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THE RESOURCE BASED VIEW AND THE NEW COMPETITIVE LANDSCAPE: CHARACTERIZING POSITIONS OF DYNAMIC CAPABILITY

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Management of Innovation and New Technology -
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WORKING PAPER NO. 75

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Abstract

The resource-based view of the firm is extended by providing detailed, theory-based characterizations of the three categories of resources identified by Barney, and the organizational environment, to give a clearer understanding of the nature of position and the kind of organizational infrastructure needed to sustain dynamic capabilities.

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 explore ways to extend its scope to new fields of study in order to leverage the knowledge and theories of those other fields.

The scope of the RBV, and other theoretical approaches, can be extended by two general approaches. In the first, incremental advances come about through the refinement of concepts and the empirical evaluation of propositions derived from the theory. Miller and Shamsie (1996) provide a good example of this approach in their excellent study of Hollywood film studios, using the RBV. A second approach is to link the RBV to other theoretical models in ways that leverage the explanatory power of the linked theories. This tends to give broader, but less specific, advances in explanatory power. An excellent example of this approach is Oliver's (1997) linking of the RBV to institutional theory. The current paper provides theoretical advancement through this second route, and does so by linking to four other theoretical models, some of which are not closely associated with the study of organizational strategy.

This linking of models will help bridge a divide which has received prominent attention in some recent discussions of the RBV. Both Barney (1991) and Teece *et al* (1997) distinguish between exogenous and endogenous bases for strategy. Models such as Porter's (1990) place more emphasis on exogenous factors, such as industry entry barriers and rivalry among industry incumbents. In contrast, the RBV stresses the importance of endogenous factors, resources, for organizational strategy. However, the RBV states broadly that to provide competitive advantage, resources must be appropriate to the industry (environment) in which the firm does business. This opens the door for the development of more a detailed theoretical analysis of the relationship between environments and resources, between the exogenous and the endogenous. This paper focuses primarily upon internal resources, but theoretically links them to the environment, with implications for how competitive advantage can be achieved.

Teece *et al* (1997) provide a clear statement of the value of being able to construct such a link. They stress the importance of acquiring dynamic capabilities so that the firm is able to deal with the current turbulent business environment. We can extend this insight to note that, in the past, dynamic capabilities were not so important as they are now, and, even now, they may be less important in some industries than others. This paper provides a theoretical model for understanding, in more detail, the relationships between various types of exogenous business environments and various types of endogenous capabilities.

Teece *et al* (1997) explain that 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." That difficulty is clearly illustrated in recent empirical work (eg. Coff, 1997; McGrath, Macmillan and Venkataraman, 1995). This is in contrast to exogenous approaches

which all but trivialize the difficulties inherent in assembling an appropriate set of resources. The present paper sets forth a model that provides some prescriptions for, and some insights into, the difficulties inherent in the assembly of congruent resources for dynamic capabilities.

Another important concept from the RBV is position. Teece *et al* (1997) define position as a bundle of endowments or resources which an organization possesses which give competitive advantage. They explain in general terms that the resource and capability assemblage of the position should be compatible with the environment, but they do not provide any detailed theoretical specification of this. The current paper builds upon Teece *et al* by providing a more detailed method for theoretically specifying various positions and for specifying the degree of compatibility between a position and an environment.

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. It can be argued that our lack of detailed specification of resources contributes to ambiguity in our understanding of position and of the relationship between endogenous and exogenous factors. The current paper will contribute to the advancement of the RBV by providing a more detailed model of resources, including the three general categories of resources identified by Barney (1991); organizational, physical and human. First, though, a more detailed specification of environment will be provided.

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. If the RBV is to build upon this proposition, it must characterize environments in a way that allows them to be linked theoretically to the resources of firms. Teece *et al* (1997) reason

along these lines, as noted above, saying that in the current turbulent business environment a unique set of **dynamic** capabilities is necessary if the firm is to have competitive advantage.

Bettis and Hitt (1995) 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 technical 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 characteristics 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 creating the new economy are globalization, industry convergence, increasing competition, increasing knowledge and communication intensity, and the spread of information technology.

