

# Chapter 1

## Dynamic Capabilities: Foundations

Strategy matters most during times of change. Businesses and people find it far easier to do more of the same than to do something different. But the world does not stand still. As markets become more globally integrated and new forms of technology and competition arise, companies cannot rest on their laurels. Firms must adapt to and exploit changes in their business environment, while seeking opportunities to create change through technological, organizational, or strategic innovation. Creating, adapting to, and exploiting change is inherently entrepreneurial, for large firms and small, for old firms and new. But entrepreneurial activity of this sort does not imply a lack of strategy or organization. Indeed, effective change often requires both. To survive and prosper under conditions of change, firms must develop the “dynamic capabilities” to create, extend, and modify the ways in which they make their living.

Since the concept of dynamic capabilities was first introduced, additional research has elaborated on the initial idea. Many questions remain, however. The core concept requires clarification and development of the conceptual underpinnings along with grounding in empirical observation. This book addresses both the conceptual and empirical grounding of dynamic capabilities. We provide a succinct yet comprehensive definition of dynamic capabilities to serve as the basis for future work. We also provide a starting point for assessing the performance of dynamic capabilities, both conceptually and empirically. Additionally, a substantial portion of the book focuses on empirical observations regarding dynamic capabilities, including case examples and statistical analysis.

A capability, whether operational or dynamic, is the ability to perform a particular task or activity. Operational capabilities enable an organization to earn a living in the present (Winter, 2003). In contrast, dynamic capabilities concern change. A dynamic capability is *the capacity of an organization to purposefully create, extend, or modify its resource base*. Dynamic capabilities come in many forms. Some dynamic capabilities enable firms to enter new businesses and extend old ones through internal growth, acquisitions, and strategic alliances. Other capabilities help a firm to create new products and production processes. Yet others involve the capabilities of the managers

responsible for leading profitable firm change and growth. The types of dynamic capabilities extend even further, far beyond what a single book can incorporate. We focus here on a few in-depth examples of dynamic capabilities involving alliances, acquisitions, and management.

The concept of dynamic capability includes the capacity with which to identify the need or opportunity for change, formulate a response to such a need or opportunity, and implement a course of action. Not all dynamic capabilities serve all three functions. Instead, different dynamic capabilities serve different purposes.

To understand how organizations identify and respond to the need for change, we must examine the underlying organizational and managerial processes. The transformation of an organization (even a nascent one) through additions, deletions, or modifications to its resource base entails processes for achieving these changes. We need to know not only what organizations do – which markets they enter, which products they introduce, how fast they grow, which firms they acquire or ally with – but also how they do it. This book therefore pays close attention to the managerial and organizational processes that are part and parcel of dynamic capabilities.

The benefits that firms obtain from their dynamic capabilities depend not only on the efficacy of the underlying organizational and managerial processes, but also on the context in which the capabilities are employed. That is, how well dynamic capabilities “fit” with the internal and external environment of the firm affects their usefulness as a means for adapting to, exploiting, and creating change in the business environment. Accordingly, we extend the concept of “fit” to begin to develop conceptual yardsticks for evaluating how well or poorly dynamic capabilities perform.

To begin the analysis, in this chapter we elaborate on the concept of dynamic capability and introduce conceptual yardsticks for assessing the performance of dynamic capabilities. The following chapters analyze conceptual issues involving managers and organizational processes in greater detail, and then examine empirical evidence regarding the nature and consequences of dynamic capabilities. The book concludes with an overall assessment and look to the future.

## The Dynamic Capabilities Concept

The original definition of dynamic capabilities referred to “the firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (Teece, Pisano, and Shuen, 1997: 516). In this definition, organizational competencies denoted managerial and organizational processes or “patterns of current practice and learning” (Teece, Pisano, and Shuen, 1997: 518), through which “firm-specific assets are assembled in integrated clusters spanning individuals and groups” (Teece, Pisano, and Shuen, 1997: 516). By altering the organization’s resource base, dynamic capabilities could then open new strategic alternatives or “paths” for the firm (Helfat, 1997).

Subsequent work refined and expanded the original definition of dynamic capabilities. Eisenhardt and Martin (2000: 1107) defined dynamic capabilities as “the firm’s processes that use resources . . . to match and even create market change.” In this conception, dynamic capabilities took the form of organizational processes. Eisenhardt

and Martin (2000) provided examples of dynamic capabilities as processes, such as product development routines, alliance and acquisition capabilities, resource allocation routines, and knowledge transfer and replication routines. In addition to defining dynamic capabilities as processes, Eisenhardt and Martin (2000) extended the original definition of dynamic capabilities to include the creation of market change, as well as the response to exogenous change. These authors further noted that dynamic capabilities can operate in environments other than those experiencing rapid change.

Zollo and Winter next focused on organizational learning as a source of dynamic capability, which they defined as “a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness” (Zollo and Winter, 2002: 340). This definition implicitly distinguishes dynamic capabilities from operational capabilities. This definition also suggests that, like operational capabilities, dynamic capabilities consist of *patterned* organizational behavior that companies can invoke on a repeated rather than idiosyncratic basis. Unlike some implications of prior research, in this definition dynamic capabilities do not necessarily improve firm performance. Although firms pursue greater effectiveness of their operating routines, they may or may not achieve it. Hence, the definition of dynamic capabilities does not suffer from any sort of tautology with regard to the superiority of performance (see also Winter, 2003).

Zollo and Winter’s (2002) definition focuses on dynamic capabilities that modify an organization’s operating routines. Not all dynamic capabilities, however, act upon operating routines. Of particular importance are information processing capabilities that may enable the firm to identify the nature of the changing market environment and sense opportunities that it holds (Teece, Pierce, and Boerner, 2002). This ability to identify strategic opportunities in a changing environment provides a potential continuing source of competitive advantage (Denrell, Fang, and Winter, 2003).

Recently, Teece, Pierce, and Boerner (2002) have noted the importance of managerial capability to sense opportunities. Taking account of the role of management more generally, Adner and Helfat (2003: 1012) used the term “dynamic managerial capabilities” to refer to the capacity of managers to create, extend or modify the resource base of an organization. Like dynamic organizational capabilities, dynamic managerial capabilities arise from prior learning and experience.

The foregoing research includes a range of definitions of dynamic capabilities.<sup>1</sup> Although these definitions overlap, they capture different attributes of the phenomenon. In order to provide a solid foundation for subsequent work, we next provide a succinct and comprehensive definition of dynamic capabilities. Additionally, prior research suggests that dynamic capabilities serve two main functions with regard to

<sup>1</sup> Many other authors have utilized similar definitions to those reviewed here, including: Rosenbloom (2000), who highlights the importance of management leadership as a dynamic capability; Zott (2003), who focuses on dynamic capabilities as routine organizational processes that guide the evolution of firm resources and operational routines; Galunic and Eisenhardt (2001), who analyze dynamic capabilities as the processes through which managers manipulate resources into new configurations as markets change; Pisano (2000), who focuses on dynamic routines that regulate the search for improved routines; and Collis (1994), who includes strategic insights that derive from managerial or entrepreneurial capabilities.

the resource base of an organization: 1) search and selection, including resource creation, and 2) deployment. Although the deployment, or implementation, aspect of dynamic capabilities has tended to receive the most attention, search and selection are equally important. In what follows, we elaborate on these different functions of dynamic capabilities as well.

## Dynamic Capability: Definition

Building on the prior literature, we provide this definition:

*A dynamic capability is the capacity of an organization to purposefully create, extend, or modify its resource base.*

We recognize that a single phrase cannot include everything of importance with regard to dynamic capabilities. This definition, however, captures many of the critical features of dynamic capabilities. The words in this definition have specific meanings, as follow.

The “resource base” of an organization includes tangible, intangible, and human assets (or resources) as well as capabilities which the organization owns, controls, or has access to on a preferential basis. An organization need not own a resource or capability for it to comprise part of the resource base. For example, organizations do not own their employees. Organizations also have access to many other sorts of resources and capabilities on a preferential basis that they do not own. Preferential access through alliances to the resources and capabilities of others clearly falls into this category.

