we need to remember that the advantages that flow from these innovative steps gradually get competed away as others imitate. Unless an organization is able to move into further innovation, it risks being left behind as others take the lead in changing their offerings, their operational processes, or the underlying models that drive their business. For example, leadership in banking has moved to those who were able to capitalize early on the boom in information and communications technologies; particularly, many of the lucrative financial

services such as securities and shares dealing became dominated by players with radical new models like Charles Schwab [7]. As retailers all adopted advanced IT, so the lead shifted to those who were able – like Zara and Benneton – to streamline their production and design operations to respond rapidly to the signals flagged by the IT systems.

With the rise of the Internet, the scope for service innovation grew enormously – not for nothing is it sometimes called 'a solution looking for problems'. As Evans and Wurster point out, the traditional picture of services being offered, either as a standard to a large market (high 'reach' in their terms) or else as highly specialized and customized to a particular individual able to pay a high price (high 'richness'), is 'blown to bits' by the opportunities of Web-based technology [8]. It became possible to offer both richness and reach at the same time – and thus to create totally new markets and disrupt radically those that existed in any information-related businesses.

Table 3.1 gives some examples of different types of innovation in services, using the same '4Ps' typology, which we introduced in Chapter 1.

There are challenges in service innovation, not least because they are often much easier to imitate, and the competitive advantages that they offer can quickly fade. In services there are fewer barriers to entry or imitation – for example, there is limited scope for intellectual property (IP) protection. The pattern of airline innovation on the transatlantic route provides a good example of this – there is a fast pace of innovation, but as soon as one airline introduces something like a flat bed, others will quickly emulate it. Arguably, the drive to personalization of the service experience comes in part from a recognition that it is only through such customized experiences that a degree of customer 'lock-on' takes place [9]. As **Case Study 3.2** suggests, the idea of 'experience innovation' is not new but highlights the importance of engaging with users early and in a sustained fashion [10].

As the experience of mobile phone providers, online banking and insurance and other utility providers suggests, despite attempts to customize the experience via sophisticated Web technologies, there is little customer loyalty and a high rate of churn. At the same time the lower capital cost of creating and delivering services and their relative simplicity make co-creation more of an option. Where manufacturing may require sophisticated tools such as computer-aided design and rapid prototyping, services lend themselves to shared experimentation at relatively lower

Table 3.1 Examples of Incremental and Radical Innovations in Services

Type of Innovation	'Do Better' – Incremental	'Do Different' – Radical
'Product' – service offering to end users	Modified/improved version of an established service offering – for example, more customized mortgage or savings 'products', add-on features to basic travel experience (e.g., in entertainment system), increased range of features in telecom service	Radical departure – for example, online retailing
'Process' – ways of creating and delivering the offering	Lower-cost delivery through 'back office' process optimization, waste reduction through lean, six sigma and so on approaches	Radical shift in process route – for example, moving online from face-to-face contact, supermarkets and self-service shopping rather than traditional retailing, hub-and-spoke delivery systems and so on
'Position' – target market and the 'story' told to those segments	Opening up new market segments – for example, offering specialist insurance products for students	Radical shift in approach – for example, opening up new travel markets via low-cost travel innovation, shifting health-care provision to communities
'Paradigm' – underlying business model	Rethinking the underlying model – for example, migrating from insurance agents and brokers to direct and online systems	Radical shift in the mindset – for example, moving from product-based to service-based manufacturing

CASE STUDY 3.2 Experience Innovation

In 1865 Thomas Cook was looking for a new offering for his growing travel business. Originally a printer and Baptist lay preacher he'd built his original business organising day trips; his first didn't run too far (the relatively short hop from his home town of Leicester to nearby Loughborough) but by 1845 he'd clearly tapped into a rich potential market; his trip to the seaside at Liverpool was booked by 1200 people and he had to repeat it two weeks later for another 800 happy travellers.

Cook began to extend his trips across the Channel and by 1863 had seen the possibilities of offering people the opportunity to see the (relatively unknown at that time) Swiss Alps for themselves. In doing so he pioneered what effectively became the package tour, organizing not only the travel (by road, rail, boat and even mules) and accommodation but also providing guides to help conduct the tour. His tour was not for the faint-hearted. In her diaries an intrepid young woman, Jemima Morrell described in detail a world of 4 am alarm calls, 20-mile hikes and other challenges – not least of which was also being able to dress for dinner every evening in the hotels in which she stayed! But she clearly felt it was worth it for the experience.

'*The days spent on foot, or by the sides of mules, afford the greatest satisfaction. . . . It was then that, away from the life of the city, we were taken into the midst of the great wonders of nature and seemed to leave the fashion of this world at a distance . . . It was an entire change; the usual routine of life was gone. All memory of times and seasons faded away and we lived only in the enjoyment of the present.*'

Thomas Cook's ideas changed several things. From the point of view of Switzerland it helped transform a poor rural economy into a travel destination; today the Swiss Alps are one of the world's most popular tourist destinations.

But he also created a system-level innovation, much as Henry Ford was to do with the motor car 50 years later. Putting together a successful package tour involves much more than simply arranging travel and tickets. Cook pioneered the complex logistics, arranged for integration of different travel and accommodation options, provided a system of coupons (the fore-runners of traveller's cheques) to help pay for goods and services, developed a network of guides and other support staff and printed brochures not only as sales tools but as a way of engaging customers in imagining and dreaming about the journey they were about to embark upon. In doing so he can rightly be considered one of the founding fathers of an industry which today is worth over $7 trillion.

But perhaps his real contribution was to offer an early example of what is called 'experience innovation'; his efforts helped stage an experience which – to judge by Jemima Morrell's diaries – was hugely valued. It was much more than simply travelling to a destination.

As Joe Pine and James Gilmore point out, the risk with services is that they quickly become commoditized. There are relatively few barriers to entry, there is no deep scientific knowledge barrier, they are often short-lived, being created and consumed simultaneously. Building a successful service business is hard and even when an innovation is offered it doesn't take long for others to copy it. Imitation levels the field once again and so there is strong downward pressure in the industry; very quickly any service becomes a commodity with price as the main basis of competition [10].

One way of meeting this challenge is to move away from commoditization, towards gaining strategic advantage through creating memorable experience. Experiences are not simply labels attached to products or services; they result from careful planning and organising – they are 'staged'. And just like in a theatrical performance what goes on when the audience is in the house is the tip of an iceberg; weeks of preparation, rehearsals, scenery building, lighting design, hundreds of elements need to be brought together to enable the experience. As Pine and Gilmore put it . . . . *leading-edge companies—whether they sell to consumers or businesses—will find that the next competitive battleground lies in staging experiences'.*

Examples of such experience construction can be seen in many places; it underpins the enduring magic of Disney's theme parks, and it runs through the core of performances by Cirque du Soleil which go far beyond the conventional visit to the circus. Companies like Lego and Adidas realise that their products and brands are intimately connected with experience, particularly the storytelling which they and their customers engage with around those artefacts. First Direct's continuing success in maintaining high customer satisfaction levels owes much to the way they have transformed a transaction-based activity like banking into a valued experience.

cost. There is growing interest in such models involving active users in design of services – for example, in the open-source movement around software or in the digital entertainment and communication fields where community and social networking sites such as Facebook, Instagram, WhatsApp and YouTube have had a major impact.

Research Note 3.2 explores further the idea of experience innovation as a way of 'de-commoditizing' services.

RESEARCH NOTE 3.2 The Growth of Experience Innovation

Chris Voss and colleagues from London Business School and the Advanced Institute for Management Research carried out extensive research on 'experience innovation'. This focuses on how service businesses, in particular, are using the creation and delivery of novel and rich experiences to attract and retain customers. A study in 2004 examined 50 organizations in the areas of retail, entertainment and sport, theme parks, destinations and hotels, largely from the United Kingdom, Europe and the United States. The research identified a repeated cycle of investment and management, vibrant experiences, customer growth, profitability and reinvestment that drives profit, which can be seen as the experience profit cycle. The research also examined how organizations are turning services into destinations, compelling places where people visit for an extended period of time, engage in multiple activities and want to return to.

Subsequent work looked in more detail at examples in the United Kingdom and United States, addressing the question of how focusing on the customer experience changes the way services and service delivery processes are designed. It looked at the process and content of experience design. The study involved eight case studies of design agencies and consultancies that specialize in experience design and nine case studies of experiential service providers. The research showed that companies often use the customer journey and touchpoints approach to design experiences. Innovation took place in five design areas: physical environment, service employees, service delivery process, fellow customers and back office support. An important part of the design process is collecting customer insights [11].

SERVICE INNOVATION EMPHASIZES THE DEMAND SIDE

It is important in the context of service innovation to remind ourselves of the definition of innovation – 'the successful exploitation of new ideas'. While this involves invention – the creation of some new or different combination of needs and means – there is much more to getting that invention successfully developed and widely adopted. Central to this is the idea of different kinds of knowledge streams being woven together – about possibilities (e.g., opened up by new technology) and needs (whether articulated or latent). Countless studies of innovation highlight its nature as an interactive, coupling process – yet, much thinking in policy and management practice defaults to linear views of the process and especially to a knowledge-push model.

In the context of service innovation, the search for and use of demand-side knowledge is critical – many services are simultaneously created and consumed, and end-user understanding and empathy are essential to success. This is not to say that new knowledge – for example, of technological possibilities – is unimportant, but the balance of importance in service innovation may be more in the direction of demand-side knowledge.

One consequence of this different orientation is that much of the language that surrounds the discussion of innovation may differ between manufacturing and service contexts. The underlying principles and issues may be the same, but the labels may differ. For example, the term 'R&D' used in a manufacturing context conjures images associated with organized research and development. Search involves reviewing established scientific knowledge (in papers, via patent searches, etc.) and identifying interesting lines of enquiry, which are followed through via designed experiments in laboratories. Small-scale successes may be further explored in pilot plants or via construction of prototypes, and there is a gradual convergence around the final product or process involving an increasing commitment of resources and an increasing involvement of wider skills and knowledge sets. Eventually, the new product is launched into the marketplace or the new process adopted and diffused across an internal context.

The Frascati manual (which takes its name from the location in Italy where a 1963 OECD meeting on the topic of innovation took place) is a widely used reference work for developing innovation and technology policy. It defines R&D as 'creative work undertaken on a systematic basis in order to increase the stock of knowledge . . . and the use of this stock of knowledge to devise new applications' [12]. If we look at the challenge of service innovation, we can see a similar process taking place – search (albeit with a much stronger demand-side emphasis), experiment and prototyping (which may extend the 'laboratory' concept to pilots and trials with potential end users), and a gradual scaling up of commitment and activity leading to launch. Service businesses may not have a formal R&D department, but they do undertake this kind of activity in order to deliver a stream of innovations. Importantly, the knowledge sets with which they work involve a much higher level of user insight and experience. Indeed, in some areas – such as IT (see Case Study 3.1) – service sector players in retailing and finance have set the pace in hardware and software innovation [13]. Similarly, the tools for customer relationship management, which emerged from programs such as store loyalty cards and frequent traveller clubs, are now being adopted by manufacturers trying to move to more of a service orientation.

They are also similar to manufacturing in that much of their innovation-related work is about 'doing what we do but better' – essentially building competitive advantage through a stream of incremental innovations and extensions to original concepts. The distinction made in Frascati between 'routine' – incremental – improvements and R&D also applies in service innovation.

'Servitization' of manufacturing businesses Increasingly what we call manufacturing includes a sizeable service component with core products being offered together with supporting services – a website, a customer information or helpline, updates and so on. This approach, termed 'servitization', represents an example of 'paradigm innovation' of the kind we saw in Chapter 1.

Indeed, for many complex product systems – such as aircraft engines – the overall package is likely to have a life in excess of 30 or 40 years, and the service and support component may represent a significant part of the purchase. At the limit, such manufacturers are recognizing that their users actually want to buy some service attribute that is embodied in the product – so, aero engine manufacturers are offering 'power by the hour' rather than simply selling engines. The computer giant IBM transformed its fortunes in this way; it began life as a manufacturer of mainframes, became active in the early days of the personal computer (PC), but increasingly saw its business becoming one of providing solutions and services. Following a traumatic period in the 1990s, the company has moved much further into service territory and, in 2006, sold off its last remaining PC business to the Chinese firm Lenovo.

Research Note 3.3 gives some more detail about servitization.

RESEARCH NOTE 3.3 Servitization

Andy Neely and colleagues at Cambridge University have been working with a number of companies in the Cambridge Service Alliance, trying to understand the drivers and challenges in this shift (**http://www.cambridgeservicealliance.org**). They identify several reasons for the transition including powerful economic and technological trends.

Traditionally, manufacturing was about producing and then selling a product. But increasingly, manufacturers are bundling various support services around their products, particularly for major capital goods. Rolls-Royce, the aircraft engine maker, still produces high-quality engines, but it has an increasingly large business around services to ensure that those engines keep delivering power over the more than 30-year lifespan of many aircraft. Caterpillar, the specialist machinery company, now earns as much from service contracts that help keep its machines running productively as it does from the original sale.

The emergence of technologies such as 'big data' and remote sensing enables a much richer set of services to be wrapped around a manufacturer's proposition. For example, construction equipment is remotely monitored and the data used to make predictions about engine wear and the need for service and support. GE has models that allow it to recommend to customers the routes their airplanes should fly, so they extend engine life. When planes fly over deserts, the sand causes pitching in the engine, but a different form of wear and tear occurs when planes fly over oceans. So, GE now recommends to its customers how long their planes should fly to the Middle East and when they should switch routes and start flying over the ocean to the United States. These predictive analytic models are becoming more and more widespread in industrial circles, as well as in healthcare, insurance and finance.

