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**DYNAMIC CAPABILITIES:  
A NEO-CONTINGENCY THEORY?**

by

John W. Medcof

Management of Innovation and New Technology  
Research Centre

WORKING PAPER NO. 96  
January, 2000

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## **Abstract**

Organizations can weaken their competitive positions by having either an excess or an insufficiency of dynamic capabilities, and/or by failing to assemble a resource configuration that includes basic resources as well as the key resources that give competitive advantage. Resources must also be appropriate at both the infrastructure and functional levels. These propositions are based upon an elaboration of the resource based view of the firm that provides refined characterizations of the organizational environment and the three categories of resources identified by Barney, and gives a clearer understanding of the nature of position and the kind of resource infrastructure needed to sustain dynamic capabilities. The argument that the dynamic capabilities model is a neo-contingency approach is addressed.

## **DYNAMIC CAPABILITIES: A NEO-CONTINGENCY THEORY?**

The resource based view of the firm (RBV) has received increasing attention recently and holds considerable promise as a model which can encompass a wide variety of organizational phenomena (Amit and Shoemaker, 1993; Barney, 1986, 1991, 1995; Miller and Shamsie, 1996; Oliver, 1997; Peteraf, 1993; Teece, Pisano and Shuen, 1997). The core of the RBV is the proposition that firms can generate sustained competitive advantage by building and/or accessing a set of strategic resources which have value and are rare, inimitable and nonsubstitutable (Barney, 1991). In addition, from this core of ideas about strategy, the RBV seems capable of bridging to issues in fields as disparate as social welfare and organizational theory (Barney, 1991). Given that the RBV is so promising and still relatively new, an important task for scholars is to refine and extend it in various ways to increase its explanatory power and to understand better its limitations.

Wernerfelt identifies the, "need to map the space of resources in more detail" (1995: 172) as a high priority in the development of the RBV. His argument is supported by Teece *et al* (1997) in their discussion of the endogenous and exogenous bases for strategy. According to Teece *et al*, some strategy theorists, such as Porter (1980, 1990), stress the role of exogenous factors, such as industry entry barriers and rivalry among industry incumbents. In contrast, the RBV stresses the role of endogenous factors, namely, resources. Teece *et al* state that those taking the exogenous approach all but trivialize the difficulties inherent in assembling an appropriate set of resources while the RBV brings the theorist's attention to endogenous considerations in a way that shows their true importance and the great difficulty of "getting them right." The RBV can fulfill its promise for clarifying the nature of endogenous factors in strategy

only if it can provide a well developed understanding of the nature of resources. Further, although the generalization that it is difficult to bring together assemblages of resources that provide competitive advantage is certainly plausible, and there is some empirical evidence to support it (eg. Coff, 1997; McGrath, Macmillan and Venkataraman, 1995), no elaborated theoretical basis for it has been provided. The provision of such a solid theoretical base would greatly strengthen the RBV.

This paper will develop a more detailed specification of resources than has been provided in past versions of the RBV, and show some theoretical advantages of doing so. One important advantage will be the a fuller theoretical explanation of why it is difficult to assemble appropriate endogenous resources. Those difficulties include the need to ensure compatibility among resources and the need to consider resources at more than one level of analysis. This will provide an improvement in theory and should also be of some help to managers concerned with the practical matter of creating such assemblages in working organizations.

The more detailed specification of resources will also provide a useful refinement of Teece *et al*'s (1997) statement that the current turbulent business environment requires that firms adopt dynamic capabilities to remain competitive. This broad and important insight, which has also been advanced by other authors (often using different terminology), leaves open many questions for the theorist and the manager. Are dynamic capabilities dichotomous in nature, in the sense that you either have them or do not, or can organizations adopt dynamism to different degrees? If to different degrees, is there a basis for deciding the degree to which a particular organization should adopt them? How are these issues of dynamism theoretically related to the issue of resource assembly just discussed. This paper will also show that although the acquisition of

dynamic capabilities can certainly improve the competitive position of firms, it is possible to carry dynamism too far. Firms can develop more dynamism than they need, incurring unnecessary costs and creating organizational dysfunction.

The refined definitions of resources to be developed here will also improve our understanding of the relationship between endogenous and exogenous bases for strategy. Given that these two realms of strategic consideration are identified as separate, and different theories have come to be associated with the two, there is a danger that their differences will come to be emphasized and their important interactions ignored. The refinements developed here will provide clear theoretical ways to appreciate the relationships between endogenous and exogenous factors.

### **Facets of Resource Analysis**

Our more detailed mapping of resources begins by distinguishing two levels of analysis for resources, which we will call the functional and infrastructure levels. All resources can be analysed at both levels. The **functional** level concerns the particular functions that a resource carries out in the organization. The **infrastructure** level concerns the underlying characteristics of the resource which are more fundamental than the functional characteristics. For example, a firm may assemble a team of designers, marketers, scientists and engineers to work on the development of a new product. That team is a human resource of the firm and for it to contribute effectively to the firm its members must have appropriate characteristics at both the functional and infrastructure levels. At the functional level, the team members must have the appropriate technical, marketing and business skills to develop a good product for the specific market targeted. At the infrastructure level, the team must have a set of operating characteristics that is compatible with the surrounding organization. For example, if the organization has a highly

flexible structure, the team members must be good at working in flexible structures if they are to contribute significantly to value. The team will not be very effective if it insists upon conducting its work and its relationship with other units according to a rigid set of rules.

This distinction between the infrastructure and functional levels can be likened to the distinction between a platform and the modules that can be fitted onto it. The learning capabilities of the humans in an organization provide a platform infrastructure which is more or less capable of acquiring new functional skills and discarding obsolete ones. The technology resources of the organization can be thought of in the same way. In flexible manufacturing systems, the new information technologies are more flexible as a platform infrastructure than were traditional factory machines, which were usually built for a single, fixed function.

A second way in which resources can be differentiated is based upon the concepts of key and commodity technologies proposed by Harris, Insinga, Morone and Werle (1996). Roussel, Saad and Brickson (1991) propose a similar distinction. Borrowing the terms and concepts of Harris *et al*, and applying them to organizational resources, we can distinguish **key resources**, which are unique to an organization and provide competitive differentiation to the firm which possesses them, from **basic resources**, which are necessary to do business in a particular industry and are needed by all firms who wish to compete in it, but do not give competitive differentiation. For example, a firm in the consumer retailing business must have certain minimum capabilities for purchasing from suppliers, but those basic capabilities will not give it a competitive advantage because its competitors also have them. In this case the purchasing capabilities are a basic resource. If the firm had distinctive purchasing capabilities that were much more effective than their competitors', those capabilities would be a key resource.