As our use of the term “resource base” implies, we consider capabilities to be “resources” in the most general sense of the word. By this we mean simply that resources are something that the organization can draw upon to accomplish its aims. This usage is consistent with the way in which the most widely used English dictionaries, including the Oxford, Merriam-Webster, and the American Heritage, define the word “resource.”<sup>2</sup>

Since dynamic capabilities are themselves capabilities, it follows that dynamic capabilities comprise part of the resource base of an organization. Since dynamic capabilities create, modify, or extend the resource base of an organization and since dynamic capabilities also comprise part of this resource base, this implies that dynamic capabilities can modify or extend dynamic capabilities. At first glance, the latter statement may appear contradictory, but it is not. While it may be difficult for a particular dynamic capability to modify or extend itself (although we cannot rule out such a possibility), we can find many instances where one dynamic capability can and

<sup>2</sup> Consider the following definitions of *resource* according to these online dictionary sources: a) An action or thing resorted to (*Compact Oxford English Dictionary*); b) Means that can be used to cope with a difficult situation; the total means available to a company for increasing production or profit (*American Heritage*); c) A source of support: an available means (*Merriam-Webster*); d) A means of support (*Chambers*).

does alter another dynamic capability (see Helfat and Peteraf, 2003). For example, a dynamic capability for learning frequently helps to extend or modify dynamic as well as operational capabilities of all types. As another example, dynamic managerial capabilities create, modify, and extend many types of capabilities, including dynamic ones such as those for innovation, acquisition, and alliance.

The word “capacity” refers to the ability to perform a task in at least a minimally acceptable manner. Thus, if an organization has a dynamic capability, it can alter its resource base in at least some minimally satisfactory manner. (We return to the issue of what constitutes minimally acceptable performance of a task later in this chapter when we introduce the concept of “technical fitness.”) How well the organization alters its resource base is another matter. Neither “capability” nor the related term “competence” implies outstanding ability, according to the *Merriam-Webster Dictionary of Synonyms and Antonyms* (1992). These terms imply only the potential for “adequate performance.” In the definition of dynamic capability, we therefore are careful to exclude any sort of tautology with regard to superior performance. Change in the resource base of an organization implies only that the organization is doing something different, but not necessarily better, than before.

The term “capacity” has a second dimension as well. It implies that the function that a dynamic capability performs is repeatable and can be reliably executed to at least some extent. In other words, a dynamic capability consists of patterned and somewhat practiced activity. To qualify as a capability rather than simply as ad hoc problem solving, dynamic capabilities must contain some patterned element (Winter, 2003). It is therefore important to distinguish dynamic capability from a one-time idiosyncratic change to the resource base of an organization. We further distinguish dynamic capability from some sort of innate “talent” that does not derive from the patterned experience of the individuals involved in the decision making or deployment of the capability. Innate talent is not a capability, dynamic or otherwise.

The word “purposefully” also has a specific meaning in our definition. This word indicates that dynamic capabilities reflect some degree of intent, even if not fully explicit. We therefore distinguish dynamic (and other) capabilities from organizational routines, which consist of rote organizational activities that lack intent (Dosi, Nelson, and Winter, 2000). That is, the attribute of intentionality differentiates the patterned aspect of dynamic capabilities from rote organizational activity. The intentionality element also distinguishes dynamic capabilities from accident or luck. Intent does, however, incorporate emergent streams of activity (in the sense of Mintzberg and Waters, 1985) that have some implicit aim, even if not fully planned. Emergent activity within an organization, for example, includes the actions of managers lower down in the organization who make decisions in reaction to changes in the external environment, even when top management has not explicitly directed the managers to take these steps (Mintzberg and Waters, 1985).

As used here, the terms “capacity” and “purposeful” apply not only to dynamic capabilities, but also to operational capabilities that enable firms to perform their ongoing tasks of making a living. The words “create, extend, or modify” in the definition of dynamic capability, however, do not apply to operational capabilities. Unlike operational capabilities, which pertain to the current operations of an organization, dynamic capabilities alter the resource base of an organization. Such

alteration can take many forms. Organizations can create a resource base, or portions of a resource base. In using the word “create,” we include all forms of resource creation in an organization, including obtaining new resources through acquisitions and alliances, as well as through innovation and entrepreneurial activity. Organizations also can extend their current resource base in the direction of more of the same, as for example when they seek to promote growth in an ongoing business. And organizations can modify their resource base in order to change their businesses, including in response to change in the external environment.

This definition of dynamic capabilities applies to not-for-profit as well as for-profit organizations. Both types of organizations have resource bases and both may face or initiate change. The definition also applies to newly formed as well as to established organizations. Almost by definition, however, new-to-the-world organizations typically have developed fewer patterned forms of behavior that underpin a capability (Helfat and Peteraf, 2003).

Our definition further incorporates the search and selection aspects of dynamic capabilities. The creation of resources through acquisitions, for example, fundamentally involves search for and selection of acquisition candidates. The creation of resources through new product development similarly involves search for and selection of new products to introduce. Similar logic applies to search and selection through alliances and to any number of other dynamic capabilities directed toward resource creation. Extension of the current resource base also requires an important selection decision regarding whether or not to enhance current assets and capabilities, and which ones to enhance. In addition, modification of a resource base requires search for and selection of any such modifications. As part of resource modification, a firm may choose to destroy part of its existing resource base by selling, closing, or discarding it. Dynamic capabilities apply to exit, not just expansion.

Search and selection entail decision making. Thus, we must incorporate decision making into our analysis, in addition to the change and building processes that support dynamic capabilities. Decision making sometimes occurs in groups, such as top management and other teams, and sometimes falls to individuals. Dynamic capabilities therefore pertain to both an organizational unit (e.g., a firm, a division, other sub-unit, or team) and to an individual decision maker within the organization. The role of individuals suggests the importance of understanding managerial decision making under conditions of change.

Individual dynamic capabilities come in many forms. For example, research on dynamic capabilities has referred to learning, product development, and acquisition as dynamic capabilities, to name a few. But when we seek to understand dynamic capabilities, we must move beyond general typologies of types of capabilities. Consider a dynamic capability of “learning.” Learning about what and how? A capability of learning-by-doing differs substantially from learning by observing or learning from written material. To make progress, it is helpful to be as precise as possible about the nature of a particular dynamic capability before proceeding with analysis.

In addition, the context within which organizations utilize dynamic capabilities matters. To continue the example of learning, a capability of learning-by-doing about auto manufacturing at Toyota or Honda differs from a capability of learning-by-doing about supply chain logistics in discount retailing at Wal-Mart and Carrefour.

Dynamic capabilities not only have generic attributes, but also become tailored to the settings in which they function, including different industries, technologies, functional areas, and organizations. For example, consider Dell Computer. Dell has become the fastest growing and most profitable personal computer manufacturer as a result of its low-cost, efficient component assembly and delivery and its low-cost direct sales model. Dell's development of its process for manufacturing personal computers, however, depended on the modular nature of the technology that underlies the personal computer. Dell's development of its direct sales model depended on the growth of Internet usage among potential customers.

## The Performance of Dynamic Capabilities and Fit

Having thus far defined dynamic capabilities at a conceptual level, we are now in a position to propose yardsticks for measuring how well or poorly dynamic capabilities perform. To date, we lack such yardsticks. As a starting point, we require a clear conceptualization of how to measure the performance of dynamic capabilities. Then we can begin to translate such a conceptualization into empirical metrics.

As just noted, dynamic capabilities are context dependent. We therefore require a yardstick that accounts for context-dependence. Our primary conceptual yardstick for measuring the performance of dynamic capabilities is what we term "evolutionary fitness."<sup>3</sup> Evolutionary fitness refers to how well a dynamic capability enables an organization to make a living by creating, extending, or modifying its resource base. The analogue to evolutionary fitness for operational capabilities is what has come to be called "external fit." Evolutionary fitness depends on the external "selection" environment: evolutionarily fit dynamic capabilities enable a firm to survive and perhaps grow, and to prosper in the marketplace. Thus, the extent of evolutionary fitness depends on how well the dynamic capabilities of an organization match the context in which the organization operates.

We can identify four important influences on the evolutionary fitness of a dynamic capability: quality, cost, market demand, and competition. We introduce the term "technical fitness" (see figure 1.1) to capture the idea of quality per unit of cost, an internal measure of capability performance. The other two factors of market demand and competition capture important environmental influences on evolutionary fitness (figure 1.2). Each of these factors affects the external fit of operational capabilities as well as the evolutionary fitness of dynamic capabilities.

The term "technical fitness" is introduced to denote how effectively a capability performs its intended function when normalized (divided) by its cost. Thus, technical

<sup>3</sup> This terminology suits our present purposes, but other terms may prove useful for different but related purposes. The population ecology literature has used the term "fitness" with reference to the ability of an organization to survive in the face of Darwinian-like selection by the external environment (see e.g., Hannan and Freeman, 1984). Winter (2005) uses the term "ecological fitness" to incorporate the impact on organizational survival (including net reproduction or growth rates) not only of the technical fitness of an entire organization, but also the technical fitness of individual attributes (e.g., capabilities) of organizations.