THE EXTENDED ENTERPRISE

One of the significant developments in business innovation, driven by globalization and enabling technologies, has been the 'outsourcing' of key business processes – IT, call centre management, human resources administration and so on. Although indicative of a structural shift in the economy, it has, at its heart, the same innovation drivers. In addition, the distinction between commercial and not-for-profit organizations may also blur when considering innovation. While private sector firms may compete for the attention of their markets by offering new things or new ways of delivering them, public sector and nonprofit organizations use innovation to help them compete against the challenges of delivering healthcare, education, law and order and so on [14]. They may often do this in some form of strategic partnership with other players with expertise in key areas.

Even if companies are being 'hollowed out' by outsourcing, the challenges facing the outsourcer and its client remain those of process innovation [15]. The underlying business model of outsourcing is based on being able to do something more efficiently than the client and thereby creating a business margin – but achieving this depends critically on the ability to re-engineer and then continuously improve on core business processes. And over time, the attractiveness of one outsourcer over another increasingly moves from simply being able to execute outsourced standard operations more efficiently and towards being able to offer – or to coevolve with a client – new products and services. Companies such as IBM have been very active in recent years, trying to establish a presence – and an underlying discipline – in the field of 'service science' [16].

The challenge here becomes one of *process* innovation within outsourcing agencies – how they can develop their capabilities for carrying out processes more effectively (cheaper, faster, higher quality, etc.) and how they can sustain their ability to continue to innovate along this trajectory.

INNOVATION IN THE NON-COMMERCIAL ARENA

Public sector organizations are concerned with both process innovation (the challenge of using often scarce resources more effectively or becoming faster and more flexible in their response to a diverse environment) and with product innovation (using combinations of new and existing knowledge to deliver new or improved 'product concepts') such as decentralized healthcare, community policing or micro-credit banking [17,18].

Case Study 3.3 gives some examples of public sector innovation.

These examples remind us that the public sector is a fertile and challenging ground for developing innovations . But the underlying model is different – by its nature, public sector innovation is 'contested' among a diverse range of stakeholders [20]. Unlike much private sector innovation, which is driven by ideas of competition and focused decision making, public sector innovation has different – and often conflicting – drivers, and the rewards and incentives may

CASE STUDY 3.3 Public Sector Innovation

Mindlab was a Danish organization set up to promote and enable public sector innovation in Denmark. 'Owned' by the Ministries of Taxation, Employment and Economic Affairs, it pioneered a series of initiatives engaging civil servants and members of the public in a wide range of social innovations, which have raised productivity, improved service quality and cut costs across the public sector [19].

It ran from 2002 until 2018 when it was replaced by a new organization the Ministry of Business' Disruption Taskforce. The Taskforce is a new type of innovation team: one focused on inciting a digital transformation across the Danish government. Since its inception many equivalents have sprung up around the world, from the OPM Innovation Lab in Washington, DC to the Laboratorio Para La Ciudad in Mexico City to the Human Experience Lab in Singapore.

In the United Kingdom, a number of public sector innovation initiatives have resulted in some impressive performance improvements. For example, in the Serious Fraud Office, an innovation program led to reductions of nearly 50% in the time taken to process cases and a direct financial saving of nearly £20,000 per case. In the area of product innovation, an initiative called Design Out Crime led to the development of two prototype beer glasses that feature new high-tech ways of using glass, so that they feel the same as conventional glasses, but do not break into loose dangerous shards, which can be used as weapons to inflict serious injuries.

The potential for exchanging good ideas and examples of innovation in the public sector led to the OECD setting up a database – the Observatory for Public Sector Innovation – which now showcases over 400 examples from around the world.

https://oecd-opsi.org/case_type/opsi/

be absent or different. In particular, public sector organizations bear a responsibility for ensuring delivery of key services; there is a need for them to balance not only risk and reward but also reliability. An inevitable consequence of this is a tendency to be risk averse because of the implications of innovations failing. Despite this, there is extensive evidence of radical innovation in the public services arena, with especial emphasis on citizen participation, much as commercial service organizations are increasingly trying to engage their customers [21].

There is also the problem of 'centre/periphery' relationships – often much innovative experimentation takes place close to where services are delivered, but the 'rules of the game' are set (and the purse strings often controlled) at the centre. A major challenge in public sector innovation is thus enabling diffusion of successful experiments into the mainstream . This has led to a variety of experiments with different forms of innovation labs and test-beds and a growing interest in 'safe' prototyping [22,23].

NOT-FOR-PROFIT INNOVATION

A similar challenge exists in the world of not-for-profit organizations, those set up to deliver some element of social value. They face the twin challenges of helping deal with significant social needs whilst at the same time pursuing business models which enable a degree of independence from grants and aid funding, allowing sustainability over the long term.

A good example can be seen in the world of humanitarian innovation – the kind of activity seen in response to natural and man-made disasters around the world. Agencies such as the Red Cross, Save the Children and various branches of the United Nations face the challenge of stimulating innovation while also ensuring the delivery of urgently needed support [24]. They do so in a complex ecosystem and in particular try to offer innovation across a number of key areas like food, water, sanitation and hygiene, healthcare and shelter [25]. Despite the crisis nature of their work they attempt to deploy an innovation process which is recognisably similar to those in other sectors; **Research Note 3.4** gives some detail.

RESEARCH NOTE 3.4 The Humanitarian Innovation Process

Innovation in the humanitarian aid sector is extensive but until 2009 was relatively under-studied. An influential report published that year outlined a framework model for the process highlighting key phases of recognition, ideation, concept development, implementation and diffusion to scale [26]. In a subsequent piece of research a series of case studies were mapped on to the framework to explore influences on success and failure [27]. The key findings are outlined in **Table 3.2**.

Table 3.2 Summary of Key Success Factors in Humanitarian Innovation

Factor	Examples
Effective cross-boundary working	• Senior leadership supported a proactive approach to collaboration, particularly with organizations outside the humanitarian system. • Strong partnerships with organizations within and beyond the humanitarian sector were built and maintained. • Active brokering – in successful projects key individuals were responsible for overseeing core relationships and engagement activities and given the necessary time and support for outreach. • Plans and incentives were put in place for the relationship management role to be held by the same individual(s) throughout the project. • A strong 'translation' capacity was present in the innovation team for communicating across end users, humanitarian contexts and technical areas relevant to the innovation (e.g., ICT, engineering). • Staff were recruited from outside the humanitarian sector with strong expertise in a relevant technical area, such as IT, product and service design or finance, to facilitate the cross-pollination of ideas and practices.
Managing across a clearly defined innovation process	• A broad but clear roadmap/plan for the innovation process that struck a balance between structure and flexibility. Milestones were identified and used to monitor progress against this. • A clear set of design criteria that the innovation was seeking to meet. While these criteria could be adjusted or reprioritized in light of new information, the innovation lead clearly identified them throughout the process. • A diverse set of feedback loops that were designed to engage with different stakeholders and fulfil different information needs of the innovation at different stages. • Division of tasks and responsibilities was shifted to best match the stage of the innovation.
Generating and integrating evidence	• Strong internal processes for learning from both evaluations and emerging crises and for generating ideas for improvement out of that learning. • Performance measurement systems and clear protocols and standards were in place and used to support clear comparisons between piloted innovations and what was being achieved with the status quo approach. • Strong emphasis placed on evidence generation and learning, even when a prototype or initial idea turned out to be unworkable. • Effective 'translation' skills in place that enabled the integration of strong technical expertise in an area relevant to the innovation and an understanding of the humanitarian response context.
Engaging with end users and gatekeepers	• Early on in the process, appropriate ways to capture end users' and gatekeepers' needs and incentives for adoption were identified. • Different strategies were used to engage different end users. Advisory groups and partnerships were managed strategically and in different ways at different points in the process. • Participatory approaches were used with affected people in designing innovative solutions to their self-identified problems.
Availability and creative use of resources	• Pump-priming organizational resources available to enable staff to pursue external funding and to support early invention/adaptation activities. • Innovating teams used core funding strategically to enhance flexibility and bridge the gap between potential funding gaps from external sources. • Resources were allocated to a dedicated member of staff to work full-time on the innovation. • Contingency planning and/or scenario analysis was used to identify a number of potential outcomes for the innovation and allow for better informed planning of future funding requirements. • Multiple option approach used to explore financing for scaling of an innovation, including commercialization, ownership transfer to government, core-/grant-funded advocacy and support activities and reallocation of the programme budget to accommodate the new approach offered by the innovation. • The functions of generating and capturing learning were separated and protected from the function of fund-raising and fund management.

(*continued*)

Table 3.2 (*continued*)

Factor	Examples
Effective risk management	• An open and anticipatory approach to risk was maintained: teams looked continuously for potential barriers and used regular meetings or planning sessions to find ways to address these. • Flexible working style allowing dynamic resource allocation and re-allocation to address new challenges as they arose. • Active networking, building connections with other units within the organization or with close partners who could draw on a wide range of expertise to help with backup plans or unforeseen needs. • Some use of scenario planning and other forecasting and mitigation methods to identify broad areas of potential risk.
Creating a culture of innovation	• Staff had space for innovative thinking and clear platforms and opportunities to propose ideas for improvement (e.g., 'innovation pitch' events or an ongoing innovation stream to develop new ideas). • Senior leadership saw innovation as an opportunity to fulfil a new strategic goal or direction. • Changes in the operational context were treated as opportunities to do things differently, providing a launch pad for innovation. • The organization fostered a culture that was open and positive about ideas/contributions. • The organization was open to trialling new ideas or concepts if they showed promise of improving practice. • A feeling of ownership of the innovation was built up within the organization. The initiative was supported across departments.

Source: Obrecht, A. and A. Warner, 'More than just luck. Innovation in humanitarian action', Humanitarian Innovation Fund/ALNAP, London, 2016.

SOCIAL ENTREPRENEURSHIP

'Social entrepreneurs are not content just to give a fish or teach how to fish. They will not rest until they have revolutionized the fishing industry.'

— Bill Drayton, CEO, chair and founder of Ashoka, a global nonprofit organization devoted to developing the profession of social entrepreneurship

Not all innovation is about making money – many examples of social entrepreneurship exist in which the primary aim is to create some form of social value – to make a difference to the world. Examples include Nobel Prize winner Muhammad Yunus, who revolutionized economics by founding the Grameen Bank, or 'village bank', in Bangladesh in 1976 to offer 'micro loans' to help impoverished people attain economic self-sufficiency through self-employment – a model that has now been replicated in 58 countries around the world. Or, Dr Venkataswamy, founder of the Aravind clinics, whose passion for finding ways of giving eyesight back to people with cataracts, in his home state of Tamil Nadu, eventually led to the development of an eye care system that has helped thousands of people around the country [28].

Research Note 3.5 looks at some examples of social entrepreneurs and what motivates them.

RESEARCH NOTE 3.5 Different Types of Entrepreneurs

In a recent award-winning paper, Emmanuelle Fauchart and Marc Gruber studied the motivations and underlying psychological drivers among entrepreneurial founders of businesses in the sports equipment sector. Their study used social identity theory to explore the underlying self-perceptions and aspirations and found three distinct types of role identity among their sample. 'Darwinians' were primarily concerned with competing and creating business success, whereas 'Communitarians' were much more concerned with social identities, which related to participating in and contributing to a community. 'Missionaries' had a strong inner vision, a desire to change the world, and their entrepreneurial activity was an expression of this [29].

Source: Based on E. Fauchard and M. Gruber, 'Darwinians, Communitarians, and Missionaries: The Role of Founder Identity in Entrepreneurship', *Acad. Manage. J.*, vol. 54, no. 5, pp. 935–957, 2011.

Social entrepreneurship, while following the same basic process, carries with it some additional challenges in managing innovation as **Table 3.3** indicates. (We will explore social innovation and entrepreneurship in more detail in Chapter 14.)