If follows from the above that a given resource could be key or basic at the functional level and key or basic at the infrastructure level. These four possibilities are shown in Figure 1.

Cell 1 of Figure 1 is the case of a resource playing the role of an **Essential Executor**. In this case the resource performs at the functional level in a way that is sufficient to sustain participation in the business, but does not provide any competitive differentiation from other firms. For example, a chip manufacturer must have access to manufacturing technology which is capable of manufacturing chips to the standards of quality and price generally prevalent in the industry. Without such a resource, the firm has no hope of competing in a marketplace populated by firms which do possess one, but the resource gives no competitive advantage over other chip makers.

In Cell 2 the resources play the role of **Differentiating Executors**. These resources execute functions in a way that gives the firm competitive differentiation. An example of this would be an automobile manufacturer with a unique set of assembly robots which provides high quality products with superior efficiencies. The value and uniqueness of this resource would provide strong competitive differentiation.

In cell 3 the resource plays the role of an **Essential Base**. In this case, the resource has infrastructure characteristics which the firm needs to operate in its industry, but which do not give it any distinct competitive advantage. For example, a chip manufacturer must have human resources with the cognitive abilities and motive profiles which enable them to adapt and learn at the rate generally found in the chip industry. If the human resources do not have these capabilities, the firm will be unable to keep up with the pace of change in the industry and will not be competitive. However, these capabilities which are at the industry norm do not give the

firm any distinct competitive advantage. These infrastructure capabilities are distinct from the particular chip-making skills that the workers may have at any point in time.

In Cell 4 are **Differentiating Base** resources. In this case there is something about resources at the infrastructure level that provides competitive advantage. For example, a firm may have people who are exceptionally good at learning and moving into new job functions. This characteristic of the people may give the firm a distinct competitive advantage even though the particular job functions that the people are learning are not particularly distinctive in the industry. It is the flexibility of the resource that is the differentiator.

It will be helpful to review the states of necessity and sufficiency of the cells in Figure 1. For an organization to achieve competitive advantage, basic and key resources are both necessary but neither is sufficient. A firm must have the fundamentals for participation in its industry at both the functional and infrastructure levels, so both Essential Executors (Cell 1) and Essential Bases (Cell 3) are necessary. But these are not sufficient for competitive advantage. For competitive advantage, a firm must also have at least one key resource, and it might be either a Differentiating Executor (Cell 2) or a Differentiating Base (Cell 4). This leads to our first two propositions.

**Proposition 1:** Competitive differentiation cannot be built upon valuable, rare, inimitable, and nonsubstitutable (key) resources alone. It also requires basic resources.

**Proposition 2:** Competitive differentiation can be achieved by having resources that are valuable, rare, inimitable, and nonsubstitutable (key) at either the functional or infrastructure level.

Basic and key resources can also trade-off for one another. A firm with weak Essential Bases and Executors may compensate by having a key resource which gives it an advantage and saves it from extinction. A firm that has no key resources may maintain itself in its industry by doing the basics well. It may never move to the head of the pack but it can survive. However, there are likely limits to this trade-off. If a firm's infrastructure is abysmal, no key resource can save it.

Now that we have drawn the four-fold distinction shown in Figure 1 we can consider its implications for the RBV. One implication is that different statements of the RBV focus on different cells in Figure 1.

Earlier statements of the RBV are remarkable in the degree to which they focus upon key resources, almost as if they were the prerequisite to competitive advantage. A fundamental thesis of the RBV is that firms can generate sustained competitive advantage by building and/or accessing a set of resources which have value and are rare, inimitable, and nonsubstitutable (Amit and Shoemaker, 1993; Barney, 1986, 1991, 1995; Peteraf, 1993; Wernerfelt, 1984). The resources being discussed in these statements are key resources, as defined above. From the illustrative examples these authors use, and the way in which they discuss them, it is clear that they are speaking of resources primarily at the functional level of analysis. In Figure 1, then, they are confining their attention almost exclusively to Cell 2, Differentiating Executors. They may be assuming that other kinds of resources are also necessary, but that assumption gets no attention. The nature of Basic Resources is left unexplored, as is the relationship between Basic and Key resources. It is easy to be left with the impression by this literature that Differentiating Executors are both necessary and sufficient to competitive differentiation. However, as discussed above, Differentiating Executors are neither necessary nor sufficient.

A more recent discussion of the resource based approach (Teece *et al*, 1997) does not confine its attention to Cell 2. These authors acknowledge their roots in the RBV and give considerable attention to what they call "dynamic capabilities". They state that to survive in the current turbulent business environment, organizations must have dynamic capabilities, the "...ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments" (1997: 516). It is clear from this description of dynamic capabilities that they are at the infrastructure rather than the functional level of analysis. Dynamic capabilities are not the particular chip making or product development skills (functional level) that a firm has at a particular time, but rather, the underlying ability to switch to new chip making and product development abilities when circumstances demand. Rather than focussing on Cell 2, as their RBV predecessors had done, Teece *et al* have focussed on Cells 3 and 4.

At different points in their discussion Teece *et al* (1997) speak of dynamic capabilities as Essential Bases (Cell 3) and as Differentiating Bases (Cell 4). At some points they argue that to compete in the current business environment, firms must have dynamic capabilities because many successful firms are adopting them and they have become a pre-requisite to survival, particularly in high technology industries. In this context dynamic capabilities are an Essential Base. Elsewhere, dynamic capabilities are touted as the key to gaining competitive differentiation. In this context dynamic capabilities are a Differentiating Base. Of course, there is no reason, in principle, why both cases cannot occur. In different industries, different competitive conditions obtain. In some, dynamic capabilities are a Differentiating Base, in others, they are an Essential Base. Even within a given firm, a particular dynamic capability could be a Differentiating Base when originally and uniquely introduced by that firm, but

become an Essential Base as most players in the industry adopt it in imitation. This leads to our third proposition.

**Proposition 3:** The role that a given resource plays as an Essential Executor, Differentiating Executor, Essential Base or Differentiating Base is dependent upon the competitive environment in which the firm operates and may change over time.

Another implication of Figure 1 is that a given resource may simultaneously play different roles at different levels of analysis, for example, being key at the functional level and basic at the infrastructure level. An illustrative case would be a team of R&D scientists who have a unique understanding of a particular technology which gives the firm competitive differentiation, but who are no more or less adaptable than the scientists of competitors. This leads to a fourth proposition.

**Proposition 4:** A given resource can simultaneously be valuable, rare, inimitable, and nonsubstitutable (key); and not valuable, rare, inimitable and nonsubstitutable, depending upon the level of analysis at which it is considered.