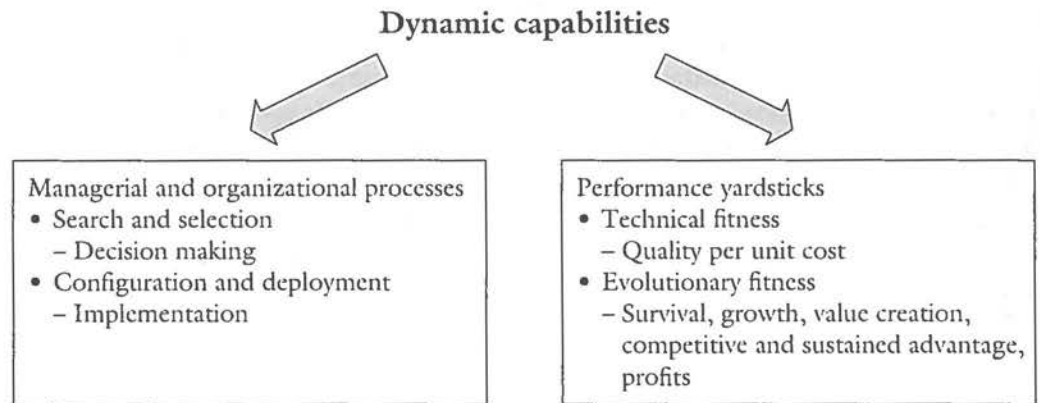


Figure 1.1 Dynamic capabilities: processes and performance yardsticks

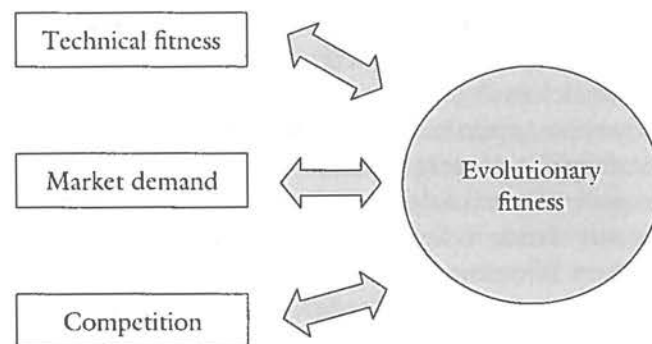


Figure 1.2 Factors that influence evolutionary fitness

fitness has two dimensions. The first comprises what we might think of as the quality dimension of a capability, regardless of the cost of creating and utilizing the capability. The second dimension of technical fitness is the cost of capability creation (or acquisition) and utilization. Quality and cost do not have a one-to-one relationship. Consider a well-known operational capability such as just-in-time delivery. Superior practitioners of this capability, such as Toyota, use just-in-time to accomplish both high quality (the right part at the right time and place) and low-cost delivery. In other instances, high costs accompany high quality. For example, studies of innovation from a wide variety of industries suggest that greater innovative output (a measure of the quality of innovative dynamic capability) is associated with higher research and development spending and therefore higher costs. Since quality and cost do not always move in the same direction, it is important to separate these two dimensions of performance.

Technical fitness also differs from market demand. The latter term refers to the quantity of output demanded at each price. Demand for a capability is what economists call a “derived demand,” meaning that it depends on the demand for the end product or service to which the capability contributes. Thus, in evaluating the market demand component of evolutionary fitness for a dynamic capability, we would like



to know the strength of market demand for the output of the capability. Technical fitness and market demand do not necessarily go together. We can think of any number of high-quality products that consumers in the market simply did not want at the cost that it took to produce it. Firms can clearly overemphasize technical fitness. The well-known stories of the continued development of the steam locomotive and the Model A Ford in the face of dropping demand provide ample evidence of excessive attention to technical fitness.

Finally, the competitive environment, including competition from and cooperation with other firms, affects the evolutionary fitness of dynamic capabilities. If all firms have similar dynamic capabilities and there are many such firms in the market, this will increase competition. Greater competition will make it more difficult for firms to survive and prosper, and therefore will decrease evolutionary fitness. Conversely, when firms cooperate to build a market or product, including through alliances, the firms may jointly increase their evolutionary fitness. Thus, even when firms have technically fit capabilities, whether or not they make money depends on competition from and cooperation with other firms.

### Measurement Scale for Fitness

The analysis thus far of evolutionary fitness raises several issues regarding the measurement of fitness that we next address. To begin, we investigate whether fitness can be negative. To answer this question, we first ask whether the technical fitness component of evolutionary fitness can have a negative value. In our definition of the term technical fitness, the answer is “no.” We have in mind an analogy to a sports event such as a track race. The technical fitness measure of the individual’s capability to run the track is the time that it takes the person to complete the event normalized (divided) by the cost of acquiring and using this capability. This value is always non-negative, since the time it takes to run the track and the amount of effort, time, and money spent to acquire and use the capability (the cost) are non-negative. Technical fitness is an absolute measure of capability. To have some bare minimum level of capability, technical fitness must exceed zero.<sup>4</sup> Thus, the yardstick of technical fitness maps directly onto the definition of a capability as reflecting some minimum capacity to perform a task.

To apply the concept of technical fitness accurately, it is important to define a capability as precisely as possible. Consider the mundane example of driving a car. If we define the capability simply as one of driving, this doesn’t differentiate between driving a car with the steering wheel on the right-hand side of the car and driving a car with the wheel on the left-hand side. Most of us have high technical fitness for performing one of these tasks and weaker technical fitness for the other.

As a business example of technical fitness, consider a dynamic capability of new product development. A measure of technical fitness for this capability would

<sup>4</sup> Here we implicitly assume that the cost of capability acquisition and deployment exceeds zero. If these costs instead are zero, then we need not normalize the quality dimension of technical fitness by its cost.

include how well the new product performs its intended function. Attributes of product performance can be measured on an absolute scale and do not depend on the market context. Thus, in their pioneering work on innovation, Mansfield et al. (1971) distinguished the “technical” dimension of innovation success from the issue of whether or not, and to what extent, a new product will succeed in the marketplace.

The argument that the technical fitness of a capability exceeds zero does not rule out the possibility that one capability can have a negative “transfer effect” on the technical fitness of another capability. That is, we may observe a negative interaction between capabilities. The old saying about trying to walk and chew gum at the same time captures this general idea well. If chewing gum decreases the technical fitness of walking, then a person shouldn’t do both at the same time. Even where there is a negative transfer effect of one capability on the technical fitness of another capability, however, the technical fitness of a capability cannot become negative.

Unlike technical fitness, evolutionary fitness can take on a negative value. To return to the driving example, low technical fitness of a dynamic capability of learning how to drive a car can result in a car crash and perhaps death – an extreme case of negative evolutionary fitness. Moreover, attempting to use a capability that has high technical fitness in one context, such as driving on the country roads of New Hampshire, in a different context, such as driving on the Daytona speedway, can create equally negative evolutionary fitness.

For organizations, one way of thinking about negative evolutionary fitness is to ask whether a firm would be willing to pay to get rid of a capability. As an economic matter, a firm would never intentionally invest in developing or purchasing a capability that had negative evolutionary fitness. But if the environment changes, the cost of maintaining a capability that no longer serves a useful purpose could become so great that the firm might be willing to pay to get rid of the capability. In order to preclude the possibility of negative evolutionary fitness, organizations would need the ability to mothball or get rid of capabilities without cost. To understand whether or not organizations can do this, we need to consider two issues. The first has to do with whether organizations can possess capabilities at zero cost without using them. The second has to do with the bundled nature of capabilities.

To begin with the first of these issues, unlike in standard economic theory, capabilities often have the property that they function less well if they are not used. Capabilities incorporate the knowledge of individuals and teams of how to perform a task or set of tasks. Most knowledge that resides within an organization has the property that it is remembered by doing. Thus, to maintain a capability and the knowledge that underpins the capability, an organization may need to use it. And using a capability entails costs. For example, consider a product development capability for a particular class of drugs. It might prove difficult to maintain this capability without incurring costs of retaining the researchers and having them continue to maintain their knowledge base through active use, even if the company does not wish to develop products in that particular drug class at present. Capability development in general has a strong element of irreversibility (Dierickx and Cool, 1991). As a result, firms may not be able to easily mothball capabilities at zero cost.

The bundled nature of a capability also may make it difficult to possess a capability without incurring some costs. A capability involves the integration of tangible assets, knowledge, and skills in order to perform a task. For example, a capability of auto assembly utilizes assembly line workers, engineers, computer operators, and their knowledge, as well as the procedures that they follow when assembling a car. Moreover, this capability is useless without the requisite physical assets such as an auto assembly plant. Because a capability is an integrated bundle, it can prove costly to disentangle the constituent parts from one another. For example, suppose that the environment changes such that a capability as an integrated whole no longer contributes to evolutionary fitness, but parts of the capability retain their usefulness in the same or another application. The firm might be willing to pay something to untangle the bundle and extract the value of the useful parts of the capability. In essence, this willingness to pay for unbundling means that a capability can have negative evolutionary fitness.