Table 3.3 Challenges in Social Entrepreneurship

What Has to Be Managed?	Challenges in Social Entrepreneurship
Recognizing opportunities	Many potential social entrepreneurs (SEs) have the passion to change something in the world – and there are plenty of targets to choose from, such as poverty, access to education and healthcare. But passion isn't enough. They also need the classic entrepreneur's skill of spotting an opportunity, a connection, a possibility, which could develop. It's about searching for new ideas that could bring a different solution to an existing problem, for example, the microfinance alternative to conventional banking or street-level moneylending. As we've seen elsewhere in the book, the skill is often not so much discovery (finding something completely new) as connection (making links between disparate things). In the SE field, the gaps may be very wide, for example, connecting rural farmers to high-tech international stock markets requires considerably more vision to bridge the gap than spotting the need for a new variant of futures trading software. So, SEs need both passion and vision, plus considerable broking and connecting skills.
Finding resources	Spotting an opportunity is one thing, but getting others to believe in it and, more importantly, back it is something else. Whether it's an inventor approaching a venture capitalist or an internal team pitching a new product idea to the strategic management in a large organization, the story of successful entrepreneurship is about convincing other people. In the case of SE, the problem is compounded by the fact that the targets for such a pitch may not be immediately apparent. Even if you can make a strong business case and have thought through the likely concerns and questions, who do you approach to try to get backing? There are some foundations and nonprofit organizations, but in many cases, one of the important skill sets of an SE is networking, the ability to chase down potential funders and backers and engage them in the project. Even within an established organization, the presence of a structure may not be sufficient. For many SE projects, the challenge is that they take the firm in very different directions, some of which fundamentally challenge its core business. For example, a proposal to make drugs cheaply available in the developing world may sound a wonderful idea from an SE perspective, but it poses huge challenges to the structure and operations of a large pharmaceutical firm with complex economics around R&D funding, distribution and so on. It's also important to build coalitions of support. Securing support for social innovation is often a distributed process, but power and resources are often not concentrated in the hands of a single decision-maker. There may also not be a board or venture capitalist to pitch the ideas to. Instead, it is a case of building momentum and groundswell. And there is a need to provide practical demonstrations of what otherwise may be seen as idealistic pipedreams. The role of pilots, which then get taken up and gather support, is well-proven, for example, the Fair Trade model or microfinance.
Developing the venture	Social innovation requires extensive creativity in getting hold of the diverse resources to make things happen, especially since the funding base may be limited. Networking skills become critical here, engaging different players and aligning them with the core vision. One of the most important elements in much social innovation is scaling up, taking what may be a good idea implemented by one person or in a local community, and amplifying it so that it has widespread social impact. For example, Anshu Gupta's original idea was to recycle old clothes found on rubbish dumps or cast away to help poor people in his local community. Beginning with 67 items of clothing, the idea has now been scaled up so that his organization collects and recycles 40,000 kg of cloth every month across 23 states in India. The principle has been applied to other materials, for example, recycling old cassettes to make mats and soft furnishings (see **www.goonj.org/**).
Innovation strategy	Here, the overall vision is critical: the passionate commitment to a clear vision can engage others, but social entrepreneurs can also be accused of idealism and 'having their head in the clouds'. Consequently, there is a need for a clear plan to translate the vision step by step into reality.
Innovative organization/ rich networking	Social innovation depends on loose and organic structures where the main linkages are through a sense of shared purpose. At the same time, there is a need to ensure some degree of structure to allow for effective implementation. The history of many successful social innovations is essentially one of networking, mobilizing support and accessing diverse resources through rich networks. This places a premium on networking and broking skills.

Source: J. Bessant and J. Tidd, *Innovation and entrepreneurship*. Chichester: John Wiley and Sons, 2015.

3.4 CROSS SECTOR DIFFERENCES

Within these sector differences there are also variations which have a bearing on the way innovation is organized, though the underlying core process remains the same.

ORGANIZATIONAL SIZE

Another important influence on the particular ways in which innovation is managed is the size of the organization. Typically, smaller organizations possess a range of advantages – such as agility, rapid decision making – but equally, limitations such as resource constraints. **Table 3.4** explores some of these. This means that developing effective innovation management will depend on creating structures and behaviours which play to these – for example, keeping high levels of informality to build on shared vision and rapid decision making but possibly to build network linkages to compensate for resource limitations.

But we need to be clear that small organizations differ widely. In most economies, small firms account for 95% or more of the total business world, and within this huge number of firms, there is enormous variation, from micro-businesses such as hairdressing and accounting services, through to high-technology start-ups. Once again, we have to recognize that the generic challenge of innovation can be taken up by businesses as diverse as running a fish and chip shop through to launching a nanotechnology spin-out with millions of pounds in venture capital – but the particular ways in which the process is managed are likely to differ widely.

For example, small-/medium-sized enterprises (SMEs) often fail to feature in surveys of R&D and other formal indicators of innovative activity. Yet, they do engage in innovative activity and carry out research – but this tends to be around process improvement or customer service and often involving tacit rather than formalized knowledge [30]. Much research has been carried out to try and segment the large number of SMEs into particular types of innovator and to explore the contingencies that shape their particular approach to managing innovation. Work by David Birch, for example, looked at those SMEs – 'gazelles' – which offered high growth potential (greater than 20% per year) – clearly of interest in terms of job creation and overall economic expansion [31]. But subsequent studies of SMEs and growth suggest that the innovation picture is more complex.

In particular, the idea that high-tech, young, and research intensive SMEs in fast-growing sectors were associated with high economic growth does not appear to hold water. Instead, gazelles had relatively little to do with high-tech – US figures from the Bureau of Statistics suggest that only 2% of high-growth SMEs are high-tech, gazelles were somewhat older than small companies in general, and few gazelles were found in fast-growing sectors. Only 5% of gazelles

Table 3.4 Advantages and Disadvantages for Small Firm Innovators

Advantages	Disadvantages
Speed of decision making	Lack of formal systems for management control – for example, of project times and costs
Informal culture	Lack of access to key resources, especially finance
High-quality communications – everyone knows what is going on	Lack of key skills and experience
Shared and clear vision	Lack of long-term strategy and direction
Flexibility, agility	Lack of structure and succession planning
Entrepreneurial spirit and risk-taking	Poor risk management
Energy, enthusiasm, passion for innovation	Lack of application to detail, lack of systems
Good at networking internally and externally	Lack of access to resources

were present in the three fastest-growing US sectors, and the top five sectors in which high-growth SMEs were found were in slow growth sectors such as chemicals, electrical equipment, plastics and paper products [32].

As David Birch commented in 2004, '*most people think that companies are like cows – growing a lot when young and then very little thereafter . . . It turns out we're mistaken. Companies, unlike cows, are regularly 'born again' – they take on new management, stumble on a new technology or benefit from a change in the marketplace. Whatever the cause, statistics show older companies are more likely to grow rapidly than even the youngest ones . . .*' [31].

This perspective is borne out by studies in the OECD and of long-standing SME-led development in areas such as Cambridge in the United Kingdom [33]. It argues for a more fine-grained view of SMEs and their role as innovators and sources of growth – while high-tech research performing firms of this kind are important, so too are those 'hidden' innovators in more mature sectors or performing process rather than product innovation [13].

PROJECT-BASED ORGANIZATIONS

For many enterprises, the challenge is one of moving towards project-based organization – whether for realizing a specific project (such as construction of a major facility, such as an airport or a hospital) or for managing the design and build around complex product systems such as aero engines, flight simulators or communications networks. Project organization of this kind represents an interesting case, involving a system that brings together many different elements into an integrated whole, often involving different firms, long timescales and high levels of technological risk [34]. (A recent study by Andy Davies and colleagues highlights the many sources of failure attached to large-scale innovation projects – what they term 'megaprojects' [35].)

Increasingly, they are associated with innovations in project organization and management – for example, in the area of project financing and risk sharing. Although such projects may appear very different from the core innovation process associated with, for example, producing a new soap powder for the mass market, the underlying process is still one of careful understanding of user needs and meeting those. The involvement of users throughout the development process and the close integration of different perspectives will be of particular importance, but the overall map of the process is the same.

PLATFORM INNOVATION

Another area in which there is growing interest is the concept of 'platform innovation' [36,37]. This can take various forms – for example, Intel's work over decades to position its chips at the heart of computers, smartphones and other intelligent devices represents an attempt to provide the platform on which other players can innovate. In a similar fashion, Apple, Samsung and others try to make their devices platforms across which various app developers can offer their products to a huge marketplace. And Lego has built a strong platform based not only on its physical bricks but also on the range of stories that can be built up around them – the success of the Lego movie indicates how effective this model has been.

In each case, there is an underlying need to manage innovation in a particular fashion, looking for commonalities in architecture and working with what are often multi-sided markets (e.g., smartphones face both the end-user market and the apps supplier markets) [38].

As we saw in Chapter 2, platforms are becoming widely used as innovation vehicles since they offer considerable opportunities for rapid scaling due to network effects. But at the same time their management as innovation resources requires the development of new managerial capabilities. Many platforms, even well-known players like Uber, fail to make money and may eventually fall, being usurped by late-comers better able to sustain such

a business model. They rely in particular on the ability to build and manage at the ecosystem level.

Simply building multi-sided platforms may not work unless there is the capability for system-level governance. Apple's successful apps platform builds on decades of experience in orchestrating such an ecosystem, first honed with the early work on I-Tunes as a platform bringing together the many actors in the music creation and delivery supply chain and linking this to the user side. By the same token Sony's e-reader, whilst being a technically strong product with a number of advantages over other devices like Amazon's Kindle, failed because of an inability to orchestrate the ecosystem around e-publishing [39]. Tesla's success in the electric vehicles business comes in part from its careful construction of an ecosystem to support their core innovation – for example, building an infrastructure of charging points to reduce concerns about 'range anxiety' [40]. By contrast Better Place, one of the most successful start-ups in terms of raising nearly $1bn in various rounds of venture financing failed in its ambitious attempt to create an electric car ecosystem, primarily through a lack of capabilities in working at this level [41].

ECOSYSTEMS

As we saw in Chapter 2, one of the emerging features of the twenty-first-century innovation landscape is that it is much less of a single enterprise activity. For a variety of reasons, it is increasingly a multiplayer game in which organizations of different shapes and sizes work together in networks. These may be regional clusters or supply chains or product development consortia or strategic alliances, which bring competitors and customers into a temporary collaboration to work at the frontier of new technology application. Although the dynamics of such networks are significantly different from those operating in a single organization and the controls and sanctions much less visible, the underlying innovation process challenge remains the same – how to build shared views around trigger ideas and then realize them. Throughout the book, we will look at the particular issues raised in trying to manage innovation beyond the boundaries of the organization, and Chapter 8, in particular, picks up this theme of managing across innovation *networks*.

One of the key implications of this multiplayer perspective is the need to shift our way of thinking from that of a single enterprise to more of a *systems* view. Innovation doesn't take place in isolation, and if we are to manage it effectively, we need to develop skills in thinking about and operating at this system level. Such a system view needs to include other players – customers and suppliers, competing firms, collaborators, and beyond that a wider range of actors who influence the ways in which innovation takes place [42,43].

THE INFLUENCE OF GEOGRAPHY

Thinking about the wider context within which innovation takes place has led to the emergence of the concept of 'innovation systems'. These include the range of actors – government, financial, educational, labour market, science and technology infrastructure and so on – which represent the context within which organizations operate their innovation process [44] – and the ways in which they are connected. They can be local, regional and national – and the ways in which they evolve and operate vary widely [45,46]. In some cases, there is clear synergy between the elements that create the supportive conditions within which innovation can flourish – for example, the regional innovation-led clusters of Baden-Württemberg in Germany, Cambridge in the United Kingdom, Silicon Valley and Route 128 in the United States or the island of Singapore [33,47].

Increasingly, effective innovation management is being seen as a challenge of connecting to and working with such innovation systems – and this again has implications for how we might organize and manage the generic process (see **Case Study 3.4**). Phil Cooke points out the growing interest among policymakers in what he calls 'constructed advantage' – the degree to which such clustering can be organized and managed, particularly at the regional level [48]. (We discuss national systems of innovation in more depth in Chapter 4.)

CASE STUDY 3.4 The Power of Regional Innovation Systems

Michael Best's fascinating account of the ways in which the Massachusetts economy managed to reinvent itself several times is one that underlines the importance of innovation systems [47]. In the 1950s, the state suffered heavily from the loss of its traditional industries of textiles and shoes, but in the early 1980s, the 'Massachusetts miracle' led to the establishment of a new high-tech industrial district. It was a resurgence enabled in no small measure by an underpinning network of specialist skills, high-tech research and training centres (the Boston area has the highest concentration of colleges, universities, research labs and hospitals in the world) and by the rapid establishment of entrepreneurial firms keen to exploit the emerging 'knowledge economy'. But, in turn, this miracle turned to dust in the years between 1986 and 1992 when around one-third of the manufacturing jobs in the region disappeared as the minicomputer and defence-related industries collapsed. Despite gloomy predictions about its future, the region built again on its rich network of skills, technology sources and a diverse local supply base, which allowed rapid new product development to emerge again as a powerhouse in high technology such as special-purpose machinery, optoelectronics, medical laser technology, digital printing equipment and biotech.

REGULATORY CONTEXT

It is also important to recognize the role played in some sectors by the regulatory regime [49,50]. In industries such as food, drink or pharmaceuticals there is extensive legislation in place requiring a wide range of external standards and checks to be successfully passed in launching new products. The impact of agencies like the Food and Drug Administration in the United States can significantly lengthen the time taken to bring new products to market and also to withdraw products in the longer term as negative user evidence accumulates. In a similar fashion the increasing regulation of utilities by national-level agencies and across trading blocs like the European Union means that both the rate and direction of innovative activity is externally shaped to a significant degree. Similar controls are now beginning to emerge around the Big Tech companies such as Apple, Google, Amazon and Facebook in terms of their innovative activity based on using such large-scale datasets.

INDUSTRY LIFE CYCLE

Another variable which has a bearing on the way in which the innovation process operates relates to the maturity (or otherwise) of the sector. As Abernathy and Utterback point out there are significantly different dynamics associated with early stages where the emphasis is on entrepreneurial activity with many ideas competing to establish themselves as a dominant design [51]. Most of these will fail but the pattern in this fluid phase is strongly around product innovation; once the dominant design becomes established the emphasis moves to process innovation and

the sector matures, moving towards more incremental improvement innovations in both product and process. But, as industries like automobiles or lighting indicate, such maturity can be followed by sudden shifts which establish a new fluid phase [52]. (We discuss this model further in Chapter 6.)

3.5 DO BETTER/ DO DIFFERENT

It's not just the sector, type of firm or wider context that moderates the way the innovation process operates. An increasing number of authors draw attention to the need to take the degree of novelty in an innovation into account [53–56].

At a basic level, the structures and behaviours needed to help enable incremental improvements will tend to be incorporated into the day-to-day standard operating procedures of the organization. More radical projects may require more specialized attention – for example, arrangements to enable working across functional boundaries. At the limit, the organization may need to review the whole bundle of routines that it uses for managing innovation when it confronts discontinuous conditions and the 'rules of the game' change.