The RBV can capture such characterizations in its theoretical net using the concept of uncertainty. Uncertainty, as a descriptor of the environment, is based upon two more fundamental characteristics, complexity and stability (Daft, 1995; Dess and Beard, 1984; Duncan, 1972). This particular way of characterizing the environment is not new and is not universally accepted, and there are variations in the meanings attached to these terms (Boyd, Dess and Rasheed, 1993; Price, 1997). However, this characterization is widely accepted and used (eg. Chakravarthy, 1997; Jarley, Fiorito and Delaney, 1997). It can be argued that the new economy, as described above, 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). This higher complexity and lower stability make the environment more difficult to predict and thus more uncertain. The business environment is generally more uncertain now than it was 50 years ago and, within the current environment, some industries have more uncertainty (eg. electronics, pharmaceuticals) than others (eg. food processors and beer bottlers), according to Daft (1995).

By adopting the concept of uncertainty to describe organizational environments, the RBV can extend its theoretical reach to include some of the conceptual and empirical work already done on environments. There is also ready-made instrumentation for measuring environmental uncertainty (Boyd, Dess and Rasheed, 1993; Price, 1997), which should prove useful in developing the RBV in this conceptual direction. This extension is consistent with the work of Teece *et al* (1997) and provides a way to grapple with the issue of how dynamic the dynamic capabilities of a firm need to be. The level of dynamism appropriate for any firm will depend upon the uncertainty of its environment. It will now be shown that this characterization of the environment provides a way to link the environment to firm resources, theoretically. To do that we will draw upon Barney's (1991) identification of three kinds of resources: Organizational, physical and human.

ORGANIZATIONAL CAPITAL RESOURCES (STRUCTURE)

According to Barney, organizational capital resources 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." This resource must have value, rareness, inimitability and non-substitutability if it is to contribute to competitive advantage.

Ancona, Kochan, Scully, Van Maanen and Westney (1996) describe the structural characteristics of the "new organization." To survive in the new economy, the new organization must be networked internally (cross-functional teams, IT networks) and externally (alliances, consortia, IT networks). It must also be flat (levels of middle management eliminated), flexible (able to learn and adjust to new contingencies), diverse and global.

Bettis and Hitt (1995) consider similar themes in their discussion of "the new organization and disorganization." This includes the blurring of markets and hierarchies as organizations participate increasingly in alliance networks, the provision of structures that allow the organization to learn, and the need to replace the skills of long range planning with the skills of strategic response capability.

Traditionally, many of these characteristics have been subsumed under the rubric, "organic structure" (Burns and Stalker, 1961; Courtright, Fairhurst and Rogers, 1989), and contrasted to "mechanistic structure." This traditional terminology does encompass much of what is relevant to the RBV but, given the thrust of the recent work, the term "flexible" seems more apt. For example, Ancona *et al* (1996) include flexible as one of the prime characteristics of the new organization: Bettis and Hitt (1995) emphasize the need to respond quickly to changes in the environment: Teece *et al* (1997) talk of dynamic capabilities: Volberda (1997) gives practical advice on how to create a flexible organization. The new organization 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.

Many of the factors contributing to flexibility can be subsumed under the concepts of decentralization and the reduction of formalization (Dougherty and Hardy, 1996; Markides and Williamson, 1996; Robbins, 1996). Flexibility comes from the decentralization of power to enable people "low" in the organization to make decisions about how to deal with the unpredicted contingencies they encounter. Flexibility comes from reducing the number of formal rules in the organization that inhibit the free flow of communication and slow down the decision-making process.

But flexibility is not a free good. Costs rise as the efficiencies of repetition, hierarchy and standard operating procedures are waived in favour of the ability to change and react. The organization of 50 years ago was not as flexible as the organization of today, and it did not need to be. In the more certain environment of that time, high flexibility did not give strategic advantage and was a waste of resources. Organizations should adopt levels of structural flexibility (and the associated cost) appropriate for the uncertainties of their environments.

Teece *et al* 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). The hallmark here is flexibility, to develop innovative ways of gaining competitive advantage and to respond to strategic threats. We can see that dynamic capabilities can be sustained only by a structure that is flexible. Highly centralized and formalized organizations do not allow dynamic capabilities to flourish.