### Relationship of Technical and Evolutionary Fitness

Dynamic capabilities need not perform equally well on both the technical and evolutionary fitness dimensions. A firm might make a very good living and therefore have high evolutionary fitness if it operates in a munificent market environment, despite having less technically fit capabilities. For example, as the personal computer (PC) market took off, many new firms, such as Gateway, entered and prospered for a time. But as the market became more competitive, Gateway could not create or extend or modify its resources successfully. In contrast, competing in the same low end segment of the PC market as Gateway, Dell proved able to expand its PC business and grow. The Dell example suggests that excellent technical fitness also may enable a firm to prevail even in a less munificent environment.

The Dell versus Gateway example illustrates another important point concerning competition and relative fitness: the technical fitness of a firm's dynamic capabilities relative to the technical fitness of the capabilities of the firm's competitors can affect the evolutionary fitness of the firm's capabilities. If technical fitness is poor relative to that of competitors, competitive pressures will make it harder for the firm to profit from its dynamic capabilities. This is particularly true in a less munificent environment such as a maturing industry. Once again consider the example of Dell Computer. Other companies in the personal computer industry have tried to develop a just-in-time assembly process similar to Dell's, but have had great difficulty doing this nearly as effectively as Dell. In more formal terms, Dell's competitors have less technically fit dynamic capabilities for developing just-in-time manufacturing processes, allowing Dell to grow and profit with greater evolutionary fitness.

When we think about the Dell example, it becomes clear that by virtue of the technical fitness of the company's dynamic and operational capabilities, Dell had a strong impact on the evolutionary fitness of its capabilities. Dell had a clear strategy of using the superior technical fitness of its capabilities to push out less cost-efficient competitors and dominate the PC market. As a consequence, Dell's evolutionary fitness increased.

As Dell's experience illustrates, evolutionary fitness can be endogenous to technical fitness. Market leaders in particular have opportunities to use technically fit capabilities to influence their environment in a manner that promotes the evolutionary fitness of their capabilities. Intel, for example, used its dynamic innovation capabilities to continually preempt competitors by introducing new generations of microprocessors, thus sustaining its evolutionary fitness in the microprocessor market for many years. As another example, Microsoft has used its software development capability to create suites of applications software that it has used to influence its evolutionary fitness in the operating systems market.

Firms do not have unlimited ability to influence the evolutionary fitness of their capabilities, however. Even firms that dominate their markets operate within environmental constraints. To continue with the Intel example, the company chose to repeatedly cannibalize its current generation of microprocessors because it faced the threat of competition (potential and actual). Moreover, Intel eventually encountered limits to customer demand for new generations of microprocessors – that affected the firm's evolutionary fitness in terms of profitability and growth. Microsoft, meanwhile, currently faces challenges from alternatives, such as Linux, that threaten to affect Microsoft's evolutionary fitness in the market for operating systems.

Although firms have the potential to use the technical fitness of their capabilities to influence evolutionary fitness, this potential does not guarantee success. Once again consider dynamic capabilities for innovation, in this case in the auto industry. When developing a hybrid car, General Motors opted for hydrogen fuel, betting that the company could influence its environment in the direction of hydrogen fuel. The United States, however, currently has no infrastructure to deliver and sell hydrogen fuel to the average consumer; nor does the development of such an infrastructure seem imminent. General Motors has attempted to shape the infrastructure through alliances with companies such as Shell, but has not yet succeeded.

Conversely, Toyota viewed the environment as largely exogenous, opting to develop a hybrid car powered by a combination of widely available gasoline fuel and electricity. Toyota's approach has prevailed, at least initially. Not only does this example illustrate the limits to the endogeneity of evolutionary fitness, but it also illustrates once again the importance of managerial decision making with regard to search and selection. Firms whose managers better understand the extent to which an organization can use its dynamic capabilities to influence its environment will end up with greater evolutionary fitness.

## Evolutionary Fitness and Market Performance

Thus far we have introduced the concept of evolutionary fitness and linked it to technical fitness. We next elaborate on two aspects of evolutionary fitness in two ways. First, we tie the concept of evolutionary fitness to established concepts of performance in economics and strategy. We then discuss potential empirical metrics for the evolutionary fitness of dynamic capabilities.

Economic logic underlies the most commonly used conceptual measures of firm performance: value creation (willingness-to-pay minus cost), competitive advantage

► Complementary perspectives

Dynamic capabilities are part of the overall resource and capability base

But dynamic capabilities are directed toward strategic change

- What
- How
- Performance outcomes

**Figure 1.3** Dynamic capabilities and the resource-based view

(relative value creation), and sustained competitive advantage. These concepts are directly linked to one another. To clarify these linkages, we draw on the “resource based view” of the firm (Wernerfelt, 1984; Barney, 1991; Peteraf, 1993; Amit and Schoemaker, 1993). As noted earlier, like operational capabilities, dynamic capabilities are part of the resource base of an organization. From this perspective, we can use resource-based logic to analyze dynamic capabilities as a possible source of value creation and of competitive and sustained advantage (figure 1.3). To illustrate the analysis, we use an example of a dynamic capability that is critical to an organization’s performance, such as the drug development capabilities of a pharmaceutical company.<sup>5</sup>

As a general principle, competitive advantage depends on whether a resource creates relatively more value, defined as willingness-to-pay minus costs, than the comparable resources of competing organizations (Peteraf and Barney, 2003). To understand competitive advantage from dynamic capabilities, we therefore must first ask how much value a dynamic capability creates. Then we can evaluate value creation relative to the dynamic capabilities of other organizations.

Dynamic capabilities create value by conferring upon an organization the ability to perform a particular function, by which we mean a purposeful set of actions. The set of actions could include a wide array of activities, but the function is specific to a clear objective. In the case of drug development capability, the objective is to develop drugs that fulfill an unmet medical need.

The value of a dynamic capability depends on whether or not its function creates value and to what degree. The value of a function is always context dependent. It depends in part on the environmental need (in terms of derived demand and, therefore, willingness-to-pay) for the function to be performed and on any environmental constraints. The value of a dynamic capability varies with time and circumstance, as environmental opportunities change. Environments can change in such a way as to either increase or decrease the value of a particular dynamic capability. Regulatory proscription of drug development activities, for example, would render a firm’s innovation capabilities of low value, even if the firm has the technical fitness to

<sup>5</sup> This method may help to resolve some causal ambiguity, although it will not be useful if the causal ambiguity is extreme.

perform such functions in a highly effective manner. Conversely, deregulation of the US banking industry increased the value of certain replication capabilities involved in expanding the number of bank branches within states and across state and national boundaries. In addition, deregulation that allowed national banking increased the value of acquisition-based dynamic capabilities. Banks that developed such capabilities quickly, such as Bank One, gained substantial competitive advantage.

Even when the environmental need for a function is high, a dynamic capability to perform this function may create only passable value. That is, although a dynamic capability may have some degree of value in that it allows an organization to perform some needed function in an adequate manner, the value created may not be high. Moreover, even if a dynamic capability creates high value, the firm may gain no real advantage if it creates no more value than other firms. For example, if all pharmaceutical firms have drug development capabilities that create comparable value, they cannot be a source of competitive advantage. If there is heterogeneity between organizations in the technical fitness of a capability, however, then the dynamic capabilities of some firms may lead to a competitive advantage. In our pharmaceutical company example, some firms may have specialized knowledge of certain therapeutic classes of drugs. If this makes it possible for companies with this specialized knowledge to develop new drugs more efficiently and effectively than firms with less specialized capabilities, the specialized firms will have a competitive advantage in drug development of this type.

As the discussion above suggests, dynamic capabilities do not necessarily lead to competitive advantage. Several conditions must be met before a dynamic capability can confer a competitive advantage. First, there must be heterogeneity in the technical fitness of dynamic capabilities of the same type (Barney, 1991; Peteraf, 1993). Second, there must be demand for their services. Since capabilities only have value in use (or option value for later use), competitive advantage comes from applying the capabilities. Third, dynamic capabilities must be rare in relation to the demand for their services (Peteraf and Barney, 2003). Otherwise, competition between firms with the same dynamic capabilities would level the playing field. Similarly, if a dynamic capability of a different type can meet demand and can create comparable value, no competitive advantage derives from applying the first type of capability, even if it is rare. The two types of capabilities would be equifinal substitutes for one another (see also Eisenhardt and Martin, 2000). Peteraf and Bergen (2003) make a similar argument about how resource substitutes can erode value.

The question of whether the competitive advantage of a dynamic capability is sustainable is yet another matter. Answering this question requires consideration of competitive factors, environmental factors, and internal factors. In the resource-based framework, a *sustainable* advantage is one that persists in the face of competitive efforts to duplicate the advantage. Sustainability derives from barriers to imitation and/or substitution that prevent rival firms from matching the value created by a capability. The types of isolating mechanisms that Rumelt (1984) lists apply to dynamic capabilities just as they do to other types of resources and capabilities.