As we saw in Chapter 1, we can think of innovation in terms of two complementary modes. The first can be termed 'doing what we do but better' – a 'steady state' in which innovation happens but within a defined envelope around which our 'good practice' routines can operate. This contrasts with 'do different' innovation where the rules of the game have shifted (due to major technological, market or political shifts, for example) and where managing innovation is much more a process of exploration and coevolution under conditions of high uncertainty. A number of writers have explored this issue and conclude that, under turbulent conditions, firms need to develop capabilities for managing both aspects of innovation [57–59].

Once again, the generic model of the innovation process remains the same. Under 'do different' conditions, organizations still need to search for trigger signals – the difference is that they need to explore in much less familiar places and deploy peripheral vision to pick up weak signals early enough to move. They still need to make strategic choices about what they will do – but they will often have vague and incomplete information, and the decision making involved will thus be much more risky – arguing for a higher tolerance of failure and fast learning. Implementation will require much higher levels of flexibility around projects – and monitoring and review may need to take place against more flexible criteria than might be applied to 'do better' innovation types [60].

For established organizations, the challenge is that they need to develop the capability to manage both kinds of innovation. Much of the time, they will need robust systems for dealing with 'do better', but from time to time, they risk being challenged by new entrants better able to capitalize on the new conditions opened up by discontinuity – unless they can develop a 'do different' capability to run in parallel. New entrants don't have this problem when riding the waves of a discontinuous shift – for example, exploiting opportunities opened up by a completely new technology. But they, in turn, will become established incumbents and face the challenge later if they do not develop the capacity to exploit their initial advantage through 'do better' innovation process and also build capability for dealing with the next wave of change by creating a 'do different' capability [61].

Table 3.5 highlights the differences between these two ways of thinking and operating.

The challenge is thus – as shown in **Figure 3.2** – to develop an ambidextrous capability for managing both kinds of innovation within the same organization. We will return to this theme repeatedly in the book, exploring the additional or different challenges posed when innovation has to be managed beyond the steady state.

Table 3.5 Different Innovation Management Archetypes

Example	Type 1 – Steady-state Archetype	Type 2 – Discontinuous-innovation Archetype
Interpretive schema – how the organization sees and makes sense of the world	There is an established set of 'rules of the game' by which other competitors also play Particular pathways in terms of search and selection environments and technological trajectories exist and define the 'innovation space' available to all players in the game	No clear 'rules of the game' – these emerge over time but cannot be predicted in advance Need high tolerance for ambiguity – seeing multiple parallel possible trajectories
Strategic decision-making	Strategic direction is highly path-dependent Makes use of decision-making processes, which allocate resources on the basis of risk management linked to the aforementioned 'rules of the game' (Does the proposal fit the business strategic directions? Does it build on existing competence base?) Controlled risks are taken within the bounds of the 'innovation space' Political coalitions are significant influences maintaining the current trajectory	'Innovation space' defined by open and fuzzy selection environment. Probe and learn experiments needed to build information about emerging patterns and allow dominant design to emerge Highly path-independent High levels of risk taking since no clear trajectories – emphasis on fast and lightweight decisions rather than heavy commitment in initial stages Multiple parallel bets, fast failure and learning as dominant themes. High tolerance of failure, but risk is managed by limited commitment. Influence flows to those prepared to 'stick their neck out' – entrepreneurial behaviour
Operating routines	Operates with a set of routines and structures/procedures that embed them, which are linked to these 'risk rules' – for example, stage gate monitoring and review for project management Search behaviour is along defined trajectories and uses tools and techniques for R&D, market research and so on, which assume a known space to be explored – search and selection environment Network building to support innovation – for example, user involvement, supplier partnership, and so on – is on the basis of developing close and strong ties	Operating routines are open-ended, based around managing emergence Project implementation is about 'fuzzy front end', light touch strategic review, and parallel experimentation Probe and learn, fast failure and learn rather than managed risk Search behaviour is about peripheral vision, picking up early warning through weak signals of emerging trends Linkages are with heterogeneous population and emphasis less on established relationships than on weak ties

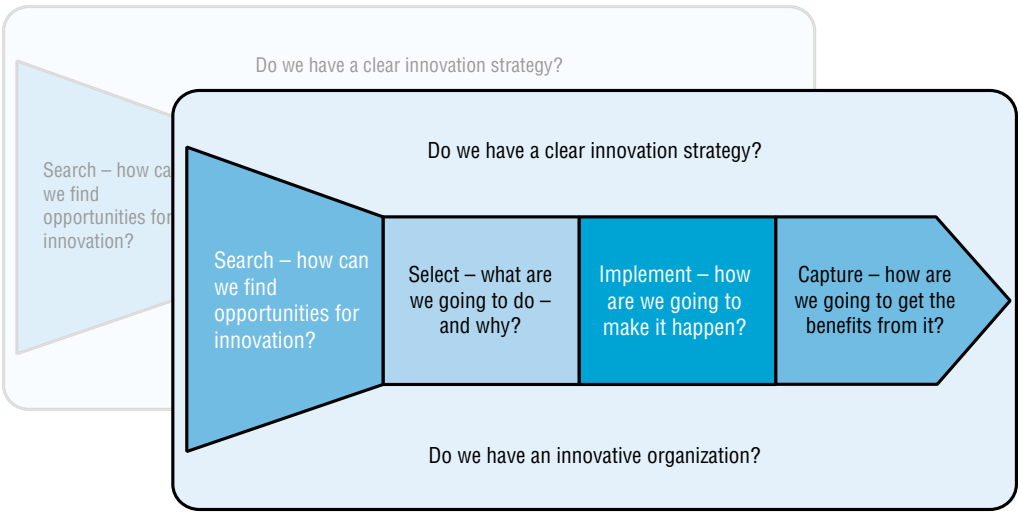

FIGURE 3.2 Managing steady-state and discontinuous innovation

Table 3.6 How Context Affects Innovation Management

Context Variable	Modifiers to the Basic Process	Example References Discussing These
Sector	Different sectors have different priorities and characteristics – for example, scale-intensive, science-intensive. And there is considerable difference in the worlds of for profit and not-for-profit organizations and those within the public sector	[20,62,63]
Size	Small firms differ in terms of access to resources, and so on and so need to develop more linkages	[64–68]
Type of organization	Individual enterprises differ compared with those having complex projects involving multiple players. Platform organizations have similar challenges in terms of trying to orchestrate innovation processes across multiple organizational boundaries	[34,38]
Regional context	Different geographical locations have network effects associated with creating a supportive climate and infrastructure for innovation, a feature linked to clustering and regional innovation policy	[69,70]
National systems of innovation	Different countries have more or less supportive contexts in terms of institutions, policies, etc.	[44,71,72]
Life cycle (of technology, industry, etc.)	Different stages in life cycle emphasize different aspects of innovation – for example, new technology industries versus mature established firms	[52,73]
Degree of novelty – continuous versus discontinuous innovation	'More of the same' improvement innovation requires different approaches to organization and management to more radical forms. At the limit, firms may deploy 'dual structures' or even split or spin off in order to exploit opportunities	[56,74,75]
Role played by external agencies such as regulators	Some sectors – for example, utilities, telecommunications, and some public services – are heavily influenced by external regimes, which shape the rate and direction of innovative activity. Others – such as food or health care – may be highly regulated in certain directions	[50,76]

3.6 A CONTINGENCY MODEL OF THE INNOVATION PROCESS

Table 3.6 tries to summarise some of the wide range of influences around which organizations need to configure their particular versions of the generic innovation process. The key message in this section is that the same generic process can be observed – the management challenge is *configuration*.

3.7 EVOLVING MODELS OF THE PROCESS

The importance of viewing innovation as a process is that this understanding shapes the way in which we try and manage it. Put simply, our mental models shape our actions – we pay attention to, allocate resources to, take decisions about things according to how we think about them. So, if innovation is a process, we need to have a clear and shared understanding of what that process involves and how it operates.

This understanding of the core process model has changed a great deal over time. Early models (both explicit and, more important, the implicit mental models whereby people managed the process) saw it as a linear sequence of functional activities. Either new opportunities arising out of research gave rise to applications and refinements, which eventually found their way to the marketplace ('technology push') or else the market signalled needs for something new, which then drew through new solutions to the problem ('need pull', where necessity becomes the mother of invention).

The limitations of such an approach are clear; in practice, innovation is a coupling and matching process where interaction is the critical element [77]. Sometimes, the 'push' will

dominate, sometimes the 'pull', but successful innovation requires interaction between the two. The analogy to a pair of scissors is useful here; without both blades, it is difficult to cut. (Chapter 6 explores the issue of sources of innovation and how there is considerable interplay between these two types.)

One of the key problems in managing innovation is that we need to make sense of a complex, uncertain and highly risky set of phenomena. Inevitably, we try and simplify these through the use of mental models – often reverting to the simplest linear models to help us explore the management issues that emerge over time. Prescriptions for structuring the process along these lines abound; for example, one of the most cited models for product innovation was originally developed 40 years ago by the consultants Booz, Allen and Hamilton [78]. Many variations exist on this theme – for example, Robert Cooper's work suggests a slightly extended view with 'gates' between stages, which permit management of the risks in the process [79]. There is also a British Standard (BS 7000) that sets out a design-centred model of the process [80].

Much recent work recognizes the limits of linear models and tries to build more complexity and interaction into the frameworks. For example, the Product Development Management Association (PDMA) offers a detailed guide to the process and an accompanying toolkit [81]. Increasingly, there is recognition of some of the difficulties around what is often termed the 'fuzzy front end' where uncertainty is the highest, but there is still convergence around a basic process structure as a way of focusing our attention [82]. This has led to a wealth of models based on 'agile' approaches to innovation [83], a theme we will return to in Chapter 10.

The balance needs to be struck between simplifications and representations that help thinking – but just as the map is not the same as the territory it represents, so they need to be seen as frameworks for thinking, not as descriptions of the way the process actually operates. Extensive discussions amongst academic researchers, practising managers and policy makers within the International Standards Organization (ISO) have led to the development of a framework model based on current 'good practice' which can act as a normative framework to help develop such approaches [84,85].

Roy Rothwell was, for many years, a key researcher in the field of innovation management, working at SPRU at the University of Sussex. In one of his later papers, he provided a useful historical perspective on this, suggesting that our appreciation of the nature of the innovation process has been evolving from such simple linear models (characteristic of the 1960s) through to increasingly complex interactive models (Table 3.7). His 'fifth-generation innovation' concept sees innovation as a multi-actor process, which requires high levels of integration at both intra- and interfirm levels and which is increasingly facilitated by IT-based networking [86]. While his work did not explicitly mention the Internet, it is clear that the kinds of innovation management challenges posed by the emergence of this new form fit well with the model. Although such fifth-generation models and the technologies that enable them appear complex, they still involve the same basic process framework [87].

In essence, we are talking about 'innovation model innovation' – changing and revising our internal representations of how innovation happens and adapting these to take account of shifts in enabling technologies, social and legal frameworks and market conditions. The shift to 'open innovation' – which we will discuss in more detail in Chapter 11 – represents a good example, fleshing out Rothwell's fifth-generation model into one based on open and collective innovation [88,89]. And there is growing discussion about the implications for innovation models based on 'open user innovation' [90] and 'interactive value creation' [91].

Table 3.7 illustrates Rothwell's five generations.

Mental models are important because they help us frame the issues that need managing – but therein also lies the risk. If our mental models are limited, then our approach to managing is also likely to be limited. For example, if we believe that innovation is simply a matter of coming up with a good invention – then we risk managing that part of the process well, but failing to consider or deal with other key issues around actually taking that invention through technological and market development to successful adoption.

Table 3.7 Rothwell's Five Generations of Innovation Models

Generation	Key Features
First/second	Simple linear models – need pull, technology push
Third	Coupling model, recognizing interaction between different elements and feedback loops between them
Fourth	Parallel model, integration within the company, upstream with key suppliers and downstream with demanding and active customers, emphasis on linkages and alliances
Fifth	Systems integration and extensive networking, flexible and customized response, continuous innovation

Here are some examples of the problems in 'partial thinking':

- Seeing innovation as a linear 'technology push' process (in which case all the attention goes into funding R&D with little input from users) or one in which the market can be relied upon to pull through innovation.
- Seeing innovation simply in terms of major 'breakthroughs' – and ignoring the significant potential of incremental innovation. In the case of electric light bulbs, the original Edison design remained almost unchanged in concept, but incremental product and process improvement over the 16 years from 1880 to 1896 led to a fall in price of around 80% [92].
- Seeing innovation as a single isolated change rather than as part of a wider system (effectively restricting innovation to the component level rather than seeing the bigger potential of architectural changes) [93].
- Seeing innovation as product or process only, without recognizing the interrelationship between the two.

Table 3.8 provides an overview of the difficulties that arise if we take a partial view of innovation.

3.8 CAN WE MANAGE INNOVATION?

It would be hard to find anyone prepared to argue against the view that innovation is important and likely to be more so in the coming years. But that still leaves us with the big question of whether or not we can actually manage what is clearly an enormously complex and uncertain process.

There is certainly no easy recipe for success. Indeed, at first glance, it might appear that it is impossible to manage something so complex and uncertain. There are problems in developing and refining new basic knowledge, problems in adapting and applying it to new products and processes, problems in convincing others to support and adopt the innovation, problems in gaining acceptance and long-term use and so on. Since so many people with different disciplinary backgrounds, varying responsibilities and basic goals are involved, the scope for differences of opinion and conflicts over ends and means is wide. In many ways, the innovation process represents the place where Murphy and his associated band of lawmakers hold sway, where if anything can go wrong, there's a very good chance that it will!