We now have a way of characterizing organizational capital resources (structure) along a dimension running from low flexibility to high flexibility. That characterization is useful

because it can be theoretically linked to the concept of dynamic capabilities. Organizations need to develop dynamic capabilities to cope with the uncertain environment of the new economy, as Teece *et al* (1997) suggest. However, they can develop such capabilities only to the degree that their structures allow. Dynamic capabilities can be built only upon flexible structures. Further, firms should develop flexible structures and dynamic capabilities only to the degree appropriate to the degree of uncertainty in their environments. If an organization identifies the appropriate levels of flexibility and dynamism accurately, and achieves them operationally, it will very probably have a competitive advantage that involves value, rareness, inimitability and nonsubstitutability, given that the identification and implementation of the appropriate levels is an extremely difficult task.

This way of characterizing organizational capital resources provides a more detailed conceptual model of an important class of resources within the RBV, thus enriching and extending the RBV. It also enables the use of already available measuring instruments such as Podsakoff, Nichoff, Mackenzie and Williams'(1993) for formalization and Iverson and Roy's (1994) for centralization (Price, 1997), in empirical studies of these conceptual developments.

PHYSICAL CAPITAL RESOURCES (TECHNOLOGY)

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.

Bettis and Hitt (1995) 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 Bettis and Hitt, the new organization is largely the child of the new technology, and Ancona *et al* (1996) concur, with their description of the role of information technology in the internal and external networks of the new organization.

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.

The changes precipitated by the new technology are an integral part of the shift to the new economy and the new organization, described above, and linked theoretically to the RBV. For example, Parker, Wall and Jackson (1997) linked the strategic orientation and flexible role orientation of workers to the implementation of new manufacturing technology. However, the new technology must also be couched in a theoretical framework if it is to be included in theoretical extensions to the RBV.

Perrow (1967) provides a framework which will allow us to make those theoretical linkages. He characterized work technology (whether it be computers, pencils or fork-lift

trucks) using two basic dimensions, variability and analyzability. Technology has high variability if its use involves many encounters with unexpected problems. Technology has high analyzability if those problems are easily analysed and solved. On the basis of these two dimensions, Perrow ordered work technologies on a dimension running from routine (low variability and high analyzability, as with positions on a traditional assembly line) to non-routine (high variability and low analyzability, as with keeping the space-station Mir aloft).

The new technologies are more non-routine than the technologies of the past. For example, on the traditional automobile assembly line, the machinery and the long, efficient production runs, required workers to do the same simple repetitive work over long periods of time. New problems rarely arose (low variability). When they did, they were usually of such a nature that they could be solved by individuals who had work experience with those particular machines, but not much advanced education. This indicates relatively high analyzability of the problems. In contrast, in the modern automobile assembly facility, shorter production runs require workers to meet new problems more frequently, creating higher variability. Many of those problems involve robotics and other technical knowledge which may require years of formal education to acquire, indicating low analyzability (Baker and Armstrong, 1996). 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). Empirical studies using Perrow's model show that non-routine technology is associated with more flexible structures (Van de Ven and Delbecq, 1974). Other studies show that the effectiveness of the new information technologies is enhanced when more flexible structures are adopted (Dean, Yook and Susman, 1992; Wall and Davids, 1992).

The implications of these considerations for the RBV are as follow. As firms establish positions by assembling configurations of technology resources, they find themselves with increasing numbers of non-routine technologies on board. Those non-routine technologies will contribute to the effectiveness of those firms only if they are embedded in congruent complementary assets of people and structure. Further, dynamic capabilities can be sustained only if supported by a congruent technology infrastructure, and that technology will inevitably be non-routine. The routineness dimension, based upon variability and analyzability, thus provides a metric to contrast the new technology resources with the old, and a conceptual system that links to environments, structures and dynamic capabilities. There are also instruments available to measure routineness (Withey, Daft and Cooper, 1983) which can be employed in the empirical work based upon this conceptual extension. The specification of this dimension provides another theoretical plank in the bridge linking exogenous and endogenous elements in the theoretical framework of the RBV.