Since the advantage derived from deploying a capability depends on the need for its function in the external environment, the question of sustainability necessarily concerns environmental matters as well. In relatively stable environments, a

competitive advantage can persist, abstracting from the imitative efforts of competitors.<sup>6</sup> In more turbulent environments, the need for some previously valuable functions can diminish, detracting from the value gained from deploying the capability. In a high-velocity environment, the fact that imitation barriers prevent duplication of a capability's functionality may be immaterial if the capability no longer serves a need. Certainly many dynamic capabilities retain their value in turbulent environments as well. For example, capabilities for environmental scanning retain or even gain value when the environment changes. But as a general proposition, the sustainability of competitive advantage can depend on the extent of stability in the external environment, separate from competitive factors.

A third set of factors affecting the sustainability of an advantage arises within the organization. Abstracting from environmental need, how a capability is managed can affect both the level and the sustainability of its value. Dynamic capabilities can attain higher and more lasting value if firms make appropriate investments in improving and maintaining the capabilities. As an example, consider the long-term focus of companies like Sharp with respect to their R&D capabilities, as well as the efforts that companies such as 3M make in constantly reinforcing their innovation and experimentation activities. On the other hand, mismanagement, lack of investment, and infrequent use can degrade a capability, thereby limiting the sustainability of any prior advantage. As emphasized earlier, managerial decision making with regard to asset selection and deployment affects the evolutionary fitness of dynamic capabilities.

The strategic management literature often uses the term "rents" as yet another indicator of performance. Sometimes researchers have used this term in an imprecise (and even inaccurate) fashion to denote generally high profitability. Technically, however, the term "rent" has many different definitions, depending on the type of rent in question. (See Peteraf (1994) for a comprehensive glossary of terms, as well as additional explanation of some of the terminology in Rumelt (1987) and Winter (1995).) Due to the complexity of the rent concept, we do not discuss it in more detail here, other than to note that rents also can serve as a measure of evolutionary fitness.

The foregoing discussion explains how traditional measures of performance can be applied to dynamic capabilities. With the exception of sustained competitive advantage, however, these measures do not have a time dimension that explicitly incorporates the dynamic aspect of evolutionary fitness. For this reason, we supplement these traditional measures of performance with two additional measures of evolutionary fitness: survival and growth. Survival provides a clear measure of whether a firm can adapt to its external environment at some minimally satisfactory level. Long-term survival implies success in maintaining evolutionary fitness. The second measure of organizational growth presupposes survival and incorporates the extent of evolutionary fitness in the form of increased organizational size over time, whether in terms of revenues, assets, or other measures of size. As metrics for evolutionary fitness, survival and growth lend themselves directly to empirical measurement. Empirically measuring value creation as well as competitive and sustained advantage is more difficult, as we next explain.

<sup>6</sup> Of course the more stable the environment, the less important are dynamic capabilities, which are directed toward change.

## Empirical Metrics for Evolutionary Fitness

Generally, researchers have used accounting and stock market measures of financial performance as empirical proxies for value creation and relative advantage (competitive or sustained). Use of financial performance to measure value creation, however, has many problems that current empirical research has yet to address effectively. Technically, economic value equals willingness-to-pay (rather than price) minus the opportunity (rather than the actual) cost of inputs. Empirical measures of financial performance that reflect some aspect of economic return, however, depend on prices received for goods and services rather than on willingness-to-pay for these same goods and services. In addition, as for any other resource, costs to an organization may include returns paid to providers of dynamic capabilities (see Castanias and Helfat, 1991, 2001; Coff, 1999), potentially overstating opportunity cost.

In general, empirical measures of financial performance tend to understate value creation from resources. What we need to know is whether, and to what extent, this measurement bias affects comparisons of financial performance between firms at a point in time (in order to assess current competitive advantage) and over time (in order to assess sustained competitive advantage). As a first step toward further understanding of potential biases, in chapter 7 we examine some of the measurement issues raised by using accounting measures of performance to assess the evolutionary fitness of dynamic capabilities.

Using survival as a measure of evolutionary fitness provides a much clearer benchmark than do financial measures of performance. Although many academic studies have used firm survival as a dependent variable, the vast majority of them do not include explanatory variables that either directly measure or serve as a proxy for dynamic capabilities.

Such omission creates at least two problems. First, at best, extant studies of firm survival cannot provide much help in understanding dynamic capabilities. Secondly, at worst, the studies may incorrectly attribute organizational survival to only the explanatory factors included in the analyses. Without explicitly taking dynamic capabilities into account, it is difficult to know whether the included explanatory factors might be correlated with or endogenous to dynamic capabilities, and therefore serve as proxies for dynamic capabilities. It also is difficult to know whether the included explanatory factors might lose their significance if dynamic capabilities were incorporated into the studies.

Although survival provides a clear empirical measure of evolutionary fitness, it does not tell us much about how well an organization is surviving, other than the length of time since birth. Some long-lived organizations continue to survive in states of near permanent failure by regularly convincing constituents to contribute resources that allow them to linger on. Ongoing public support for unprofitable airlines in the US, Europe, and elsewhere offers one such example. Such “failing survivors” typically do not grow on any meaningful dimension, however.

Firms that not only survive but also prosper tend to grow. Hence, the growth of an organization provides a measure of the extent of evolutionary fitness. Sustained growth in particular suggests that the organization consistently demonstrates



evolutionary fitness. Growth as a measure of organizational performance also has been underutilized in most research on strategy. Moreover, it is a measure that is especially appropriate for an analysis of dynamic capabilities, which sometimes are directed toward growth. Singh and Mitchell (2005), for instance, offer an example of the opportunity to study how alliance-based dynamic capabilities influence growth. For all of these reasons, chapter 7 examines what we can learn from empirical evidence regarding sustained firm growth. As we explain, growth is not an appropriate measure of performance for all types of dynamic capabilities and in all situations. It does, however, provide an extremely useful performance measure in certain environmental contexts.

## Implications

In this chapter, we have provided a general framework to serve as a basis for future research. We view this as the start to a complex research agenda, of which we can only scratch the surface. In addition to providing a succinct definition of dynamic capabilities and clarifying several of their attributes, we have introduced the concepts

Theoretical underpinnings	Chapter 1	Foundations
	Chapter 2	Management
	Chapter 3	Organizational processes
	Chapter 8	Extensions
Empirical applications	Chapter 4	Top executives <ul style="list-style-type: none"> <li>• Management and organizational processes</li> <li>• Acquisitions, innovation, and internal change</li> </ul>
	Chapter 5	Relational capabilities <ul style="list-style-type: none"> <li>• Organizational processes</li> <li>• Alliances</li> </ul>
	Chapter 6	Acquisition-based dynamic capabilities <ul style="list-style-type: none"> <li>• Organizational processes</li> <li>• Cross-border acquisitions</li> </ul>
	Chapter 7	Firm growth <ul style="list-style-type: none"> <li>• Evolutionary fitness</li> <li>• Potential avenues for growth include alliances, acquisitions, and internal growth</li> </ul>

Figure 1.4 Dynamic capabilities: theoretical underpinnings and empirical applications

of evolutionary fitness and technical fitness. We also brought interactions into the analysis, including potential negative transfer effects on technical fitness as well as potential endogeneity of evolutionary fitness with regard to technical fitness. We then dealt at some length with the measurement of evolutionary and technical fitness, and the potential for negative values of evolutionary fitness. The analysis further linked evolutionary fitness to more traditional measures of economic performance, both conceptual and empirical.

The next two chapters of this book elaborate on two aspects of dynamic capabilities that have received less sustained attention in prior research but that are fundamental to an improved empirical understanding of dynamic capabilities, namely, managerial and organizational processes. Chapter 2 first provides an economic analysis of managers and dynamic capabilities, arguing that the economic theory of the firm must take into account the importance of managers who orchestrate strategic change. Chapter 3 then focuses on the organizational processes that underpin dynamic capabilities. This chapter explains the linkages between research on dynamic capabilities and research on what has been termed “strategy process,” as well as the potential for synergies between these two areas of research. Subsequent chapters then discuss empirical applications of these ideas. Chapter 4 provides empirical evidence regarding managerial capabilities and strategic decisions, including the impact of managerial decisions on technical and evolutionary fitness. Chapter 5 deals with relational capabilities in alliances, focusing in particular on the organizational processes that underpin effective relational capabilities. Chapter 6 then analyzes relational capabilities in the form of acquisition-based dynamic capabilities, focusing on the acquisition of new resources in geographically distant locations. Both alliances and acquisitions are possible routes to growth, the subject of chapter 7. This chapter analyzes the empirical evidence on growth persistence and draws implications regarding evolutionary fitness of dynamic capabilities. The final chapter draws together many of the themes in the book and suggests fruitful avenues for additional research.