But despite the uncertain and apparently random nature of the innovation process, it is possible to find an underlying pattern of success. Not every innovation fails, and some firms (and individuals) appear to have learned ways of responding and managing it such that, while there is never a cast-iron guarantee, at least the odds in favour of successful innovation can be improved. We are using the term 'manage' here not in the sense of designing and running a complex but predictable mechanism (such as an elaborate clock) but rather that we are creating conditions within an organization under which a successful resolution of multiple challenges under high levels of uncertainty is made more likely.

Table 3.8 Overview of the Difficulties from Taking a Partial View of Innovation

If Innovation Is Only Seen As . . .	*. . . The Result Can Be*
Strong R&D capability	Technology that fails to meet user needs and may not be accepted
The province of specialists	Lack of involvement of others and a lack of key knowledge and experience input from other perspectives in the R&D laboratory
Understanding and meeting customer needs	Lack of technical progression, leading to inability to gain competitive edge
Advances along the technology	Producing products or services that the market does not want or designing processes that do not meet the needs of the user and whose implementation is resisted
Frontier	Weak small firms with too high a dependence on large customers
The province only of large firms	Disruptive innovation as apparently insignificant small players seize new technical or market opportunities
Only about 'breakthrough' changes	Neglect of the potential of incremental innovation. Also an inability to secure and reinforce the gains from radical change because the incremental performance ratchet is not working well
Only about strategically targeted projects	May miss out on lucky 'accidents', which open up new possibilities
Only associated with key individuals	Failure to utilize the creativity of the remainder of employees and to secure their inputs and perspectives to improve innovation
Only internally generated	The 'not invented here' effect, where good ideas from outside are resisted or rejected
Only externally generated	Innovation becomes simply a matter of filling a shopping list of needs from outside, and there is little internal learning or development of technological competence
Only concerning single firms	Excludes the possibility of various forms of interorganizational networking to create new products, streamline shared processes and so on

One indicator of the possibility of doing this comes from the experiences of organizations that have survived for an extended period of time. While most organizations have comparatively modest lifespans, there are some that have survived at least one and sometimes multiple centuries. Looking at the experience of these '100 club' members – firms such as 3M, Corning, Procter & Gamble, Reuters, Siemens, Philips and Rolls-Royce – we can see that much of their longevity is down to having developed a capacity to innovate on a continuing basis. They have learned – often the hard way – how to manage the process (both in its 'do better' and 'do different' variants) so that they can sustain innovation [94–97].

It is important to note the distinction here between 'management' and managers. We are not arguing here about who is involved in taking decisions or directing activity, but rather about what has to be done. Innovation is a management question, in the sense that there are choices to be made about resources and their disposition and co-ordination. Close analysis of many technological innovations over the years reveals that although there are technical difficulties – bugs to fix, teething troubles to be resolved, and the occasional major technical barrier to surmount – the majority of failures are due to some weakness in the way the process is managed. Success in innovation appears to depend upon two key ingredients – technical resources (people, equipment, knowledge, money, etc.) and the capabilities in the organization to manage them.

This brings us to the concept of what have been termed 'routines' [98,99]. Organizations develop particular ways of behaving, which become 'the way we do things around here' as a result of repetition and reinforcement. These patterns reflect an underlying set of shared beliefs about the world and how to deal with it and form part of the organization's culture – 'the way we do things in this organization'. They emerge as a result of repeated experiments and experience around what appears to work well – in other words, they are learned. Over time, the pattern becomes more of an automatic response to particular situations, and the behaviour becomes what can be termed a 'routine' [100].

This does not mean that it is necessarily repetitive, only that its execution does not require detailed conscious thought. The analogy can be made with driving a car; it is possible to drive along a stretch of motorway while simultaneously talking to someone else, eating or drinking, listening to and concentrating on, something on the radio or planning what to say at the forthcoming meeting. But driving is not a passive behaviour; it requires continuous assessment and adaptation of responses in the light of other traffic behaviour, road conditions, weather and a host of different and unplanned factors. We can say that driving represents a behavioural routine in that it has been learned to the point of being largely automatic.

In the same way, an organizational routine might exist around how projects are managed or new products researched. For example, project management involves a complex set of activities such as planning, team selection, monitoring and execution of tasks, replanning, coping with unexpected crises and so on. All of these have to be integrated – and offer plenty of opportunities for making mistakes. Project management is widely recognized as an organizational skill, which experienced firms have developed to a high degree but which beginners can make a mess of. Firms with good project management routines are able to codify and pass them on to others via procedures and systems. Most importantly, the principles are also transmitted into 'the way we run projects around here' by existing members passing on the underlying beliefs about project management behaviour to new recruits.

Over time, organizational behaviour routines create and are reinforced by various kinds of artefacts – formal and informal structures, procedures and processes that describe 'the way we do things around here' and symbols that represent and characterize the underlying routines. It could be in the form of a policy – for example, 3M is widely known for its routines for regular and fast product innovation. They have enshrined a set of behaviours around encouraging experimentation into what they term 'the 15% policy' in which employees are enabled to work on their own curiosity-driven agenda for up to 15% of their time [100]. These routines are firm-specific – for example, they result from an environment in which the costs of product development experimentation are often quite low.

Levitt and March describe routines as involving established sequences of actions for undertaking tasks enshrined in a mixture of technologies, formal procedures or strategies and informal conventions or habits [101]. Importantly, routines are seen as evolving in the light of experience that works – they become the mechanisms that 'transmit the lessons of history'. In this sense, routines have an existence independent of particular personnel – new members of the organization learn them on arrival, and most routines survive the departure of individual routines. Equally, they are constantly being adapted and interpreted such that formal policy may not always reflect the current nature of the routine – as Augsdorfer points out in the case of 3M [102].

For our purposes, the important thing to note is that routines are what makes one organization different from another in how they carry out the same basic activity. We could almost say they represent the particular 'personality' of the firm. Each enterprise learns its own particular 'way we do things around here' in answer to the same generic questions – how it manages quality, how it manages people and so on. The set of routines that describe and differentiate the responses that organizations make to the question of structuring and managing the generic model, which we have been looking at in this chapter (see Figure 3.1), provide a description of 'how we manage innovation around here'.

It follows that some routines are better than others in coping with the uncertainties of the outside world, in both the short and the long term. And it is possible to learn from others' experience in this way; the important point is to remember that routines are firm-specific and must be learned. Simply copying what someone else does is unlikely to help, any more than watching someone drive and then attempting to copy them will make a novice into an experienced driver. There may be helpful clues, which can be used to improve the novice's routines, but there is no substitute for the long and experience-based process of learning. **Research Note 3.6** gives some examples where change has been introduced without this learning perspective.

RESEARCH NOTE 3.6 Fashion Statements vs. Behavioural Change in Organizations

The problem with routines is that they have to be learned – and learning is difficult. It takes time and money to try new things, it disrupts and disturbs the day-to-day working of the firm, it can upset organizational arrangements and require efforts in acquiring and using new skills. Not surprisingly, most firms are reluctant learners – and one strategy that they adopt is to try and short-cut the process by borrowing ideas from other organizations.

While there is enormous potential in learning from others, simply copying what seems to work for another organization will not necessarily bring any benefits and may end up costing a great deal and distracting the organization from finding its own ways of dealing with a particular problem. The temptation to copy gives rise to the phenomenon of particular approaches becoming fashionable – something that every organization thinks it needs in order to deal with its particular problems.

Over the past 40 years, we have seen many apparent panaceas for the problems of becoming competitive. Organizations are constantly seeking new answers to old problems, and the scale of investment in the new fashions of management thinking has often been considerable. The original evidence for the value of these tools and techniques was strong, with case studies and other reports testifying to their proven value within the context of origin. But there is also extensive evidence to suggest that these changes do not always work and in many cases lead to considerable dissatisfaction and disillusionment.

Examples include the following:

- Advanced manufacturing technology (AMT – robots, flexible machines, integrated computer control, etc.) [103,104]
- Total quality management (TQM) [105]
- Business process re-engineering (BPR) [106]
- Benchmarking best practice [107]
- Quality circles [108,109]
- Networking/clustering [110,111]
- Knowledge management [112]
- Open innovation [113]

What is going on here demonstrates well the principles behind behavioural change in organizations. It is not that the original ideas were flawed or that the initial evidence was wrong. Rather it was that other organizations assumed they could simply be copied, without the need to adapt them, to customize them, to modify and change them to suit their circumstances. In other words, there was no learning, and no progress towards making them become routines, part of the underlying culture within the firm. Chapter 4 picks up this theme in the context of thinking about strategy.

3.9 BUILDING AND DEVELOPING ROUTINES ACROSS THE CORE PROCESS

Successful innovation management routines are not easy to acquire. Because they represent what a particular firm has learned over time, through a process of trial and error, they tend to be very firm-specific. While it may be possible to identify the kinds of thing that Google, Procter & Gamble, Nokia, 3M, Toyota or others have learned to do, simply copying them will not work. Instead, each firm has to find its own way of doing these things – in other words, developing its own particular routines.

In the context of innovation management, we can see the same hierarchical relationship in developing capability as there is in learning to drive. Basic skills are behaviours associated with actions such as planning and managing projects or understanding customer needs. These simple routines need to be integrated into broader abilities, which taken together make up an organization's capability in managing innovation. **Table 3.9** gives some examples.

NAVIGATING THE NEGATIVE SIDE OF ROUTINES

One last point about the negative side of routines. They represent, as we have seen, embedded behaviours that have become reinforced to the point of being almost second nature – 'the way we do things around here'. Therein lies their strength, but also their weakness. Because they represent ingrained patterns of thinking about the world, they are resilient – but they can also become

Table 3.9 Core Abilities in Managing Innovation

Basic Ability	Contributing Routines
Recognizing	Searching the environment for technical and economic clues to trigger the process of change
Aligning	Ensuring a good fit between the overall business strategy and the proposed change – not innovating because it is fashionable or as a knee-jerk response to a competitor
Acquiring	Recognizing the limitations of the company's own technology base and being able to connect to external sources of knowledge, information, equipment and so on Transferring technology from various outside sources and connecting it to the relevant internal points in the organization
Generating	Having the ability to create some aspects of technology in-house – through R&D, internal engineering groups and so on
Choosing	Exploring and selecting the most suitable response to the environmental triggers, which fit the strategy and the internal resource base/external technology network
Executing	Managing development projects for new products or processes from initial idea through to final launch Monitoring and controlling such projects
Implementing	Managing the introduction of change – technical and otherwise – in the organization to ensure acceptance and effective use of innovation
Learning	Having the ability to evaluate and reflect upon the innovation process and identify lessons for improvement in the management routines
Developing the organization	Embedding effective routines in place – in structures, processes, underlying behaviours and so on

barriers to thinking in different ways. Thus, core capabilities can become core rigidities – when the 'way we do things round here' becomes inappropriate, but when the organization is too committed to the old ways to change [114]. So, it becomes important, from the standpoint of innovation management, not only to build routines but also to recognize when and how to destroy them and allow new ones to emerge. This is a particularly important issue in the context of managing discontinuous innovation; we return to it in Chapter 4, in the context of strategy.

3.10 LEARNING TO MANAGE INNOVATION

Our argument in this book is that successful innovation management is primarily about building and improving effective routines. Learning to do this comes from recognizing and understanding effective routines (whether developed in-house or observed in another enterprise) and facilitating their emergence across the organization. And this learning process implies a building up of capability over time.

It's easy to make the assumption that because there is a rich environment full of potential sources of innovation that every organization will find and make use of these. The reality is, of course, that they differ widely in their ability to innovate – and this capability is clearly not evenly distributed across a population. For example, some organizations may simply be unaware of the need to change, never mind having the capability to manage such a change. Such firms (and this is a classic problem of small firm growth) differ from those that recognize in some strategic way the need to change, to acquire and use new knowledge but lack the capability to target their search, or to assimilate and make effective use of new knowledge once identified. Others may be clear about what they need but lack the capability in finding and acquiring it. And others may have well-developed routines for dealing with all of these issues and represent resources on which less experienced firms might draw – as is the case with some major supply chains focused around a core central player [115].

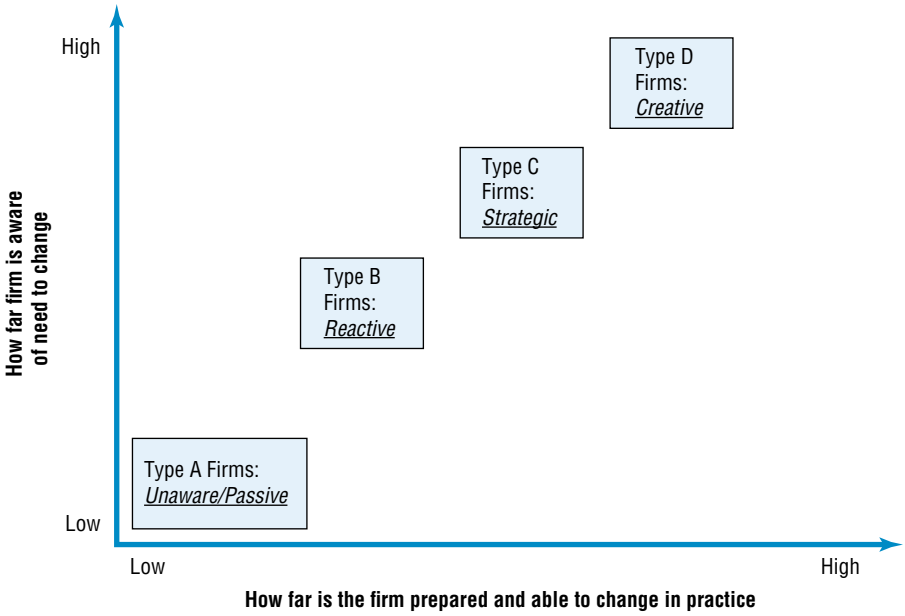

FIGURE 3.3 Groups of firms according to innovation capability

Source: Based on Hobday, M., H. Rush, and J. Bessant, Reaching the innovation frontier in Korea: A new corporate strategy dilemma. *Research Policy*, 2005. 33: 1433–1457, Elsevier.