Now that we have clarified that earlier articulations of RBV, such as Barney's (1991), discuss resources at a different level of analysis than the more recent articulation of Teece *et al* (1997), we can explore some of the implications of that difference. Articulations such as Barney's think of resources mainly at the functional level and when speaking of key resources think of them as capabilities that enable organizations to deal with the specific challenges found in their business niche. For example, a unique set of human resources may enable a firm to manufacture higher

quality products than its competitors. In contrast, Teece *et al* think of resources at the infrastructure level and think of key resources as involving the ability to change more rapidly than competitors. Dynamic capabilities are not adopted to deal with particular functional challenges but to deal with the environment of the organization.

In short, the Teece *et al* (1997) theory of dynamic capabilities draws upon ideas given some prominence in Contingency Theory (Andrews, 1980; McNichols, 1977; Mintzberg, 1979; Pennings, 1992; Summer, 1980) . However, the Teece *et al* ir statement of contingency is very bluntly drawn in broad dichotomies. They say organizations [all organizations, it seems] should adopt dynamic capabilities [everyone to the same high level, it seems] to deal with the current, turbulent business environment [all share the same high level of turbulence, it seems].

We will now explore this contingency aspect of the RBV further in an attempt to refine its broad dichotomies. We bear in mind, though, the hazards of doing so. Contingency Theory dominated the filed of organizational theory for many years but has been found wanting in a number of aspects. Therefore, it would be a mistake to try to resurrect Contingency Theory in full form. However, we may draw from it some ideas of value, without accepting the theory *in toto*. We therefore ask that readers not reject these analyses out of hand because they include some consideration of Contingency Theory, which has been discredited for a number of reasons. We ask that readers consider the value of particular concepts from Contingency Theory which may provide us with new insights in the context of the RBV. Science progresses by the development of new ideas and the meshing of them with refreshed old ideas, as shown by the long history of the concept of the atom, which stretches back to the time of the classical Greeks. But dynamic capabilities model, which discusses the need to adjust to the current environment, is

so very clearly a contingency theory, in the sense that it recommends that an organization arrange its infrastructure to adjust to the dynamism of its environment, that it is difficult to resist calling it a "neo-contingency approach", to acknowledge its roots but to differentiate it from traditional Contingency Theory.

The primary objective of this discussion will be to refine the RBV by refining some of the neo-contingency ideas which it embodies. We will show that when the dichotomies of dynamic capabilities model are reformulated as dimensions, a number of useful insights are possible, concerning resources at the infrastructure level. The first aspect of dynamic capabilities model that we will consider is the environment of the organization.

### **Environment**

A fundamental premise of the RBV is that firm specific resources have value only if they give the firm competitive advantage in the particular environment in which it does business.

Earlier statements of RBV (Amit and Shoemaker, 1993; Barney, 1986, 1991, 1995; Peteraf, 1993; Wernerfelt, 1984) accept this premise and stress the use of functional resources to meet specific challenges. Teece *et al* (1997), with more focus at the infrastructure level, reason that in the current turbulent business environment dynamic capabilities are necessary for competitive advantage.

Hitt and his colleagues (Bettis and Hitt, 1995; Hitt, Keats & DeMarie, 1998) make similar arguments and go even further in describing the nature of the current business environment, which they call the "new competitive landscape." They describe a number of trends that are prime drivers on the new "battlefield" upon which strategic management is now practised, including increasing risk and uncertainty, decreasing forecastability, and the ambiguity of

industry. These are the characteristics that create the need for dynamic capabilities. There is also a great deal written about the "new economy," in both the popular and academic press, describing various facets of this new business reality (*The Economist*, 1996; Schwab and Smadja, 1994; Steingraber, 1996; Tapscott, 1996 ). Prominent among the trends said to be creating the new economy are globalization, industry convergence, increasing competition, increasing knowledge and communication intensity, and the spread of information technology.

All of these discussions of the current business environment tend to portray it in dichotomous terms. There is the "new" environment, and there is the "old" environment. This dichotomization is a useful device for introducing certain ideas, but it hampers theoretical development

Other theorists have chosen to describe environments as varying along a dimension, most usually the uncertainty dimension (Dess and Beard, 1984; Duncan, 1972). The concept of uncertainty does have its difficulties, and there are variations in the meaning attached to the term, but the amount of recent work on environments using the concept of uncertainty (Boyd, Dess and Rasheed, 1993; Chakravarthy, 1997; Jarley, Fiorito and Delaney, 1997; Li and Simerly, 1998; Price, 1997; Souder, Sherman and Davies-Cooper, 1998; Sutcliffe and Zaheer, 1998) indicates that, although the concept is not without its problems, it is, perhaps, as good as the available alternatives. It is argued that the new economy is making organizational environments more complex (eg. there are more competitors and markets to pay attention to in the global economy), and less stable (eg. competitors bring out new products more often and technology changes more rapidly) and, therefore, more uncertain. In addition, some industries have more uncertainty (eg. electronics, pharmaceuticals) than others (eg. food processors and beer bottlers).



The descriptions of the current environment by scholars such as Teece *et al* (1997) and Hitt and his colleagues (Bettis and Hitt, 1995; Hitt *et al*, 1998) are not inconsistent with the concept of uncertainty.

The idea that business environments vary along a continuum of uncertainty leads naturally to the conclusion that a firm should adopt a level of dynamic capabilities that matches the level of uncertainty in its environment. Teece *et al* (1997) and Hitt and his colleagues (Bettis and Hitt, 1995; Hitt *et al*, 1998) strongly make the case that organizations should ensure that their dynamic capabilities are sufficiently dynamic to meet the challenges of change and turbulence found in the current business environment. The discussion below will show that there are also dangers to being too dynamic for one's environment as well. The basic principle involved here is captured in this proposition.

**Proposition 5:**        There is an optimum level of dynamic capability appropriate to any given level of uncertainty in the environment and organizations, should, ideally, seek to adopt that optimum.

The idea of adapting a level of dynamism in one's infrastructure that is appropriate to the level of uncertainty in one's environment leads to more specific questions about how to tune one's infrastructure to the appropriate level of dynamism. We will be more specific here by using Barney's (1991) three part model of resources (organizational, human and physical) as our basis for describing dynamic capabilities in more detail. This approach will show that although Barney discussed these resources and their role at the functional level, they can be usefully considered at the infrastructure level as well. This helps to confirm the statement made above that all resources can be considered at both levels. In addition, this approach will provide a

manageable working framework for analysing neo-contingency ideas and understanding what can be usefully drawn from traditional Contingency Theory. This is so because Barney's three resource categories are based in the earlier versions of the RBV, they are often raised in Teece *et al*'s (1997) discussion of dynamic capabilities even though they are not organised in exactly the same way, and they align conceptually with important ideas in traditional Contingency Theory. But to use Barney's three resources in this way we must make an assumption about the relationship between dynamic capabilities and resources at the infrastructure level. That assumption is stated in this proposition.