# Chapter 2

## Managers, Markets, and Dynamic Capabilities

### Introduction

The concept of dynamic capabilities highlights organizational and managerial competences. Key ingredients of dynamic capabilities include organizational processes directed toward learning and innovation, the basic manner in which a business is designed, as well as the decision frames and heuristics that inform firms' investment choices over time. Once assets come within the orbit of management rather than the market, their effective utilization and orchestration becomes essential. Indeed, orchestration directed at achieving new combinations and co-alignment of assets is central to the dynamic capabilities framework. Such orchestration requires astute decision making and entrepreneurial capacity. Managers play a critical role in such orchestration and therefore have particular importance for dynamic capabilities.

Dynamic capabilities of all types perform an economic function: they affect how well business enterprises function within an economic system. An analysis of dynamic capabilities would be incomplete if it did not address this economic function. In this chapter, we analyze what economic theory and logic does and does not tell us about (strategic) managers in general and the asset orchestration function that they perform in particular. We also suggest promising directions for an economic theory of the firm that incorporates the dynamic capabilities of managers in a central way. This economic approach to understanding the managerial processes that underpin dynamic capabilities complements the following chapter, which focuses on organizational research on managerial and organizational processes. Together these two chapters provide a backdrop for the empirical analyses of managerial and organizational dynamic capabilities in subsequent chapters.

### Understanding the Fundamental Economic Problems “Solved” by Strategic Managers

It is an understatement to say that economic theory underplays the role of the manager; in fact, the strategic manager simply does not exist in any recognizable

form. True, shareholders appoint agents (managers) to stewardship roles in the enterprise, but economic theory says little about what executives actually do and the economic function, if any, that they perform.<sup>1</sup> Sometimes executives manage workers through the employment relationship; but otherwise the executive in economic theory is rather a lackluster being who is almost completely invisible, and doesn't really perform an economic function, other than standing in for the owner/investor.

At least one well-known economist has commented on this lacuna. William Baumol notes that in economic theory:

“There is no room for enterprise or initiative. The management group becomes a passive calculator that reacts mechanically to changes imposed on it by fortuitous external developments over which it does not exert, and does not even attempt to exert, any influence. One hears of no clever ruses, ingenious schemes, brilliant innovations, of no charisma or of any of the other stuff of which outstanding entrepreneurship is made; one does not hear of them because there is no way in which they can fit into the model.” (Baumol, 1968: 67)

The cavalier treatment of entrepreneurship and management in economics stems in part from a failure to understand the importance of managing organizations, and the absence of well-developed and well-functioning markets for intangibles and other idiosyncratic assets, particularly those of the co-specialized variety. Because markets are often viewed, at least in the neoclassical paradigm, as working rather frictionlessly, the special role that managers play in transactions and in asset deployment, business model design, strategy formulation and implementation, and leadership seems quite unnecessary. In a perfectly competitive world with homogeneous inputs and outputs and technology that are ubiquitously available for all, the functions identified above aren't needed. The manager is left simply as a calculator, setting marginal revenue equal to marginal cost. Of course, if this is all managers do, a reasonably simple software program and a set of rules for the organization would void the need for managers and management.

On closer examination, however, executive management performs several distinctive and important roles, which help the economic system overcome special problems, problems that might otherwise result in “market failures.” That is, but for the actions of astute managers, competitive markets wouldn't function very well. Moreover, business organizations couldn't function either. Seven particular classes of economic functions can be assigned in economic theory to management. They are: 1) orchestrating co-specialized assets; 2) selecting organizational/governance modes and associated incentive systems; 3) designing business models; 4) nurturing change (and innovation) processes/routines; 5) making investment choices; 6) providing leadership, vision, and motivation to employees; and 7) designing and implementing controls and basic operations. None of these functions can be performed well, if at

<sup>1</sup> Oliver Williamson has noted that supplying a coherent theory of effective coordination and resource allocation, and of entrepreneurship and technical progress is a “tall order” (Williamson, 1991: 19). This chapter endeavors to make progress towards this goal, which has important ramifications for management theory and the theory of the firm. It implies a very different set of economic activities as the essence of the enterprise than the literature has heretofore featured.

all, by computers or by naked market processes. Managers are needed to make markets work well, and to make organizations function properly.

The first six classes of decisions are “strategic” and/or entrepreneurial and must be performed astutely for firms to compete effectively. They relate to issues of strategic “fit” between the company and its competitive environment, as well as between and amongst the assets that comprise the resource base of the firm. We do not discuss the seventh set of decisions at length in this chapter, as it focuses on more operational issues. The management skills required for successful execution of operational decisions are conceptually different from those required for strategic management. The fact that they are not at the essential core of this book does not make them unimportant. Operational capabilities can provide a strong point of differentiation and advantage for a particular company. Nevertheless, we largely ignore these considerations in this chapter, which focuses on strategic management in general and decisions around resource allocation and asset alignment in particular.

If managers did not perform strategic functions within and among business enterprises, the entire adjustment and resource allocation function in the economy would fall on the price system. However, it is also generally accepted that a complete set of contingent claims markets does not exist, and even when markets do exist, trading volumes are often thin. If certain assets are rarely if ever bought and sold, then how can the economic system be restructured and assets brought into alignment?

The economics literature contains some general recognition that “internal organization” solves the problem. Exactly how internal organization solves the problem is never explained very well, if at all. Williamson and others have suggested that, with internal organization, “managerial fiat” allocates resources. Unfortunately, the extant literature doesn’t go much further. In this chapter, we seek to identify the functions of the executive that matter in a fundamental economic sense, and with regard to dynamic capabilities in particular. In this manner, we may better understand the distinctive role of managerial activity.

### Asset Orchestration (In the Face of Thin Markets)

In early management scholarship, Chester Barnard and others stressed the role of management in limiting conflict and effectuating cooperation inside the firm. Barnard saw formal organization and the business firm as a system of consciously coordinated activities of two or more persons. In Barnard’s view, achieving successful cooperation should by no means be taken for granted, as it is by no means the norm. As he notes, “most cooperation fails in the attempt, or dies in infancy, or is short lived” (Barnard, 1938: 5). The particular functions of management that Barnard recognizes include control, supervision, and administration (Barnard, 1938: 6), which are operational activities that relate to the business of keeping an organization functioning. Although these (managerial) functions must be performed, they ignore the importance of the strategic functions that managers perform in dynamic environments.<sup>2</sup>

<sup>2</sup> It is perhaps of interest to note that Barnard’s perspectives were no doubt shaped by his experience as an executive in the Bell System. Barnard served as President of New Jersey Bell. At the time, it was a regulated telephone company.

Today, many of the firm's assets are intangibles, and flexibility, entrepreneurship, and adjustment and adaptation to competition and changing consumer needs is paramount. We address these functions in more detail below.

### General considerations regarding asset orchestration

One of the most touted virtues of a private enterprise economy is its ability to achieve the coordination of disparate actors external to the enterprise itself – both consumers and producers – without central planners (Hayek, 1945). The price system of course serves as the mechanism that supposedly facilitates coordination. Prices act as signals of scarcity or abundance. Consumers adjust to price increases by reducing consumption; producers react to the same signal by increasing production, and the market clears. This simple mechanism means that a good deal of resource allocation can take place via market mechanisms – quickly and efficiently. Prices rise and resources will move to the higher valued activity; ditto when prices fall. Commodity markets usually behave in this fashion; and if all markets were commodity like, then the role and importance of (strategic) management would be limited.

A very large proportion of goods, assets, and services, however, are not exchanged in open, organized, and well-developed markets. For many transactions – forward, contingent, term, and spot – markets do not exist or are occasional at best. In these circumstances, markets are “thin,” offering limited liquidity for asset holders. Assets are not automatically allocated to their first best use. As we discuss below, this creates the opportunity for managers to use the firm's financial and other resources to build value inside firms. These functions are also socially desirable in most instances because they assist in aligning certain types of complementary assets – alignment which is necessary for systemic innovation and enhanced competition. If the economic system fails in these functions, firm performance and the economy at large will suffer.