We can imagine a simple typology (see **Figure 3.3**), ranging from organizations that are 'unconsciously ignorant' (they don't know that they don't know) through to high-performing knowledge-based enterprises. The distinguishing feature is their capability to organize and manage the innovation process in its entirety, from search through selection to effective implementation of new knowledge. Such capability is not a matter of getting lucky once but of having an embedded high order set of learning routines.

IDENTIFYING SIMPLE ARCHETYPES

We can identify in this section simple archetypes (grouped according to Figure 3.3) that highlight differences in innovation capability.

Type A firms can be characterized as being 'unconscious' or unaware about the need for innovation. They lack the ability to recognize the need for change in what may be a hostile environment and where technological and market know-how is vital to survival. They do not know where or what they might improve, or how to go about the process of technology upgrading and, as a result, are highly vulnerable. For example, if low-cost competitors enter – or the market demands faster delivery or higher quality – they are often not able to pick up the relevant signals or respond quickly. Even if they do, they may waste scarce resources by targeting the wrong kinds of improvement.

Type B firms recognize the challenge of change but are unclear about how to go about the process in the most effective fashion. Because their internal resources are limited – and they often lack key skills and experience, they tend to react to external threats and possibilities, but are unable to shape and exploit events to their advantage. Their external networks are usually poorly developed – for example, most technological know-how comes from their suppliers and from observing the behaviour of other firms in their sector.

Type C firms have a well-developed sense of the need for change and are highly capable of implementing new projects and take a strategic approach to the process of continuous innovation. They have a clear idea of priorities as to what has to be done, when, and by whom, and

also have strong internal capabilities in both technical and managerial areas, and can implement changes with skill and speed. These firms benefit from a consciously developed strategic framework in terms of search, acquisition, implementation and improvement of new knowledge. But they lack the capabilities for radical innovation – to redefine markets through new technology or to create new market opportunities. They tend to compete within the boundaries of an existing industry and may become 'trapped' in a mature or slow-growth sector, despite having exploited technological and market opportunities efficiently within the boundaries of the industry. Sometimes, they are limited in knowing where and how to acquire new knowledge beyond the boundaries of their traditional business.

Type D firms operate at the international knowledge frontier and take a creative and proactive approach to exploiting technological and market knowledge for competitive advantage and do so via extensive and diverse networks. They are at ease with modern strategic frameworks for innovation and take it upon themselves to 'rewrite' the rules of the competitive game with respect to technology, markets and organization. Strong internal resources are coupled with a high degree of absorptive capacity, which can enable diversification into other sectors, where their own skills and capabilities bring new advantages and redefine the ways in which firms traditionally compete or wish to compete.

Some creative firms emerge from traditional and mature sectors to challenge the way business is conducted. For example, Nokia moved from pulp and paper into electronics and eventually became a world leader in mobile telecommunications, showing that it was possible to make very high margins in the production of handsets within the developed countries, when most competitors believed that it was impossible to achieve this goal (e.g., Ericsson and Motorola originally viewed handsets as low-margin commodity products). It has reinvented itself again, moving from being a mobile phone handset maker to providing the core infrastructure behind mobile and data networks, in the process selling off its phone operations. Another example is IBM, which transformed itself from being a 'dinosaur' of the computer industry, to one of the fastest growing, most highly profitable information technology and consulting services companies in the world.

We'll return to this theme in Chapter 15, but for now, it is important to stress the development of innovation management capability as one of learning.

MEASURING INNOVATION SUCCESS

Before we move to look at examples of successful routines for innovation management, we should pause for a moment and define what we mean by 'success'. We have already seen that one aspect of this question is the need to measure the overall process rather than its constituent parts. Many successful inventions fail to become successful innovations, even when well planned [116–119]. Equally, innovation alone may not always lead to business success. Although there is strong evidence to connect innovation with performance, success depends on other factors as well. If the fundamentals of the business are weak, then all the innovations in the world may not be sufficient to save it. This argues for strategically focused innovation as part of a 'balanced scorecard' of results measurement [120,121].

We also need to consider the time perspective. The real test of innovation success is not a one-off success in the short term but sustained growth through continuous invention and adaptation. It is relatively simple to succeed once with a lucky combination of new ideas and receptive market at the right time – but it is quite another thing to repeat the performance consistently. Some organizations clearly feel that they are able to do the latter to the point of presenting themselves as innovators – for example, 3M, Sony, IBM, Samsung and Philips, all of which currently use the term in their advertising campaigns and stake their reputations on their ability to innovate consistently.

In our terms, success relates to the overall innovation process and its ability to contribute consistently to growth. This question of measurement – particularly its use to help shape and improve management of the process – is also one to which we will return in Chapter 15.

WHAT DO WE KNOW ABOUT SUCCESSFUL INNOVATION MANAGEMENT?

The good news is that there is a knowledge base on which to draw in attempting to answer this question. Quite apart from the wealth of experience (of success and failure) reported by organizations involved with innovation, there is a growing pool of knowledge derived from research. Over the past hundred years there have been many studies of the innovation process, looking at many different angles. Different innovations, different sectors, firms of different shapes and sizes, operating in different countries and so on, have all come under the microscope and been analysed in a variety of ways. (Chapter 10 provides a detailed list of such studies.)

From this knowledge base, it is clear that there are no easy answers and that innovation varies enormously – by scale, type, sector and so on. Nonetheless, there does appear to be some convergence around our two key points:

- Innovation is a process, not a single event, and needs to be managed as such.
- The influences on the process can be manipulated to affect the outcome – that is, it can be managed.

Most importantly, research highlights the concept of success routines, which are learned over time and through experience. For example, successful innovation correlates strongly with how a firm selects and manages projects, how it co-ordinates the inputs of different functions, how it links up with its customers and so on. Developing an integrated set of routines is strongly associated with successful innovation management and can give rise to distinctive competitive ability – for example, being able to introduce new products faster than anyone else or being able to use new process technology better.

The other critical point to emerge from research is that innovation needs managing in an integrated way; it is not enough just to manage or develop abilities in some of these areas. One metaphor (originally developed by researchers at Cranfield University) that helps draw attention to this is to see managing the process in sporting terms; success is more akin to winning a multievent group of activities (such as the pentathlon) than to winning a single high-performance event such as the 100 meters race [6].

There are many examples of firms that have highly developed abilities for managing part of the innovation process but that fail because of a lack of ability in others. For example, there are many with an acknowledged strength in R&D and the generation of technological innovation – but which lack the abilities to relate these to the marketplace or to end users. Others may lack the ability to link innovation to their business strategy. For example, many firms invested in advanced manufacturing technologies – robots, computer-aided design, computer-controlled machines and so on – during the late twentieth century, but most surveys suggest that only half of these investments really paid off. In the case of the other half, the problem was an inability to match the 'gee whiz' nature of a glamorous technology to their particular needs, and the result was what might be called 'technological jewellery'– visually impressive but with little more than a decorative function.

The concept of capability in innovation management also raises the question of how it is developed over time. This must involve a learning process. It is not sufficient to simply have experiences (good or bad); the key lies in evaluating and reflecting upon them and then developing the organization in such a way that the next time a similar challenge emerges, the response is ready. Such a cycle of learning is easy to prescribe but very often missing in organizations – with the result that there often seems to be a great deal of repetition in the pattern of mistakes and a failure to learn from the misfortunes of others. For example, there is often no identifiable point

in the innovation process where a post-mortem is carried out, taking time to try and distil useful learning for next time. In part, this is because the people involved are too busy, but it is also because of a fear of blame and criticism. Yet, without this pause for thought, the odds are that the same mistakes will be repeated. It's important to note that even 'good' innovation management organizations can lose their touch – for example, 3M, for many years, a textbook case of how to manage the process found itself in difficulties as a result of overemphasis on incremental innovation (driven by a 'Six Sigma' culture) at the expense of 'breakthrough' thinking. Its reflection on the problems this posed and commitment to reshaping its innovation management agenda again underlines the importance of learning and of the idea of 'dynamic capability'. (We will return to this theme in Chapter 15.)

View 3.1 gives some examples of the key success factors in innovation as seen by practicing innovation managers.

VIEW 3.1 WHAT FACTORS MAKE FOR INNOVATION SUCCESS IN YOUR VIEW?

- Encouragement and empowerment from management; for small-scale innovations driven bottom up a clear focus, scope and mechanism are needed to reactively receive and channel ideas or implemented improvements.
- Positive reinforcement of innovative behaviour, which encourages others to do the same (e.g., via PR, Recognition/Reward, or just saying thanks).
- Where innovation is driven through large-scale programs of change, use of a range of tools and a creative environment is crucial to success in generating far-reaching ideas.

– John Gilbert, Head of Process Excellence, UBS

- Goldilocks resources – not too much, not too little.
- People who are willing to question, to challenge the status quo, who speak out when they are in disagreement, but who are open minded enough to evaluate a new idea.
- Senior management commitment – a visible and constant commitment – to innovation.
- Sufficient slack time to allow idea generation, experimentation and evaluation not directly associated with meeting the given objective.
- Protecting the innovation environment, the space, the resources, the people and the culture from the corrosive effect of a corporate bureaucracy that seeks to exploit existing resource in a repetitive fashion and tries to impose compliance through rule following.
- Recognizing and rewarding innovation, especially 'do-different' innovations.
- Making innovation part of the company culture, not just 'something for product development'.

– Patrick McLaughlin, Managing Director, Cerulean

- Nonstop motivation for innovation at the managing director level/Not having innovative individuals being accounted for short-term results.
- Build a project-based organization.
- Build a good portfolio management structure.
- Build a funnel or stage-gate system, with gates where projects pass through.
- Ensure a large enough human resource base allocated to innovation related activities.

– Wouter Zeeman, CRH Insulation, Europe

- No question in my view that innovation success comes from the top of the company, it's all about creating a culture of innovation rather than stagnation. It is essential that the person at the top of the organization is fully behind and demonstrates their support for innovation to succeed.
- A good mix of people and differing skills that they can 'bring to the party' with both the ability and drive to do it and share with others.
- The recognition that we will sometimes get it wrong but that we will learn from this experience and move on to create and develop something that works or improves the current state or/and produce something that is completely new.

– John Tregaskes, Innovation Manager, SERCO

- Innovation must be an integral part of the company strategy.
- A culture for cooperation and networking with many different external partners, combined with a sincere curiosity towards everything that is new must be found. Be ready to share knowledge because that is the best way to convince others to share with you.
- Make a potential innovation visual to others by early prototyping (physical products) or specific case studies.

– John Thesmer, Managing Director, Ictal Care, Denmark

To make an innovation successful, you have to have a clear understanding of the business drivers and constraints being felt

by the people on the 'coal face', – that is, the folks who will make the decision to use your new technology . . . or not. Don't simply launch your technology into the market and wait patiently for it to be adopted. Instead, talk extensively with the end user and find out first-hand what's working and what is not. Discover for yourself if there are other constraints or issues that might be preventing your technology from taking root. Don't forget that these frontline managers are usually juggling thousands of issues in their minds, and your innovation is just one of them. Your technology might perfectly solve one problem – but it might cause five more that you never thought of. You won't find out what these issues are by staying in the lab or the boardroom. To get answers to these questions, you have to get as close to the end user as you can.

– Rob Perrons, Shell Exploration, USA

SUCCESS ROUTINES IN INNOVATION MANAGEMENT

Successful innovators acquire and accumulate technical resources and managerial capabilities over time; there are plenty of opportunities for learning – through doing, using, working with other firms, asking the customers and so on – but they all depend upon the readiness of the firm to see innovation less as a lottery than as a process, which can be continuously improved.

From the various studies of success and failure in innovation, it is possible to construct checklists and even crude blueprints for effective innovation management. A number of models for auditing innovation have been developed in recent years, which provide a framework against which to assess performance in innovation management. Some of these involve simple checklists, others deal with structures, others with the operation of particular subprocesses. (We will return to the theme of innovation audits and their role in helping develop capability in Chapter 15.)

For our purposes in exploring innovation management throughout the rest of the book, it will be helpful to build on our model (**Figure 3.4**) and use it to focus attention on key aspects of the innovation management challenge. At its heart, we have the generic process described earlier, which sees innovation as a core set of activities distributed over time. (Of course, as we noted earlier, innovation in real life does not conform neatly to this simple representation – and it is rarely a single event but rather a cycle of activities repeated over time.) The key point is that a number of different actions need to take place as we move through the phases of this model and associated with each are some consistent lessons about effective innovation management routines.