**Proposition 6:**        Dynamic Capabilities are the enactment of on-going processes in the organizational, physical and human resources of the firm, at the infrastructure level.

### **Organizational Capital Resources**

Turning now to the three resource types of Barney (1991), we will first discuss what Barney called organizational capital resources, which include, "a firm's formal reporting structure, its formal and informal planning, controlling and coordinating systems, as well as informal relations among groups within a firm and between a firm and those in its environment" (1991: 101). This is similar to the traditional concept of organizational structure, and Teece *et al* (1997) call it, "structural assets."

Hitt and his colleagues (Bettis and Hitt, 1995; Hitt *et al*, 1998) discuss the attributes that an organisational structure must have if it is to foster survival of the firm on the new competitive landscape, and they stress that the structure be flexible enough to allow organizational learning and strategic response capability. More recently, Volberda (1997) has provided practical advice

on how to create an organization that is flexible enough to learn, to change processes and strategies, to adjust to the diverse needs of a diverse workforce and to operate in a number of global markets.

The underlying theme in these discussions is that dynamic capabilities are only possible with an organizational structure that is flexible. An inflexible structure creates drag on a firm's ability to initiate and adapt and, in the worst case, may even preclude an effective strategic response capability. But these discussions, like those of the environment, above, tend toward dichotomization to make their points. Structures tend to be portrayed as either flexible or not flexible.

The concept of flexibility has traditionally been associated with the concept of "organic structure" (Burns and Stalker, 1961; Courtright, Fairhurst and Rogers, 1989), which is contrasted to "mechanistic structure" in Contingency Theory. In most such treatments, organic and mechanistic structures are taken to be endpoints of a continuum with many intermediate states in which an organization's structure might be positioned. Position on this continuum is determined by such structural characteristics as decentralization and formalization. Structures become more organic (and flexible) when power is decentralized so that people at all levels of the organization can quickly make decisions about how to deal with unpredicted contingencies, without having to wait for clearance from above. Structures become more organic (and flexible) when they reduce the number of formal rules that inhibit people from doing things that are not part of their defined "jobs", and which inhibit people from changing the structure itself.

This analogy between organic/mechanistic and structural flexibility suggests two refinements to our thinking about structural resources and dynamic capabilities. First, since structures vary

along the continuum of flexibility, they also vary **along a continuum** in the degree to which they can support dynamic capabilities. For any degree of dynamic capability there is an appropriate degree of structural flexibility. For a given level of dynamism, structures with too little flexibility will create drag upon that dynamic capability and may absolutely preclude it. On the other hand, there may be structures with more than enough flexibility to sustain a particular level of dynamism. Having too much flexibility for one's level of dynamism may not seem, at first, like a bad thing. However, further analysis suggests otherwise, as we shall see with the second refinement suggested by the organic/mechanistic/flexibility analogy.

The second refinement is the idea that flexibility is not a free good. Organic/mechanistic theorists have long known that certain operational costs rise as the efficiencies of repetition, hierarchy and standard operating procedures (in mechanistic structures) are waived in favour of the virtues of organic structures, which are the ability to change and react. If more dynamic capabilities demand more flexible (more expensive) structures, it follows that capabilities which are more dynamic are more expensive than less dynamic ones. Managers are faced with the tradeoff between the operating efficiencies associated with capabilities of low dynamism and the responsiveness to the environment associated with capabilities of higher dynamism.

**Proposition 7:** Organizations should adopt a level of flexibility in their organizational capital resources appropriate to sustain the level of dynamism in their capabilities which is appropriate for their environments.

### **Physical Capital Resources**

This is a second of Barney's three kinds of resources and it includes, "...the physical technology used in a firm, a firm's plant and equipment, its geographic location, and its access to

raw materials" (1991: 101). Although physical location is included in Barney's definition, most discussions of this resource focus upon the physical equipment used to carry out work, such as machinery and computers, and the technology embedded in the products of the firm. The rubric, "technology," is commonly used to reference these resources.

Teece *et al* (1997) agree with Barney that technology is an important category of resources and stress that competitive advantage comes from technological assets that are firm specific. Many kinds of technology are readily available in the market place for any organization to acquire and use. In such cases, the technology itself may not be firm specific, but the technology in combination with complementary assets, such as people particularly skilled at using it, may be a valuable, rare, inimitable and nonsubstitutable resource.

Hitt and his colleagues (Bettis and Hitt, 1995; Hitt *et al*, 1998) attribute a prominent role to technology, particularly information technology, in the creation of the new competitive landscape. Firms have adopted new information technologies which quicken the pace of their work and increase the degree of integration among far flung operations. New technologies are also transforming the products available to consumers and businesses, putting ever more stress on the product development capabilities of firms. According to Hitt and his colleagues, the changes precipitated by the new technology are an integral part of the shift to the new organizational structures needed to survive on the new competitive landscape. Dynamic capabilities cannot be sustained without the new information technologies. Those technologies enable the fast assembly of the information needed to make decisions, the rapid dissemination of what those decisions are, and the quick assembly of the information needed to act upon those decisions.

But technologies, like structures, have varied characteristics that can be organized along dimensions, and flexibility is a particularly useful dimension. For example, on the traditional assembly line, machines were not flexible. Long production runs of a single product were necessary to recoup the capital costs of the machines that could make only that product. This impeded the ability to change the product line. Today's manufacturing technology is much more flexible. Machinery can be inexpensively reconfigured to produce a variety of products. In some industries, production runs of one item are economically viable. This flexible technology, like flexible structure, is a contributor to dynamic capabilities. Manufacturing firms who aspire to dynamic capabilities have had to adopt flexible manufacturing technologies.

Firms should adopt a level of flexibility in their technologies appropriate to the degree of dynamism they need to deal with their environments. Technology should be flexible enough to support the needed dynamism, but not be too flexible. More flexibility requires more computing power, and more computing power is more expensive, for hardware, software and the people needed to run it. It is an unnecessary expense to have technology with a very high level of flexibility that may never be required, given the uncertainty of the environment.

**Proposition 8:** Organizations should adopt a level of flexibility in their physical capital resources appropriate to sustain the level of dynamism in their capabilities which is appropriate for their environments.