Thin markets are exposed to transactional complexity and contractual hazards; or even if not exposed to hazards, may experience liquidity discounts – the difference between “bid” and “ask” prices is likely to be large. Frequently, transactions in these markets don't occur at all because the services that an idiosyncratic asset provides may be difficult to describe, to define, and to access. If the asset is a competence, the valuation may be difficult to assess if the value of the competence depends on complementary and/or co-specialized assets owned by the seller, the buyer, or third parties. All of this is to say that certain assets tend to be built rather than bought (because there may not be a market) and to be deployed and redeployed inside the firm rather than sold (because sale in a market is not a good way to extract value). Because assets are bundled together and often tightly linked inside incumbent firms, it may be difficult to obtain assets in the desired configurations through asset purchase or sale in mergers and acquisitions. This is not to say that mergers and acquisitions (M&A) are not an important component of asset reconfiguration. Indeed, Capron, Dussauge, and Mitchell (1998) argue that market failures that constrain the exchange of discrete resources create incentives to use mergers and acquisitions in order to accomplish asset reconfiguration. Put differently, asset purchases/sales are often

infeasible, absent purchasing or selling corporate entities in which many such assets are bundled together.

A striking example of thin or nonexistent markets is the market for know-how and for intangible assets more generally. As Teece (1981) noted more than two decades ago, “unassisted markets are seriously faulted as institutional devices for facilitating trading in many kinds of technological and managerial know-how. The imperfections in the market for know-how for the most part can be traced to the nature of the commodity in question.” The same is true with respect to intellectual property and other intangibles. Mutually beneficial trades frequently don’t happen because the property rights may be poorly defined (fuzzy),<sup>3</sup> the asset difficult to transfer, or its use difficult to meter. When arm’s-length market trading is impaired, internal resource allocation and asset transfer within the firm achieves greater significance. This is of course a managerially directed activity.

Accordingly, resource allocation inside the firm substitutes and complements resource allocation by markets when markets for particular assets are thin or nonexistent. Relatedly, because of co-specialization, or because of differing perceptions about future demand and technological innovation, or because of differing asset positions of buyer and seller, there may be wide disparities between how the existing owner of an asset values it and the manner in which another agent or potential owner might value it.

Because many intangible assets are idiosyncratic, they may be more valuable when they can co-evolve in a coordinated way with other assets. The ability to assemble unique configurations of co-specialized assets therefore can enhance value. In short, managers often create great value by assembling particular constellations of assets inside an enterprise, because by employing such assets, they frequently can produce highly differentiated and innovative goods and services that consumers want. This process of assembling and orchestrating particular constellations of assets for economic gain is a fundamental function of management.

Effectuating systemic innovation (Teece, 2000) provides a good example of asset orchestration. Systemic innovation occurs when deep co-specialization exists between parts of a system requiring in turn the tight coordination across subsystems for innovation to occur. Systemic innovation contrasts with autonomous innovation, in which technological development can occur without immediate and direct coordination with other elements of a system.

Consider the automobile. New types of tires (such as tubeless tires, and later radial tires) have over time been developed without immediate regard for other developments in the automobile. Notwithstanding that some “components” can be developed independent of other parts of the system, it is frequently the case that innovation in one component will facilitate innovation elsewhere. For example, radial tires permitted cars to be designed for higher speeds, without compromising safety.

Systemic innovation, on the other hand, almost always requires common managerial control of the parts for success, since innovation activity must be highly coordinated

<sup>3</sup> See Teece (2000) for a discussion of the fuzzy boundaries associated with intellectual property rights.

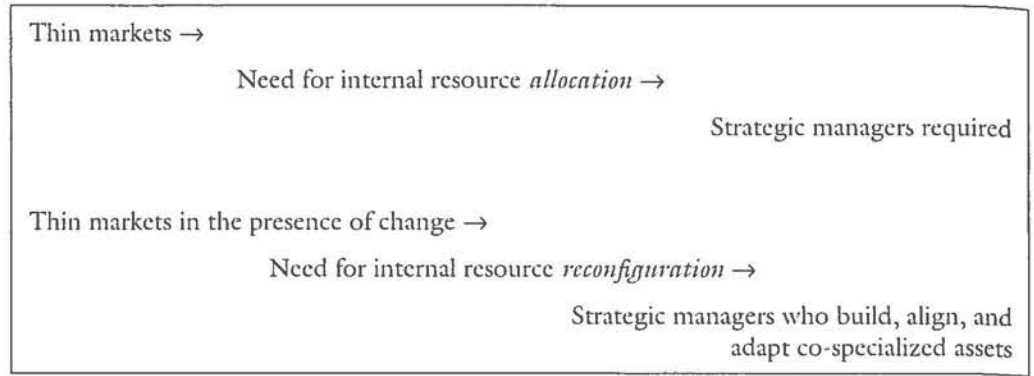


Figure 2.1 Thin markets and strategic managers

across subsystems. Contractual mechanisms will rarely suffice to achieve the necessary coordination between or amongst firms (Teece, 1980; 1988b). For instance, the Lockheed L1011 wide-bodied aircraft's late entry into the market was caused by the inability of Rolls-Royce to develop the RB211 engine on time – and the aircraft design was co-specialized to the new, still undeveloped, engine. Indeed, the failure of Rolls-Royce to develop the RB211 on time was a major contributing factor not only to the slow launch of the L1011, but also to the bankruptcy of the Lockheed Corporation.

In short, fuzzy property rights (as with intangibles), appropriability issues, and co-specialization are among the reasons why asset markets can be thin. This renders market transactions difficult. Whenever this occurs, managers have a distinctive role that differs from the role of traders and arbitrageurs.

### Asset Orchestration Versus Coordination and Adaptation

Coordination as an economic problem is only necessary because of change (Hayek, 1945). In a static environment, a short period of “set up” would be required to organize economic activity; but absent change in consumer tastes or technology, economic agents (both traders and managers) would sort out the optimal flows of goods and services (together with methods of production). Thereafter, there would be no need for their services.

Now introduce change. If there were a complete set of forward and contingent claims markets, adjustments would occur automatically; absent a complete set of futures and contingent claims markets, there is the need for economic agents to engage in trading activities, and for managers/entrepreneurs to “integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece, Pisano, and Shuen, 1997). That is why what Adner and Helfat (2003) termed “dynamic managerial capabilities” hold particular importance.

**Dynamic managerial capability** is the capacity of managers to purposefully create, extend, or modify the resource base of an organization.

Dynamic managerial capabilities include **asset orchestration**.



Coordinating and adapting effectively to changing environments (Cyert and March, 1963) is an important managerial function that is an element of a firm's dynamic capabilities. Barnard (1938) and Richardson (1960) developed this theme early. Chester Barnard viewed the firm fundamentally as a structure to achieve coordination and adaptation. But as Williamson (1995) observes, Barnard did not compare the firm with markets in terms of their coordinative or adaptive capabilities. As noted above, one key difference is that the firm, by employing astute managers and good incentive design, can achieve coordination and adaptation with respect to nontraded or thinly traded assets; the market on the other hand enables rapid adaptation with respect to assets that are actively traded in thick markets.

However, the strategic management function involves much more than "coordination" and "adaptation." The functions of the (strategic) executive go well beyond what Barnard and Williamson identified. In particular, "coordination" and "adaptation" as management functions do not fully capture the essence of critical managerial activity in dynamic markets. Such managerial activity involves, *inter alia*, orchestrating complementary and co-specialized assets, inventing and implementing new business models, and making astute investment choices (including with regard to R&D and M&A) in situations of uncertainty and ambiguity.<sup>4</sup> Nor do traditional perspectives convey the importance of asset alignment, opportunity identification, and accessing critical co-specialized assets. These are all important managerial functions that create value.

Put another way, the importance of strategic management stems in a fundamental sense from what can be thought of as "market failures."<sup>5</sup> The "market failures" arise not just from high transaction costs and contractual incompleteness.<sup>6</sup> Rather, they have to do with the thinness of asset markets, and the need to identify, "build," align, adapt, and coordinate activities and assets, especially complementary/co-specialized assets. Managers perform these important functions in the economic system.

G. B. Richardson (1960) has remarked on the information problems associated with achieving coordination and investment decisions. However, he focused on industry-level coordination of investment. He identified situations where limited information about competitors' investment decisions may impede efficient investment. In contrast, the essential coordination task identified here involves assembling and reassembling often idiosyncratic firm assets (including through strategic alliances with other firms).

<sup>4</sup> Milgrom and Roberts (1990: 525) also note that "non-convexities and significant complementarities provide a reason for explicit coordination between functions such as marketing and production."

<sup>5</sup> The use of the term "market failure" is only relative to the theoretical norm of absolute static and dynamic efficiency. Of course, a (private) enterprise economic system as a whole achieves an efficient allocation of resources, as strategic managers and the organization they lead are an inherent part of the economic system. However, the framework does highlight the fact that management systems and corporate governance must function well for a private enterprise market-oriented system to function well.

<sup>6</sup> To the extent that transaction costs are relevant, they are of the dynamic variety (see Langlois, 1992).