Search The first phase in innovation involves detecting signals in the environment about potential for change. These could take the form of new technological opportunities or changing

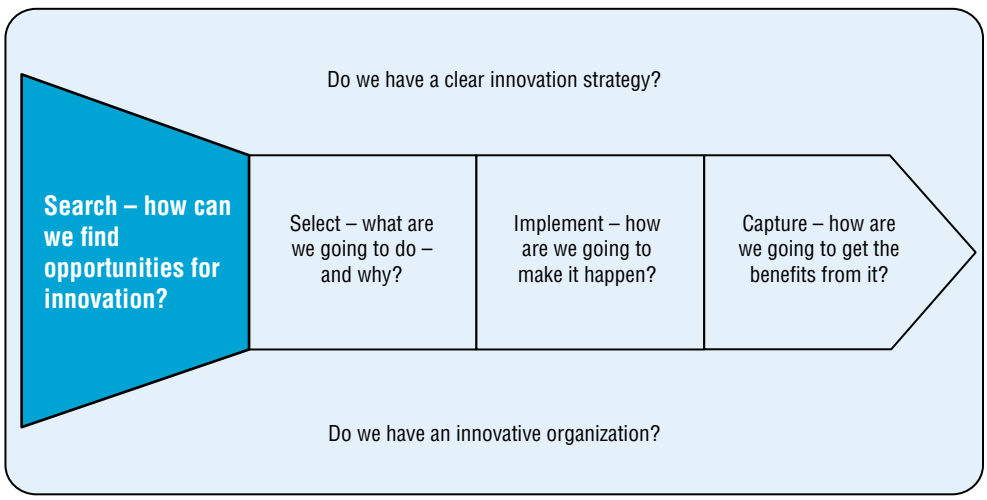

FIGURE 3.4 Process model of innovation

requirements on the part of markets; they could be the result of legislative pressure or competitor action. Most innovations result from the interplay of several forces, some coming from the need for change pulling through innovation, and others from the push that comes from new opportunities.

Given the wide range of signals, it is important for successful innovation management to have well-developed mechanisms for identifying, processing, and selecting information from this turbulent environment. Chapter 7 explores enabling routines associated with successful scanning and processing of relevant signals.

Organizations don't, of course, search in infinite space but rather in places where they expect to find something helpful. Over time, their search patterns become highly focused and this can – as we have seen – sometimes represent a barrier to more radical forms of innovation. A key challenge in innovation management relates to the clear understanding of what factors shape the 'selection environment' and the development of strategies to ensure that their boundaries of this are stretched. Again, this theme is picked up in Chapter 7.

Selection Innovation is inherently risky, and even well-endowed organizations cannot take unlimited risks. It is thus essential that some selection is made of the various market and technological opportunities and that the choices made fit with the overall business strategy of the firm and build upon established areas of technical and marketing competence. The purpose of this phase is to resolve the inputs into an innovation concept, which can be progressed further through the development organization.

Three inputs feed this phase (**Figure 3.5**). The first is the flow of signals about possible technological and market opportunities available to the enterprise. The second input concerns the current knowledge base of the organization – its distinctive competence [122]. By this, we mean what it knows about terms of its product or service and how that is produced or delivered effectively. This knowledge may be embodied in particular products or equipment, but is also present in the people and systems needed to make the processes work. The important thing here is to ensure that there is a good fit between what the organization currently knows about and the proposed changes it wants to make.

This is not to say that organizations should not move into new areas of competence; indeed, there has to be an element of change if there is to be any learning. But rather, there needs to be a balance and a development strategy. This raises the third input to this phase – the fit with the overall business. At the concept stage, it should be possible to relate the proposed innovation to improvements in the overall business performance. Thus, if a firm is considering investing in flexible manufacturing equipment because the business is moving into markets where increased customer choice is likely be critical, it will make sense. But if it is doing so in a commodity business

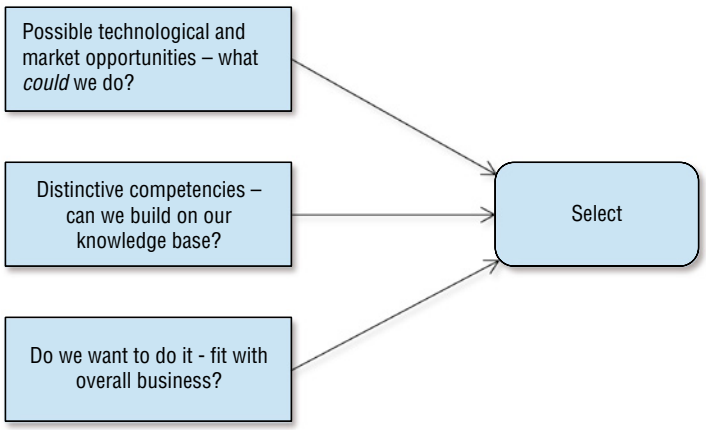

FIGURE 3.5 Key questions in the select phase

where everyone wants exactly the same product at the lowest price, then the proposed innovation will not underpin the strategy – and will effectively be a waste of money. Getting close alignment between the overall strategy for the business and the innovation strategy is critical at this stage.

In a similar fashion, many studies have shown that product innovation failure is often caused by firms trying to launch products that do not match their competence base [123].

This knowledge base need not be contained within the firm; it is also possible to build upon competencies held elsewhere. The requirement here is to develop the relationships needed to access the necessary complementary knowledge, equipment, resources and so on. Strategic advantage comes when a firm can mobilize a set of internal and external competencies – what Teece calls 'complementary assets' – which make it difficult for others to copy or enter the market [124]. (This theme is picked up in more depth in Chapter 9 where we explore in more detail some of the key routines associated with managing the strategic selection of innovation projects and building a coherent and robust portfolio.)

While the aforementioned discussion has focused particularly on business innovators, we can see similar patterns in public sector and not-for-profit innovation. Once again, the questions about core knowledge are critical. For example, the World Food Programme of the United Nations (one of the key mechanisms for providing humanitarian food assistance) has fundamentally changed its model from sourcing and distributing food towards giving people money with which to procure their own resources. This significant shift required a whole new set of skills and knowledge, effectively building a banking and financial management system to go alongside their accumulated expertise in logistics and distribution. They achieved this in a variety of ways – for example, through a strategic partnership with MasterCard [125].

Implementation Having picked up relevant trigger signals and made a strategic decision to pursue some of them, the next key phase is actually turning those potential ideas into some kind of reality – a new product or service, a change in process, a move to new markets or a shift in business model. In some ways, this implementation phase can be seen as one that gradually pulls together different pieces of knowledge and weaves them into an innovation. At the early stages, there is high uncertainty – details of technological feasibility, of market demand, of competitor behaviour, of regulatory and other influences and so on – all of these are scarce, and strategic selection has to be based on a series of 'best guesses'. But gradually over the implementation phase, this uncertainty is replaced by knowledge acquired through various routes and at an increasing cost. Technological and market research helps clarify whether or not the innovation is technically possible or if there is a demand for it and, if so, what are its characteristics. As the innovation develops, a continuing thread of problem-finding and solving – getting the bugs out of the original concept – takes place, gradually building up relevant knowledge around the innovation. Eventually, it is in a form that can be launched into its intended context – internal or external market – and then further knowledge about its adoption (or otherwise) can be used to refine the innovation. **Figure 3.6** illustrates this relationship.

We can explore the implementation phase in a little more detail by considering three core elements – acquiring knowledge, executing the project and launching and sustaining the innovation. **Acquiring knowledge** involves combining new and existing knowledge (available within

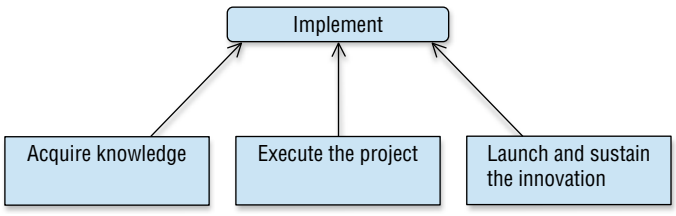

FIGURE 3.6 Key questions in the implement phase

and outside the organization) to offer a solution to the problem. It involves both generation of technological knowledge (via R&D carried out within and outside the organization) and technology transfer (between internal sources or from external sources). As such, it represents a first draft of a solution and is likely to change considerably in its development. The output of this stage in the process is both forward to the next stage of detailed development and back to the concept stage where it may be abandoned, revised or approved.

Much depends, at this stage, on the nature of the new concept. If it involves an incremental modification to an existing design, there will be little activity within the invention stage. By contrast, if the concept involves a totally new concept, there is considerable scope for creativity. While individuals may differ in terms of their preferred creative style, there is strong evidence to support the view that everyone has the latent capability for creative problem-solving [126]. Unfortunately, a variety of individual inhibitions and external social and environmental pressures combine and accumulate over time to place restrictions on the exercise of this creative potential. The issue in managing this stage is thus to create the conditions under which this can flourish and contribute to effective innovation.

Another problem with this phase is the need to balance the open-ended environmental conditions that support creative behaviour with the somewhat harsher realities involved elsewhere in the innovation process. As with concept testing and development, it is worth spending time exploring ideas and potential solutions rather than jumping on the first apparently workable option.

The challenge in effective R&D is not simply one of putting resources into the system; it is how those resources are used. Effective management of R&D requires a number of organizational routines, including clear strategic direction, effective communication and 'buy-in' to that direction, and integration of effort across different groups.

But not all firms can afford to invest in R&D; for many smaller firms, the challenge is to find ways of using technology generated by others or to complement internally generated core technologies with a wider set drawn from outside. This places emphasis on the strategy system discussed earlier – the need to know which to carry out where and the need for a framework to guide policy in this area. Firms can survive even with no in-house capability to generate technology – but to do so, they need to have a well-developed network of external sources, which can supply it, and the ability to put that externally acquired technology to effective use.

It also requires abilities in finding, selecting and transferring technology in from outside the firm – the challenge of 'absorptive capacity' [127]. This is rarely a simple shopping transaction, although it is often treated as such; it involves abilities in selecting, negotiating and appropriating the benefits from such technology transfer. (We discuss absorptive capacity in more detail in Chapter 7.)

Executing the project forms the heart of the innovation process. Its inputs are a clear strategic concept and some initial ideas for realizing the concept. Its outputs are both a developed innovation and a prepared market (internal or external), ready for final launch. This is fundamentally a challenge in project management under uncertain conditions. As we will see in Chapter 9, the issue is not simply one of ensuring that certain activities are completed in a particular sequence and delivered against a time and cost budget. The lack of knowledge at the outset and the changing picture as new knowledge is brought in during development means that a high degree of flexibility is required in terms of overall aims and subsidiary activities and sequencing. Much of the process is about weaving together different knowledge sets coming from groups and individuals with widely different functional and disciplinary backgrounds. And the project may involve groups that are widely distributed in organizational and geographical terms – often belonging to completely separate organizations. Consequently, the building and managing of a project team, of communicating a clear vision and project plan, of maintaining momentum and motivation and so on are not trivial tasks.

It is during this stage that most of the time, costs and commitment are incurred, and it is characterized by a series of problem-solving loops dealing with expected and unexpected difficulties in the technical and market areas. Although we can represent it as a parallel process, in practice, effective management of this stage requires close interaction between marketing-related and technical activities. For example, product development involves a number of functions, ranging from marketing, through design and development to manufacturing, quality assurance, and finally back to marketing. Differences in the tasks that each of these functions performs, in the training and experience of those working there, and in the timescales and operating pressures under which they work all mean that each of these areas becomes characterized by a different working culture. Functional divisions of this kind are often exaggerated by location, where R&D and design activities are grouped away from the mainstream production and sales operations – in some cases, on a completely different site.

Separation of this kind can lead to a number of problems in the overall development process. Distancing the design function from the marketplace can lead to inappropriate designs, which do not meet the real customer needs, or which are 'overengineered', embodying a technically sophisticated and elegant solution, which exceeds the actual requirement (and may be too expensive as a consequence). This kind of phenomenon is often found in industries that have a tradition of defence contracting, where work has been carried out on a cost-plus basis involving projects that have emphasized technical design features rather than commercial or manufacturability criteria.

Similarly, the absence of a close link with manufacturing means that much of the information about the basic 'make-ability' of a new design either does not get back to the design area at all or else does so at a stage too late to make a difference or to allow the design to be changed. There are many cases in which manufacturing has wrestled with the problem of making or assembling a product that requires complex manipulation, but where minor design change – for example, relocation of a screw hole – would considerably simplify the process. In many cases, such an approach has led to major reductions in the number of operations necessary – simplifying the process and often, as an extension, making it more susceptible to automation and further improvements in control, quality and throughput.

In the same way many process innovations fail because of a lack of involvement on the part of users and others likely to be affected by the innovation. For example, many IT systems, while technically capable, fail to contribute to improved performance because of inadequate consideration of current working patterns, which they will disrupt, lack of skills development among those who will be using them, inadequately specified user needs and so on.

Although services are often less tangible, the underlying difficulties in implementation are similar. Different knowledge sets need to be brought together at key points in the process of creating and deploying new offerings. For example, developing a new insurance or financial service product requires technical input on the part of actuaries, accountants, IT specialists and so on – but this needs to be combined with information about customers and key elements of the marketing mix – the presentation, the pricing, the positioning and so on, of the new service. Knowledge of this kind will lie particularly with marketing and related staff – but their perspective must be brought to bear early enough in the process to avoid creating a new service that no one actually wants to buy.

The 'traditional' approach to this stage was a linear sequence of problem-solving, but much recent work in improving development performance (especially in compressing the time required) involves attempts to do much of this concurrently or in overlapping stages. Useful metaphors for these two approaches are the relay race and the rugby team [128]. These should be seen as representing two poles of a continuum; as we shall see in Chapter 10, the important issue is to choose an appropriate level of parallel development.