### **Human Capital Resources**

This third category of resource identified by Barney includes, "the training, experience, judgement, intelligence, relationships and insight of *individual* managers and workers in the firm (1991: 101, Barney's italics)." Many other sources also give a prominent place to the human

resource, some specifying it as **the** most important resource of all (Cappelli and Crocker-Hefter, 1996; Koch and McGrath, 1996; Pfeffer, 1994; Quinn, Anderson and Finkelstein, 1996). Most emphasize that, in the new economy, the human resource is more important than ever. Cappelli and Crocker-Hefter (1996) and Koch and McGrath (1996) state their cases for the primacy of the human resource using the terminology of core competencies and the RBV, respectively. Miles and Creed (1995) tout the virtues of a human investment philosophy. Interestingly, Teece *et al* (1997) do not provide a category for the human resource. However, their concept of dynamic capability clearly depends upon human inputs. Dynamic capability is the ability of the organization to learn, reconfigure and transform. All of these activities require people of a particular type to drive them (Glynn, 1996; Sternberg, 1997).

Cappelli and Crocker-Hefter (1996), Glynn (1996), Koch and McGrath (1996), Pfeffer (1994), Quinn *et al* (1996), and Sternberg (1997), like much of the recent literature, give most attention to the cognitive activities of people in organizations, such as creativity, problem solving and knowledge acquisition. The fundamental thesis is that today's workers must be much more cognitively sophisticated than they were in the past. The popular business press also emphasizes that stronger cognitive skills are needed on the factory floor (Baker and Armstrong, 1996), in service roles (Henkoff, 1994) and in professional and managerial positions (Farnham, 1996).

A second characteristic of the human resource which is frequently mentioned as necessary in the new economy is adaptability (Baker and Armstrong, 1996; Cappelli and Crocker-Hefter, 1996; Farnham, 1996; Glynn, 1996; Henkoff, 1994; Koch and McGrath, 1996; Pfeffer, 1994; Quinn *et al*, 1996; Sternberg, 1997). People must be prepared to take on new challenges frequently as their jobs change and they are moved around within the organization in response to

changes in the volatile organizational environment. The best workers are not those who willingly submit to this demand for adaptability. The best workers are those who seek out and create learning and change because they are intrinsically motivated by it.

The themes of quest for learning, self-development and change are also found in many theories of motivation (eg. Alderfer, 1972; Maslow, 1970; McClelland, 1985). These theories arrange human motives in hierarchies of sophistication ranging from the "lower" motives which we clearly share with animals (eg. for food and water), to "higher" motives such as the need for achievement (McClelland), self-actualization (Maslow) and for growth (Alderfer). Some recent work directly addresses similar ideas about the different types of motivation and their role in the organization (eg. Davis, Schoorman and Donaldson, 1997; Ford, 1996, Mitchell, 1997). These theories also stress that workers strong in growth and other higher order needs work best in situations of change, learning and adaptation. Their higher order motives ensure that they find satisfaction in these challenges.

Drawing on the logic developed earlier, it follows that dynamic capabilities can be sustained only if the appropriate human resources are in place. The more dynamic the capabilities to be sustained, the stronger the cognitive abilities and growth motives of the people must be. For any given level of dynamism, people with inappropriate cognitive and motivational characteristics can either create drag on dynamism or have "excess capacity" in their capabilities and motives. Those with excess capacity may create unnecessarily high salary costs and/or be disruptive because their work is not challenging enough. Here again, the concept of dimension is useful because it enables a discussion of degrees of dynamism, degrees of incompatibility between a resource and dynamism, and the idea that error can come from either excess or insufficiency.



**Proposition 9:** Organizations should assemble human resources with cognitive capabilities and motivational profiles appropriate to sustain the level of dynamism in their capabilities which is appropriate for their environments.

The essence of the last several propositions has been that dynamic capabilities can be maintained at the appropriate level only if the organization has the appropriate organizational, physical and human resource infrastructure. The point is that all three must, ultimately, be tuned to the level of uncertainty in the environment. But a related issue concerns the relationship of the three resources to each other.

There is empirical evidence that the three kinds of resources must be configured to be compatible with each other if they are to constitute an effective assemblage. Studies by Dean, Yook and Susman (1992) and Wall and Davids (1992) show that the effectiveness of the new information technologies is enhanced when more flexible structures are adopted. Parker, Wall and Jackson (1997) linked the flexible role orientation of workers to the implementation of new manufacturing technology. In addition, workers in automated settings often find themselves rotated through a number of different jobs requiring different skills and involving different kinds of problems (Young, 1992). This leads to our next proposition.

**Proposition 10:** Organizations should assemble organizational, physical and human resources that are compatible with each other, as well as being individually appropriate for the level of dynamic capabilities which the organization wishes to sustain.

We have now seen that if environments, dynamism and resources are thought of as dimensional, we can appreciate more fully the intricacies of tuning all of these elements to each

other. The idea of dimensions is not new, but it has not been applied in the context of the RBV before. We will now go on to show how the ideas captured in the above propositions can help us elaborate the concept of position.

### **Environments, Resources and Position**

Position is the unique bundling of several resources in a way that, hopefully, gives competitive advantage to the firm by being valuable, rare, inimitable and nonsubstitutable (Teece *et al*, 1997). Teece *et al* recommend that, given the current turbulent business environment, organizations should take positions that include dynamic capabilities. Given the discussion above, we can see that this **Dynamic Capabilities Position** includes flexible structure and technology, and human resources with high cognitive skills and strong growth motives. Without resources of this nature, dynamic capabilities cannot be sustained. Firms in high technology industries such as telecommunications and pharmaceuticals strive to adopt this position. It is expensive to maintain, but it is necessary in industries with highly uncertain environments. This is the position which Teece *et al* focus on when they make their case for the desirability of dynamic capabilities, but they do not provide a theoretical model which enables us to contrast this position with other positions which an organization might adopt.

It follows from our earlier discussion that, when an organization considers its position, it should consider its environment, its organizational, physical and human resources, and their status *vis a vis* all four cells in Figure 1. The discussion that follows, which continues our focus on dynamic capabilities, will necessarily give primary attention to resources at the infrastructure level, and so will not cover all four cells. Teece *et al* (1997), in their discussion of dynamic capabilities, do not usually clarify whether they are discussing them as Essential Base resources

or Differentiating Base resources, although it is this reader's interpretation that they usually treat them as Differentiating Base resources. The distinction between essential and differentiating resources is an essential part of the analysis that follows.

The dynamic capabilities position introduced above can be contrasted to a **Static Capabilities Position**, which a firm should adopt if its environment has low uncertainty. With that kind of environment, the organization will work most effectively if it has structure and technology with low flexibility, and human resources that are not very strong cognitively nor much driven by growth motives. Automobile factories in North America during the late forties and early fifties came close to this position. The certain, growing market of that era made the expense of maintaining dynamic capabilities an unnecessary expense.