HUMAN CAPITAL RESOURCES (PEOPLE)

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)." 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 in the new economy, in the new organization, working with the new technology, workers must be much more cognitively sophisticated than they were in the past. The popular business press also emphasizes that more sophisticated 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. They must be "learners for life" as they are constantly training to upgrade their old skills and develop new ones. The best workers are not those who willingly submit to this demand for adaptability: The best workers are those who actually seek out 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). Figure 1 makes the point that the levels of sophistication proposed by these different motive theories have parallels. 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 welcome and enjoy these challenges.

In short, the literature suggests that the best workers for the new organization, operating in the new economy and using the new technology, are those with strong cognitive capabilities and high levels of growth motivation. Such people are relatively sophisticated, compared to those who work best in less demanding circumstances. The job characteristics model of Hackman and Oldham (1980) makes this point theoretically and the empirical support for the model confirms this view (eg. Johns, Xie and Fang, 1992). Other writers support this thesis that people must fit their organizations if they are to be effective (eg. Kristof, 1996), although they may use different conceptual frameworks to make the point.

We now have a fourth dimension for the model which will bridge the divide between the exogenous environment and the endogenous resources of the organization. People can be ordered along a dimension of sophistication based upon their cognitive abilities and their

motive profiles. As organizations position themselves in particular business environments, they must ensure that their human resources are at the appropriate level of sophistication to suit that environment, as well as the structure and technology they are using. Dynamic capabilities can be maintained only upon an appropriate infrastructure of people.

ENVIRONMENTS, RESOURCES AND POSITION

We have now described four theoretical dimensions which can be used to extend the RBV by providing more detailed characterizations of environments, structures, technologies, people and the concept of position. The four dimensions, and the sub-dimensions upon which they are based, are shown in Figure 2. Following that, in Figure 3, only the primary dimensions for each resource and the environment are shown. In both figures the dimensions are arranged so that their compatible poles are at the same ends. This will help make more intuitively obvious the elaboration of the concept of position which follows.

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. Position can best be seen in the extreme cases on the dimensions shown in Figure 3.

The vertical line joining the four elements near their right ends in Figure 3 represents what might be called the **Dynamic Capabilities Position,** because it is the configuration of resources and environment which makes dynamic capabilities both possible and desirable. In that position, the environment is highly uncertain (complex and unstable) so that firms need a high level of dynamic capability in order to deal with it (Teece *et al*, 1997). In that position, the organization has a resource infrastructure capable of sustaining high dynamic capability. Its people have high sophistication (high cognitive ability and high growth motivation). Its

technology is highly non-routine (high variability and low analyzability). Its structure is highly flexible (decentralized and not formalized). High technology firms in industries such as telecommunications and pharmaceuticals strive to adopt this position. It is an expensive position to maintain, but it is necessary in industries with highly uncertain environments. This is the position which Teece *et al* (1997) focus on when they make their case for the desirability of dynamic capabilities. But Teece *et al* do not provide a theoretical model which enables us to contrast this position with other positions which an organization might adopt.

The vertical line at the left hand end of the dimensions represents the **Static Capabilities Position**, in which the environment of the firm has low uncertainty. In this situation the organization can operate effectively with a workforce of low sophistication, routine technology and a structure with low flexibility. 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 luxury. Between the static and dynamic extremes are many other positions that a firm might find effective, depending upon its environment. The primary point is that the resources of an organization should be configured in a position of maximum congruence with the environment and each other (represented by straight vertical lines in Figure 3). But this model also opens the door for a more complex discussion of a number of issues relevant to the RBV.

Although the model recommends the achievement of positions of congruence, and recent empirical evidence suggests that some degree of congruence is possible and desirable (Jarley, Fiorito and Delaney, 1997; Parker, Wall and Jackson, 1997), it is unlikely that positions of complete congruence can be achieved in the real world. Given the complexities of

management and of the resources themselves, practising managers will usually find some degree of mismatch among the resources and environments they encounter. This will usually drive them into two major categories of managerial activity. One activity is the attempt to move the resources into better alignment with each other and the environment. An example of this was seen when the executives of North American automobile companies faced the challenge of eliminating their bureaucracies, upgrading their technologies and training their workforces, under the pressures of competition from offshore. Improving alignments of resources is usually a huge task which must be accomplished as a broad strategic initiative which takes years to complete. The second major category of managerial tasks is to keep the organizational systems functioning despite their incompatibilities. For example, workers may not be sophisticated enough for the technology they are using, as shown in the incongruent position in Figure 3. The result can be frustrated workers, absenteeism, shoddy work and irate customers. It is the role of mangers to keep the firm operating and profitable despite these problems, often knowing that fundamental solutions (realignment of the resources) will be some years in coming, if ever.