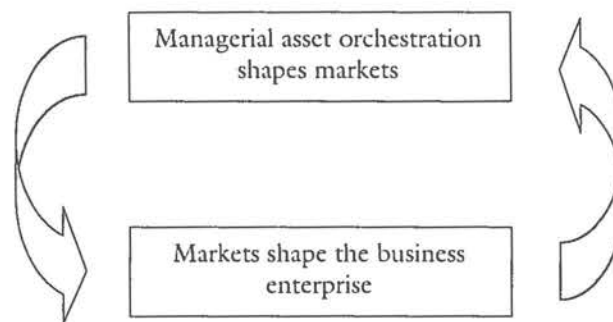
**Asset orchestration**

- A fundamental function of management
- Particularly important in dynamic settings
- Assembling and “orchestrating” configurations of co-specialized assets

Needless to say, the proficient achievement of the necessary coordination by no means occurs automatically. Decision makers need information about changing consumer needs and technology. Such information is not always available; or if it is available, decision makers must collect information, analyze it, synthesize it, and act on it inside the firm. Situations are dealt with in many ways, sometimes by creating rules, which specify how the organization will respond to the observations made (March and Simon, 1958). If this path is chosen, then rules may become codified and routinely applied (Casson, 2000: 129) whenever certain changes are detected.<sup>7</sup> However, such rules need to be periodically revised, which entails dynamic capabilities.

The coordinating and resource allocating activities performed by managers shape markets<sup>8</sup> as much as markets shape the business enterprise (Chandler, 1990; Simon, 1993). Put simply, the business enterprise and markets co-evolve. Managers shape this co-evolution. The need for asset coordination and orchestration and associated investment choices is a fundamental economic problem that the firm’s managers help address. In this regard, the evolutionary fitness of a business enterprise may be endogenous to its technical fitness. By using technically proficient asset orchestration capabilities, managers may be able to shape the external environment to the firm’s advantage, leading to evolutionary fitness.

The emergence/development of competitive markets is thus important for strategic management. As markets become developed and highly efficient, managers have less room to build competitive advantage (Barney, 1986). The emergence of competitive intermediate product markets in petroleum and chemicals, for example,



**Figure 2.2** Co-evolution of markets and the business enterprise

<sup>7</sup> Casson argues that rule making is entrepreneurial, but that rule implementation is routine, and is characterized by managerial and administrative work.

<sup>8</sup> For example, both Priceline and eBay set out to alter the structure of existing markets, and to some extent did so.

has been identified as a major leveler in global competition (Teece, 2000). Competitive advantage is illusory when all markets are highly competitive. However, change and technological innovation create new market opportunities. As long as idiosyncratic assets abound, this will create thin market situations and provide opportunities for competitive advantage.

## Towards a Dynamic Capabilities (Economic) Theory of the Firm

Ronald Coase in his classic (1937) article on the nature of the firm described firms and markets as alternative modes of governance, the choice between them made so as to minimize transaction costs. The boundaries of the firm were set by bringing transactions into the firms so that at the margin the internal costs of organizing equilibrated with the costs associated with transacting in the market.

Initiated by Coase's (1937) seminal paper, a substantial literature has emerged on the relative efficiencies of firms and markets. This literature, greatly expanded by Oliver Williamson (1975; 1985) and others, has come to be known as transaction cost economics. It analyzes the relative efficiencies of markets and internal organization, as well as intermediate forms of organization such as strategic alliances.

Contractual difficulties associated with asset specificity are at the heart of the relative efficiency calculations in transaction cost economics. When specific assets are needed to support efficient production, then the preferred organizational mode is internal organization. Vertical and other forms of integration are preferred over contractual arrangements when efficient production requires investors to make irreversible investments in specific assets. The structures used to support transactions are referred to as governance modes. Internal organization (doing things inside the firm) is one such governance mode.

The dynamic capabilities approach is very consistent with Coase in some ways but not others. It is accepted that it is useful to think of the firm and markets as alternative modes of governance. Relatedly, the selection of what to organize (manage) internally versus via alliances versus the market depends on the nontradability of assets and what Langlois has termed "dynamic transactions costs."

But it is not enough to convert the notion of nontradability entirely into the concept of "transaction costs," defined by Arrow (1969: 48) as the "costs of running the economic system." Others have tried to operationalize the concept of transaction costs, with Alchian and Demsetz (1972) proposing technological nonseparabilities and Williamson (1985) focusing on specific assets. There is indeed a strong relationship between specific assets and nontraded or thinly traded assets.

However, there are reasons why assets are not traded (or are thinly traded) that do not relate to asset specificity. For instance, the land on the corner of Park Avenue and 59th Street in New York City rarely comes onto the market. The ability to write highly creative and efficient software for computer operating systems is not widely distributed. Brands that signal particular values (e.g. Lexus) are likewise thinly traded. Uniqueness and asset specificity aren't quite the same. In addition, the concept of co-specialization is important (Teece, 1986). Assets that are co-specialized to each

Search and selection
<ul style="list-style-type: none"> <li>→ Design business models</li> <li>→ Select configurations of co-specialized assets</li> <li>→ Select investments (e.g. R&amp;D, M&amp;A) under conditions of uncertainty and ambiguity</li> <li>→ Select organization, governance, and incentive structures</li> </ul>
Configuration and deployment
<ul style="list-style-type: none"> <li>→ Orchestrate and coordinate co-specialized assets</li> <li>→ Nurture change and innovation processes</li> </ul>

Figure 2.3 Elements of asset orchestration

other need to be employed in conjunction, often inside the firm.<sup>9</sup> This isn't the emphasis of Coase, Alchian and Demsetz, or of Williamson.

Assembling co-specialized assets inside the firm in the dynamic capabilities framework is not done primarily to guard against opportunism and recontracting hazards, although in some cases that may be important. Instead, because effective coordination and alignment of these assets/resources is difficult to achieve through the price system, special value can accrue to achieving good alignment within the firm. This is different from what Barnard (1938) has suggested with his emphasis on the functions of the executive as rooted in cooperative adaptation of a conscious and deliberate kind. Here the focus is on the "orchestration" of co-specialized assets by strategic managers. It is a proactive process designed to: 1) keep co-specialized assets in value-creating co-alignment, 2) select new co-specialized assets to be developed through the investment process, and 3) divest or run down co-specialized assets that no longer help yield value. Rather than stressing opportunism (although opportunism surely exists and must be guarded against), the emphasis in dynamic capabilities is on change processes, inventing and reinventing the architecture of the business, asset selection, and asset orchestration.

One might reasonably ask the reasons for this significant difference in emphasis. Clearly, in dynamic capabilities, a comparative institutional framework is adopted. "Small numbers" bargaining is at the core, as in Williamson (1975). However, the emphasis on dynamic capabilities is not just on protecting value, but also on creating it. Barnard wouldn't naturally see the importance of this emphasis, because his laboratory was the regulated Bell operating companies.

Alchian and Demsetz and Williamson have all emphasized opportunistic free riding. Indeed, their human actors are assumed to be boundedly rational, self-interest seeking, opportunistic, and full of guile. The dynamic capabilities framework adds other (arguably less ubiquitous) traits of human nature: 1) intrapreneurship and entrepreneurship, and 2) foresight and acumen. Williamson appears to recognize

<sup>9</sup> Dynamic capabilities centrally concern the strategic management function, which transcends the question of optimal firm boundaries. Value can be created by astutely organizing assets both inside and outside the firm. In this sense, one should not expect a theory of dynamic capabilities to uniquely provide a theory of the firm.

that such skills ought to influence the theory of economic organization, when he quotes businessman Rolf Sprecket: “Whenever I see something badly done, or not done at all, I see an opportunity to make a fortune.” Williamson comments: “Those instincts, if widely operative, will influence the practice and ought to influence the theory of economic organization” (1999: 1089). This statement opens the door to dynamic capabilities.

There are other differences as well. Williamson makes the transaction the unit of analysis; in dynamic capabilities, the currency of interest includes complementary and co-specialized assets. The utility of transaction cost economics and related frameworks to make-buy-ally decisions and related governance decisions are not in dispute. But transaction cost economics leaves us without an understanding of the distinctive role of strategic management. Executives must not only choose governance modes (as between market arrangements, alliances, and internal organization), but they must also understand how to design and implement different governance structures, and to coordinate investment activities.

Just as the governance of markets is not preordained by the economic system, nor is the selection of governance modes. Many elements of internal organization, business model design, and alliance structure require managers to select and design methods of governance. For example, as chapter 5 explains in more detail, a relational capability for alliances includes selection and design of alliance governance. Again, dynamic capabilities come to the fore.

## Conclusion

In this chapter, we have argued that any robust economic theory of the firm must include a primary role for strategic managers and their dynamic capabilities. Critical dynamic managerial capabilities include asset orchestration, frequently involving co-specialized and complementary assets within the resource base of an organization. Not only must managers assemble these bundles of resources, but also they must design appropriate governance and incentive structures.