Between positions at the static and dynamic extremes are many other positions that a firm might find effective, depending upon its environment. Recall that Proposition 5 stated that organizations should adopt the optimum level of dynamic capability for their environments. We will now extend our thinking in regard to that proposition.

We can think of the competitive environment of a firm as having a particular level of uncertainty at any particular point in time. For that level of uncertainty there will be, in principle, an optimal level of dynamic capability which, if achieved by an organization, will put it in the best possible competitive position, with respect to its resource infrastructure.

Capabilities that are less dynamic will not allow the organization to change as quickly as is necessary, and capabilities that are more dynamic than the optimum incur unnecessary costs and have other undesirable consequences as well. So any competitive environment has associated with it, at any point in time, an optimum level of dynamic capability.

However, Teece *et al* (1997) and Hitt and his colleagues (Bettis and Hitt, 1995; Hitt *et al*, 1998) make the point that the business environment is continuously increasing in turbulence and uncertainty. In the current business environment the level of uncertainty is increasing, so there is an accelerating rate of change.

As a consequence of this acceleration, firms cannot attune their dynamic capabilities to the current level of uncertainty and hope to be well positioned for any length of time. To remain current they must continuously monitor and predict the accelerating level of uncertainty, and continuously adjust the dynamism of their capabilities upward to track that level.

**Proposition 11:** Ideally, a firm should monitor and predict the rising level of uncertainty in its environment, and continuously tune its resource infrastructure to maintain the optimum level of dynamism at all times.

As a practical matter, however, a firm may not need to maintain the optimal level of dynamism at all times, or at any time, in order to maintain its infrastructure as an Essential Base or even as a Differentiating Base. This is so because competitors may not be close to the optimum level of dynamism either. In any competitive environment, competitors will vary in their closeness to the dynamic optimum, and there will be some "average" degree of deviation from it which is the accepted industry norm. As long as a firm's dynamic capabilities are as close to the industry optimum as is the general practice in the industry, its infrastructure will provide it with the Essential Base necessary for participation in the industry. However, a firm that is able to maintain a level of dynamism that is **significantly** closer to the industry optimum than the vast majority of the firms in its industry, will have an infrastructure that is a Differentiating Base. It will have achieved competitive advantage, not by having unique and

valuable functional resources but by having a unique and valuable infrastructure. This leads to our next two propositions.

**Proposition 12:** An organization can deploy its resources as an Essential Base if it can maintain its infrastructure at a level of dynamism which is not significantly different from the level of dynamism generally prevalent in the industry.

**Proposition 13:** An organization can deploy its resources as a Differentiating Base if it can maintain its infrastructure at a level of dynamism which is significantly closer to the industry optimum than that achieved by its competitors.

But different industries will have differential susceptibility to allowing competitive advantage through Differentiating Base resources. Some industries may be populated by firms which, for the most part, are able to maintain themselves close to the industry optimum and so it is unfeasible to gain significant competitive advantage by trying to achieve an even closer position. On the other hand, if the firms in an industry are generally far from the industry optimum, there is more latitude to gain competitive advantage by being closer to the optimum. The situation in which most industry participants are close to the optimum is more likely to occur in an industry in which that optimum is changing at a slow rate, so that it is easy to track and there is time to make changes before the level of uncertainty changes significantly. Industry environments with more dynamic levels of uncertainty will be harder to track and more difficult to keep up with.

There is also the possibility that in some industries the rate of acceleration may be more stable than others. In industries with smooth acceleration rates, the activity of keeping up can be more routinized as a constant rate of acceleration in dynamic capabilities is needed. In other industries

the acceleration rate may be more variable. Various industry factors may cause alternate periods of fast and slow acceleration. DuPont seems to have experienced this kind of acceleration and deceleration over the years and has adjusted its technology strategy appropriately (Miller, 1997). Some industries may be like jackrabbit starts in cars, with violent and sudden changes in the acceleration rate.

The characterization of Essential and Differentiating bases in Propositions 12 and 13 makes it clear that the distinction between basic and key resources, when stated as a dichotomy, is artificial. Whether resources are essential or differentiating depends upon the relationship between the level of dynamism of a firm and the level of dynamism of its competitors, and that difference in dynamism is a continuous variable rather than a dichotomous one.

### **An Overview**

This paper embarked upon the detailed analysis of resources recommended by Wernerfelt (1995) in order to explore and elaborate upon a number of avenues of theoretical interest. To do this it began by distinguishing between the functional and infrastructure levels of analysis for resources, and the essential and differentiating roles that resources might play, to yield the fourfold classification shown in Figure 1.

That fourfold distinction was used to show that RBV theorists have generally been preoccupied with key resources and somewhat remiss in their consideration of basic resources. Propositions 1 through 4 are germane to this point and they open the door to further consideration of the relationship between basic and key resources

The fourfold distinction also showed that earlier statements of the RBV (eg. Amit and Shoemaker, 1993; Barney, 1986, 1991, 1995; Peteraf, 1993; Wernerfelt, 1984) have given most

attention to resources at the functional level of analysis, while Teece *et al* (1997) have given more attention to the infrastructure level. Teece *et al* stated that they were diverging from earlier models of the RBV but were unable to articulate very clearly how. Here we have identified one important distinction, in the level of analysis at which they are considering resources. It may lead the way for further distinctions. Having made the distinction between the functional and infrastructure levels, this paper has gone on to give most of its attention to infrastructure, by elaborating upon Teece *et al*'s concept of dynamic capabilities.

Teece *et al* (1997) held forth the promise that the RBV, with its focus on endogenous resources, would enable us to appreciate more fully the difficulties inherent in assembling the configurations of endogenous resources that give competitive advantage. Theories of strategy that focus on competitive position in the environment (such as Porter's) were faulted by Teece *et al* for not providing a theoretical platform that could effectively provide for such considerations. This paper, by elaborating upon the concept of dynamic capabilities, using Barney's (1991) threefold classification of resources, showed that dynamic capabilities model is a neo-contingency theory which links the condition of the environment to the desirable characteristics of organizations. That basic logic, worked through and articulated in propositions 5 through 13, makes it quite clear how difficult the assembly job can be. At the infrastructure level, resources must be attuned to the environment to provide the appropriate amount of dynamism for survival and/or differentiation in the industry. To complicate matters, the environment is very likely to be a moving target, and resources must be attuned to each other as well as the environment.

Propositions 5 through 13 make it clear that resource assembly will be complex but, if anything, they oversimplify the case. The discussion here has confined its attention almost

entirely to the infrastructure level of analysis. A full RBV theory would also have to include a parallel analysis at the functional level. Further, Barney's three-fold classification of resources was used here to make the discussion manageable. Further research will probably show that this simplification, although helpful as a starting point, needs elaboration.