In parallel with the technical problem-solving associated with developing an innovation, there is also a set of activities associated with preparing the market into which it will be

launched. Whether this market is a group of retail consumers or a set of internal users of a new process, the same requirement exists for developing and preparing this market for launch, since it is only when the target market makes the decision to adopt the innovation that the whole innovation process is completed. The process is again one of sequentially collecting information, solving problems and focusing efforts towards a final launch. In particular, it involves collecting information on actual or anticipated customer needs and feeding this into the product development process, while simultaneously preparing the marketplace and marketing for the new product. It is essential throughout this process that a dialog is maintained with other functions involved in the development process and that the process of development is staged via a series of 'gates', which control progress and resource commitment.

A key aspect of the marketing effort involves anticipating likely responses to new product concepts and using this information to design the product and the way in which it is launched and marketed. This process of analysis builds upon knowledge about various sources of what Thomas calls 'market friction' [129].

Recent years have seen a considerable surge in interest around 'agile innovation', a term used to describe a series of methods that originated in the field of software development [82]. It has been increasingly applied to other development projects for new products, services and even process reengineering. At its heart is an approach that emphasizes focused high-intensity team work (often called a 'scrum'), stretching goals and rapid cycles of prototyping, testing and learning. Where conventional project management techniques set a goal and then break down the various tasks needed to complete it into key activities and allocate resources to them, agile methods are more open-ended, allowing considerable creativity and flexibility in the execution of activities, which will move nearer to the stretch target.

Lean start-up (LSU) is a similar approach for entrepreneurs developed by Eric Ries and popularized by him and Steve Blank in various books and articles [130,131]. It draws on his own experience as an entrepreneur and his reflections on what went wrong with the process. At its heart, with agile innovation, is the view that starting a new venture is about a series of short fast experiments rather than a carefully planned and executed big project. Each cycle is carefully designed to generate information and test ideas out on the market – and after each prototype, the venture idea is adjusted. Key principles are the 'minimum viable product' (MVP), which is a simple basic version of the overall product idea, which can be tested on users to gain feedback, and the 'pivot', which changes in direction as a result of that feedback.

We discuss lean and agile methods in more detail in Chapter 10.

Launching and sustaining innovation of new products, services, or processes brings the need to understand the dynamics of adoption and diffusion. Buyer behaviour is a complex subject, but there are several key guidelines that emerge to help shape market development for a new product. The first is the underlying process of adoption of something new; typically, this involves a sequence of awareness, interest, trial, evaluation and adoption. Thus, simply making people aware, via advertising and so on, of the existence of a new product will not be sufficient; they need to be drawn into the process through the other stages. Converting awareness to interest, for example, means forging a link between the new product concept and a personal need (whether real or induced via advertising). Chapter 10 deals with this issue in greater depth.

Successful implementation of internal (process) innovations also requires skilled change management. This is effectively a variation on the marketing principles outlined earlier and stresses communication, involvement and intervention (via training, etc.) to minimize resistance to change – again essentially analogous to Thomas's concept of 'market friction'. Chapter 10 discusses this theme in greater detail and presents some key enabling routines for the implementation phase.

Understanding user needs has always been a critical determinant of innovation success, and one way of achieving this is by bringing users into the loop at a much earlier stage. The work of Eric von Hippel and others has shown repeatedly that early involvement and allowing

them to play an active role in the innovation process leads to better adoption and higher-quality innovation. It is, effectively, the analogue of the early involvement/parallel working model mentioned earlier – and with an increasingly powerful set of tools for simulation and exploration of alternative options, there is growing scope for such an approach [132,133].

Where there is a high degree of uncertainty – as is the case with discontinuous innovation conditions – there is a particular need for adaptive strategies, which stress the coevolution of innovation with users, based on a series of 'probe and learn' experimental approaches. The role here for early and active user involvement is critical.

Capturing Value The purpose of innovating is rarely to create innovations for their own sake, but rather to capture some kind of value from them – be it commercial success, market share, cost reduction or – as in social innovation – changing the world. History abounds with examples of innovations that succeeded at a technical level but that failed to deliver value – or achieved it briefly, only to have the advantage competed away by imitators. Capturing value from the process is a critical theme and one to which we will return in Chapter 12. There are many ways in which this can be done, from formal methods, such as patenting through to much less formal, such as the use of tacit knowledge. And central to the discussion is the concept of 'complementary assets' – what other elements around the system in which the innovation is created and delivered are hard for others to access or duplicate? This gives rise to the idea of what David Teece [124] termed 'appropriability regimes' – how easy or hard is it to extract value from investments in innovation?

An inevitable outcome of the launch of an innovation is the creation of new stimuli for restarting the cycle. If the product/service offering or process change fails, this offers valuable information about what to change for the next time. A more common scenario is what Rothwell and Gardiner call 'reinnovation'; essentially building upon early success but improving the next generation with revised and refined features. In some cases, where the underlying design is sufficiently 'robust', it becomes possible to stretch and reinnovate over many years and models [134].

But although the opportunities emerge for learning and development of innovations and the capability to manage the process that created them, they are not always taken up by organizations [135]. Among the main requirements in this stage is the willingness to learn from completed projects. Projects are often reviewed and audited, but these reviews may often take the form of an exercise in 'blame accounting' and in trying to cover up mistakes and problems. The real need is to capture all the hard-won lessons, from both success and failure, and feed these through to the next generation. Nonaka and Kenney provide a powerful argument for this perspective in their comparison of product innovation at Apple and at Canon [136]. Much of the current discussion around the theme of knowledge management represents growing concern about the lack of such 'carryover' learning – with the result that organizations are often 'reinventing the wheel' or repeating previous mistakes.

Learning can be in terms of technological lessons learned – for example, the acquisition of new processing or product features – which add to the organization's technological competence. But learning can also be around the capabilities and routines needed for effective product innovation management. In this connection, some kind of structured audit framework or checklist is useful.

KEY CONTEXTUAL INFLUENCES

So far, we have been considering the core generic innovation process as a series of stages distributed over time and have identified key challenges that emerge in their effective management. But the process doesn't take place in a vacuum – it is subject to a range of internal and external influences that shape what is possible and what actually emerges. Roy Rothwell distinguishes between what he terms 'project related factors' – essentially those that we have been considering

so far – and 'corporate conditions', which set the context in which the process is managed [85]. For the purposes of the book, we will consider two sets of such contextual factors:

- The strategic context for innovation – how far is there a clear understanding of the ways in which innovation will take the organization forward? And is this made explicit, shared and 'bought into' by the rest of the organization?
- The innovativeness of the organization – how far do the structure and systems support and motivate innovative behaviour? Is there a sense of support for creativity and risk-taking, can people communicate across boundaries and is there a 'climate' conducive to innovation?

We will explore these themes in Chapters 4 and 5, respectively.

3.11 BEYOND THE STEADY STATE

The model we have been developing in this chapter is very much about the world of repeated, continuous innovation where there is the underlying assumption that we are working within an established frame of markets, technologies, competitors, regulatory regime, etc. This is not necessarily only about incremental innovation – it is possible to have significant step changes in product/service offering, process and so on – but these still take place within our established envelope. The 'rules of the game' in terms of technological possibilities, market demands, competitor behaviour, political context and so on, are fairly clear, and although there is scope for pushing at the edges, the space within which innovation happens is well defined.

Central to this model is the idea of learning through trial and error to build effective routines, which can help improve the chances of successful innovation. Because we get a lot of practice at such innovation, it becomes possible to talk about a 'good' (if not 'best') practice model for innovation management, which can be used to audit and guide organizational development.

But we need to also take into account that innovation is sometimes *discontinuous* in nature. Things happen – as we saw in Chapter 1 – which lie outside the 'normal' frame and result in changes to the 'rules of the game'. Under these conditions, doing more of the same 'good practice' routines may not be enough and may even be inappropriate when dealing with the new challenges. Instead, we need a different set of routines – not to use instead of but as well as those we have developed for 'steady-state' conditions. It is likely to be harder to identify and learn these, in part because we don't get so much practice – it is hard to make a routine out of something that happens only occasionally. But we can observe some of the basic elements of the complementary routines, which are associated with successful innovation management under discontinuous conditions. These tend to be associated with highly flexible behaviour involving agility, tolerance for ambiguity and uncertainty, emphasis on fast learning through quick failure and so on – very much characteristics that are often found in small entrepreneurial firms.

As we will see throughout the book, a key challenge in managing innovation is the ability to create ways of dealing with both sets of challenges – and if possible to do so in 'ambidextrous' fashion, maintaining close links between the two rather than spinning off completely separate ventures.

SUMMARY

- In this chapter, we've looked at the challenge of managing innovation as a core business process concerned with renewing what the organization offers and the ways in which it creates and delivers that offering.
- The process has a number of elements, comprising search, select, implement and capture value.
- It is also influenced by key factors including the availability of a coherent innovation strategy and the presence of a supportive innovation organization.

- We have also looked at the question of routines – repeated and learned patterns of behaviour, which become 'the way we do things around here' since it is these that constitute the core of innovation management capability.
- Finally, we looked at some of the lessons learned around success routines – what does experience teach us about how to organize and manage innovation?

FURTHER READING

A number of writers have looked at innovation from a process perspective; good examples include Keith Goffin and Rick Mitchell's *Innovation management* (Macmillan, 2016), Paul Trott's *Innovation and new product development* (Pearson, 2016), and Andrew Van de Ven's *Innovation journey* (Oxford University Press, 1999). Case studies provide a good lens through which this process can be seen, and there are several useful collections including Bettina von Stamm's *Innovation, design and creativity* (2nd ed., John Wiley, 2008), Roland Kaye and David Hawkridge's *Case studies of innovation* (Kogan Page, London, 2003), and Roger Miller and Marcel Côté's *Innovation reinvented: Six games that drive growth* (University of Toronto Press, 2012). For practitioners, Gijs van Wulfen's books *The innovation expedition* (BIS, 2013) and *The innovation maze* (BIS, 2016) take metaphors around traveling through the process to help understand key issues and potential management action.

Some books cover company histories in detail and give an insight into the particular ways in which firms develop their own bundles of routines – for example, David Vise's *The Google story* (Pan, London, 2008), Graham and Shuldiner's *Corning and the craft of innovation* (Oxford University Press, 2001), and Gundling's *The 3M way to innovation: Balancing people and profit* (New York: Kodansha International, 2000) and John Bessant's *Riding the innovation wave* (Emerald, 2017) describing the German firm Hella.

Many books and articles focus on particular aspects of the process – for example, on technology strategy, Burgelman et al.'s *Strategic management of technology* (McGraw-Hill Irwin, 2008). On product or service development, Robert Cooper's *Winning at new products* (Kogan Page, 2011), Rosenau et al.'s *The PDMA Handbook of new product development* (3rd ed., John Wiley, 2013), and Tidd and Hull's *Service innovation: Organizational responses to technological opportunities and market imperatives* (Imperial College Press, 2003). On process innovation, Lager's *Managing process innovation* (Imperial College Press, 2011), Zairi and Duggan's *Best practice process innovation management* (Butterworth Heinemann, Oxford, 2012), and Gary Pisano's *The Development factory: Unlocking the potential of process innovation* (Harvard Business School Press, 1996). On technology transfer, Mohammed Saad's *Development through technology transfer* (Intellect, 2000). On implementation, Alan Afuah's *Innovation management: Strategies, implementation and profits* (Oxford University Press, 2003), Osborne and Brown's *Managing change and innovation in public service organizations* (Psychology Press, 2010), and Bason's *Managing public sector innovation* (Policy Press, London, 2011). On learning, Kim and Nelson's *Technology, learning, and innovation: Experiences of newly industrializing countries* (Cambridge University Press, 2003), Nooteboom's *Learning and innovation in organizations and economies* (Oxford University Press, 2000), Leonard's *Wellsprings of knowledge* (Harvard Business School Press, 1995), and Nonaka's *The knowledge creating company* (Harvard Business School Press, 1991).

OTHER RESOURCES

A number of additional resources including downloadable case studies, audio and video material dealing with themes raised in the chapter can be found at locations listed below.

Resource type	Details	Access
Video/audio	Interviews with practising innovation managers Interview with Helle-Vibeke Carstensen of the Danish government, talking about citizens as a source of innovation John Bessant talking about managing innovation as a process	All at https://johnbessant.org/resources/media-resources/the-innovators-media-library/

(*continued*)

Resource type	Details	Access
Case studies	• A case study of Tesco and their (failed) innovation based on market entry to the United States, which gives an insight into how large retailers approach innovation • Case studies from the public sector – RED and Open Door – and from the humanitarian sector, which give some insight into how innovation is approached in not-for-profit contexts • A case study of Zara showing how IT and networks support fast fashion as an innovation model • Several cases – AMP, Law Firms, MPESA, and NPI – which illustrate innovation in financial and legal sectors • Case examples – Threadless, Adidas, Joseph's, Lego – where companies are exploring user-led approaches • Case study of Liberty Global, which describes their efforts to create and sustain a culture of continuous incremental innovation • Case studies of Aravind, NHL Hospitals, Lifespring Hospitals, and Eastville Community Shop as examples of social innovation • Case studies of Cerulean, Coloplast, and Philips, which explore the issues in creating and executing radically new projects within a large organization • Case histories of Marshalls and Hella, which show how innovation develops over an extended period of time within organizations	All at https://johnbessant.org/case-studies/

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