The elaboration upon the concept of dynamic capabilities developed here has also shown that, at the infrastructure level, conceptual bridges can be built between endogenous and exogenous realms. The rise of the RBV as a theory that considers endogenous resources, in contrast to theories such as Porter's which focus on the exogenous environment of the organization, creates the danger that these two realms of theory will diverge over time, hampering their ability to consider very important questions about the relationship of the interior and the exterior. The neo-contingency ideas built around dynamic capabilities in this paper provide a theoretical beach head across this divide. It should be further developed and parallel beach heads established.

This analysis has helped to elaborate and strengthen the RBV. We now have a better sense of its various aspects (Figure 1), some of its weaknesses, and some areas for possible refinement. However, certain other facets of this analysis bring to the fore some serious issues for the RBV, particularly at the infrastructure level of analysis, which has been the main focus of this paper.

One area of concern is in the operationalization of constructs. The RBV is a broad, sweeping model which tries to bring a wide spectrum of concepts under its wings and at this stage in its development it may be premature to demand clear operationalizations of all of its concepts. However, if it is to be viable, it will eventually have to be operationalized and tested. It is therefore appropriate to begin asking these questions. For example, "How should dynamic capabilities be operationalized?" What questions should be asked on a questionnaire that is



intended to measure them, assuming we want to measure them with a questionnaire? Working from Teece *et al*'s (1997) broad definition would be very difficult. The more detailed specification of dynamic capabilities developed here, using Barney's (1991) resource categories, might be expected to relieve the ambiguity somewhat. One might ask organization members about the flexibility of their organizational and technological resources. One might use standardized instruments to measure the cognitive capabilities and motivational profiles of human resources. Some progress may, therefore, have been made here. But there is still much to be accomplished. How, for instance, might one define and measure the optimal level of dynamism for an industry? The question of whether Teece *et al*'s (1997) model of dynamic capabilities is viable as an empirically testable model is still open although some avenues for operationalization have been identified.

### **Wither Dynamic Capabilities?**

In this analysis we have taken the position that the dynamic capabilities model is a neo-contingency approach that is amenable to elaboration and improvement with selected ideas drawn from traditional Contingency Theory. But more sceptical readers might well ask if the dynamic capabilities model is anything more than traditional Contingency Theory restated in rather broad terms with modernized vocabulary that gives it a refreshed appearance. They might argue that there are clear parallels between the two:

1. The organization's environment is an entity to which the organization must adjust. Turbulence and change are important characteristics of the environment. Traditional Contingency Theory captures the essence of the environment with the concept of uncertainty, which is usually conceived of as having subdimensions such as complexity

and dynamism. Is not dynamic capabilities model really stating essentially the same thing about the environment?

2. The levers for changing the organization to adjust to the environment are thought of as being structure, technology and people in traditional Contingency Theory. For example, organic structure should be adopted to deal with an uncertain environment. In the dynamic capabilities model, firms are urged to adapt, integrate, and reconfigure internal and external organizational skills to match the requirements of a changing environment. The way to do this is said to be with processes, positions and paths (Teece *et al*, 1997: 518). Processes are for coordination, integration, learning and reconfiguration. It is difficult to distinguish these from traditional structural concepts.

Skeptics might argue that the fundamentals are the same and that the dynamic capabilities model adds some modernizing refinements. The reply to skeptics might be that the concepts associated with the dynamic capabilities model are more than refinements, they are fundamentally new.

Skeptics might then ask how dynamic capabilities theorists would go about measuring the organization's environment using a questionnaire, and if the questions on that questionnaire would be significantly different from those used to measure environmental uncertainty. It seems that the theoretical battle with the skeptics must ultimately be settled by consideration of the operationalization of concepts and by empirical research. And this brings us back to the discussion of operationalization above.

### **Conclusions**

This paper has shown that the RBV can be understood as having four facets (Figure 1) which have been given varied attention by different RBV theorists. An analysis of the dynamic

capabilities model has shown that it addresses resource issues at the infrastructure level and has some commonalities with traditional Contingency Theory. The authors of the current paper have argued that this commonality with traditional Contingency Theory can be a source of ideas for elaborating and refining the dynamic capabilities model, to yield insights about the nature of resources, the dynamics of the environment, the difficulties of assembling appropriate resource configurations, and the roles of key and basic resources in competitive advantage. This analysis leaves little doubt that the dynamic capabilities model is a contingency approach, we must ask ourselves if it is a viable neo-contingency approach or will it merely lead us down some well-worn dead-end paths.

## References

- Alderfer, C. P., (1972) *Existence, Relatedness and Growth: Human Needs in Organizational Settings*. New York: The Free Press.
- Amit, R., and Shoemaker, P. J. H., (1993) Strategic assets and organizational rent. *Strategic Management Journal*, 14, 33-46.
- Andrews, K. (1980) *The Concept of Corporate Strategy*. Homewood, Ill.: Dow Jones Irwin, Inc.
- Baker, S., and Armstrong, L., (1996) The new factory worker. *Business Week*, September 30, 59-68.
- Barney, J., (1986) Strategic factor markets: Expectations, luck, and business strategy. *Management Science*, 32, 1231-1241.
- Barney, J., (1991) Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Barney, J., (1995) Looking inside for competitive advantage. *Academy of Management Executive*, 9(4), 49-61.
- Bettis, R. A., and Hitt, M. A., (1995) The new competitive landscape. *Strategic Management Journal*, 16, 7-19.
- Boyd, B. K., Dess, G. G., and Rasheed, A.M.,(1993) Divergence between archival and perceptual measures of the environment: Causes and consequences. *Academy of Management Review*, 18(2), 204-226.
- Burns, T., and Stalker, G. M., (1961) *The Management of Innovation*. London: Tavistock.
- Cappelli, P., and Crocker-Hefter, A., (1996) Distinctive human resources are a firm's core competencies. *Organizational Dynamics*, Winter, 7-22.

- Chakravarthy, B., (1997) A new strategy framework for coping with turbulence. *Sloan Management Review*, Winter, 69-82.
- Coff, R. W., (1997) Human assets and management dilemmas: Coping with hazards on the road to resource-based theory". *Academy of Management Review*, 22(2) 374-402.
- Courtright, J. A., Fairhurst, G. T., and Rogers, L. E., (1989) Interaction patterns in organic and mechanistic systems. *Academy of Management Journal*, 32(66), 773-802.
- Davis, J. H., Schoorman, F. D., and Donaldson, L., (1997) Toward a stewardship theory of management. *Academy of Management Review*, 22(1), 20-47.
- Dean, J. W., Yook, S. J., and Susman, G. I., (1992) Advanced manufacturing technology and organizational structure: Empowerment or subordination? *Organization Science*, 3, 203-229.
- Dess, , G. G., and Beard, D. W., (1984) Dimensions of organizational task environments. *Administrative Science Quarterly*, 29, 52-73.
- Duncan, R. B., (1972) Characteristics of organizational environment and perceived environmental uncertainty. *Administrative Science Quarterly*, 17, 313-327.
- Farnham, A., (1996) Are you smart enough to keep your job? *Fortune*, January 15, 34-48.
- Ford, C. M., (1996) A theory of individual creative action in multiple social domains. *Academy of Management Review*, 21(4), 1112-1142.
- Glynn, M. A., (1996) Innovative genius: A framework for relating individual and organizational intelligence to innovation. *Academy of Management Review*, 21(4), 1081-1111.

- Harris, R. C., Insinga, R. C., Morone, J., and Werle, M. J., (1996) The virtual R&D laboratory. *Research-Technology Management*, March/April, 32-36.
- Henkoff, R., (1994) The best service workers. *Fortune*, October 3, 110-122.
- Hitt, M. A., Keats, B. W., and DeMarie, S. M., (1998) Navigating in the new competitive landscape: building strategic flexibility and competitive advantage in the 21<sup>st</sup> century. *Academy of Management Executive*, 12(4), 22-42.
- Jarley, P., Fiorito, J., and Delaney, J. T., (1997) A structural contingency approach to bureaucracy and democracy in US national unions. *Academy of Management Journal*, 40(4), 831-861.
- Koch, M. J., and McGrath, R. G., (1996) Improving labor productivity: Human resource management policies do matter. *Strategic Management Journal*, 17, 335-354.
- Li, M., and Simerly, R. L., (1998) The moderating effect of environmental dynamism on the ownership and performance relationship. *Strategic Management Journal*, 19, 169-179.
- Maslow, A., (1970) *Motivation and Personality (2nd ed.)*. New York: Harper & Row.
- McClelland, D. C., (1985) *Human Motivation*. Glenview, IL: Scott, Foresman.
- McGrath, R. G., MacMillan, I. C., and Venkataraman, S., (1995) Defining and developing competence: A strategic process paradigm. *Strategic Management Journal*, 16, 251-275.
- McNichols, T. J. (1977) *Executive Policy and strategy Planning*. New York: McGraw-Hill.
- Miles, R. E., and Creed, W. E. D., (1995) Organizational forms and managerial philosophies: A descriptive and analytical review. In B. Staw and L. L. Cummings, *Research in Organizational Behaviour*, Vol. 17. Greenwich CT: JAI Press, 333-372.

- Miller, D., and Shamsie, J., (1996) The resource-based view of the firm in two environments: The Hollywood film studios from 1936 to 1965. *Academy of Management Journal*, 39(3), 519-543.
- Miller, J., (1997) Discovery research re-emerges at DuPont. *Research-Technology Management*, February, 24-28.
- Mintzberg, H. (1979) *The Structuring of Organizations*. Englewood Cliffs, NJ: Prentice-Hall.
- Mitchell, T. R., (1997) matching motivational strategies with organizational contexts. In B. Staw and L. L. Cummings, *Research in Organizational Behaviour*, Vol. 19. Greenwich CT: JAI Press, 57-149.
- Oliver, C., (1997) Sustainable competitive advantage: Combining institutional and resource-based views. *Strategic Management Journal*, 18(9), 697-713.
- Parker, S. K., Wall, T. D., and Jackson, P. R., (1997) "That's not my job": developing flexible employee work orientations. *Academy of Management Journal*, 40(4), 899-929.
- Pennings, J. M., (1992) Structural contingency theory: a reappraisal. In B. Staw and L. Cummings (Eds.) *Research in Organizational Behaviour*, Vol. 14, 267-309, JAI Press.
- Peteraf, M. A., (1993) The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, 14, 179-191.
- Pfeffer, J., (1994) *Competitive Advantage Through People*. Boston: Harvard Business School Press.
- Porter, M. (1980) *Competitive Strategy*. New York: Free Press.
- Porter, M., (1990) *The Competitive Advantage of Nations*. New York: Free Press.

- Price, J. L., (1997) Handbook of Organizational Measurement. *International Journal of Manpower*, 18(4/5/6), 435-541.
- Quinn, J. B., Anderson, P., and Finkelstein, S., (1996) Leveraging Intellect. *Academy of Management Executive*, 10(3), 7-27.
- Roussel, P. A., Saad, K. N., and Erickson, T. J., (1991) *Third Generation R&D*. Boston, MA: Harvard Business School Press.
- Schwab, K., and Smadja, C., (1994) Power and Policy: The new economic world order. *Harvard Business Review*, Nov.-Dec., 40-50.
- Souder, W. E., Sherman, J. D., and Davies-Cooper, R., (1998) Environmental uncertainty, organizational integration, and new product development effectiveness: A test of contingency theory. *Journal of Product Innovation Management*, 15, 520-533.
- Steingraber, F. G., (1996) The new business realities of the twenty-first century. *Business Horizons*, Nov.-Dec., 2-5.
- Sternberg, R. J., (1997) Managerial intelligence: Why IQ isn't enough. *Journal of Management*, 23(3), 475-493.
- Summer, C. E., (1980) *Strategic behaviour in Business and Government*. Boston: Little, Brown and Company.
- Sutcliffe, K. M., and Zaheer, A., (1998) Uncertainty in the transaction environment: an empirical test. *Strategic Management Journal*, 19, 1-23.
- Tapscott, D. (1996) *The Digital Economy*. New York: McGraw-Hill.
- Teece, D. J., Pisano, G., and Shuen, A., (1997) Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.



- The Economist*, (1996) The world economy survey. Set. 28, S1-S46.
- Volberda, H. W., (1997) Building flexible organizations for fast-moving markets. *Long Range Planning*, 30(2), 169-183.
- Wall, T. D., and Davids, K., (1992) Shopfloor work organization and advanced manufacturing technology. *International Review of Industrial and Organizational Psychology*, 7, 363-398.
- Wernerfelt, B., (1984) A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171-180.
- Wernerfelt, B. (1995) The resource-based view of the firm: Ten years after. *Strategic Management Journal*, 16, 171-174.
- Young, S. M., (1992) A framework for the successful adoption and performance of Japanese manufacturing practices in the United States. *Academy of Management Review*, 17, 677-700.

**Figure 1**

**Four Facets of Resource Analysis**

	Basic Resources	Key Resources
Functional Level of Analysis	Cell 1  Essential  Executor	Cell 2  Differentiating  Executor
Infrastructure Level of Analysis	Cell 3  Essential  Base	Cell 4  Differentiating  Base