Although the above analysis of the three categories of resources proposed by Barney (1991) has been shown to be useful for understanding the relationships among resources and environments, it does not tell the whole story. This can be seen by making a distinction between two levels of analysis of resources, which we can call the infrastructure and functional levels. The **infrastructure** level of analysis concerns resources as parts of organizational systems while the **functional** level concerns particular functions that resources carry out in the organization. For example, a firm may assemble a team of scientists and

engineers to work on the development of a particular product. That team is a human resource of the firm. For this resource to give competitive advantage, it must have the right set of characteristics at both the infrastructure and functional levels. At the functional level, the team members must have the appropriate technical and marketing knowledge 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 other resources of the 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. Clearly, the analysis presented in this paper has addressed issues primarily at the infrastructure level rather than the functional level. It provides a framework for discussing the degree to which a resource is congruent with other resources and the environment, but does not provide a framework that would help very much in deciding which particular technical skills will be needed by a team which will develop products for a particular market. In a sense, a set of resources which is congruent at the infrastructure level provides a platform for the operation of those resources at the functional level. The characteristics of resources at the infrastructure and functional levels are not entirely independent but, as will be seen below, the distinction is a useful one. To show that, though, we will differentiate resources on yet another dimension.

This other way of differentiating resources draws upon the concepts of key, emerging, basic and commodity technologies proposed by Harris, Insinga, Morone and Werle (1996). Roussel, Saad and Erickson (1991) propose a similar, but less elaborated, system. Borrowing the terms and concepts of Harris *et al,* and applying them to organizational resources, we can

distinguish four categories of resources. A **key resource** is one which is unique and provides competitive differentiation to firms which possess it. An **emerging resource** is one that has the potential to become key. A **basic resource** is one that is necessary to do business in a particular industry but which does not give competitive differentiation. For example, a firm in the consumer retailing business must have certain minimum capabilities at purchasing from suppliers, but those basic capabilities will not give it a competitive advantage because its competitors also have those capabilities. A **commodity resource** is one that is readily available in the market-place for any and all who may wish to purchase it. We will focus on key and basic resources here so that the central points can be made succinctly.

The RBV is remarkable in the degree to which it focuses upon key resources. 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; Miller and Shamsie, 1996; Oliver, 1997; Peteraf, 1993; Teece, Pisano and Shuen, 1997). The resources being discussed in these statements are key resources, as defined above, and it is a solid assumption that such resources are necessary for sustained competitive advantage. However, key resources are not sufficient. Basic resources are also necessary. An automobile manufacturer whose unique design team produces customer-pleasing car models which the competition cannot match will probably not prosper if it cannot access manufacturing plants capable of producing cars with efficiency and quality close to industry standards. We can build upon the RBV's insight that unique resources are necessary for competitive advantage by saying that basic resources are also necessary, and that neither is sufficient.

Examination of Figure 4 will make it clearer what the central conceptual base of the RBV is, how the current paper has provided an extension of that base, and what some other areas of theoretical and empirical exploration might be. Figure 4 provides a crossing of the two dimensions of resource analysis just articulated, basic vs key and infrastructure vs functional.

In Figure 4, cell 1 in the upper left is the case of a resource that is basic at the functional level. For example, a computer chip manufacturer must have access to human resources capable of executing the standard methods used in the manufacture of chips. Without such a resource, the firm has no hope of competing in a marketplace populated by firms which do possess it. However, possession of this resource will not give any strategic advantage. It is a necessary but not sufficient prerequisite to competitive success.

In cell 2, on the lower left, is the case of a resource that is basic at the infrastructure level. For example, the chip manufacturer in the previous example must have human resources whose level of sophistication meets industry standards. Workers must not only know how to make chips (as covered in cell 1), they must also have a motive profile which enables them to adapt to, and create, change at the rate found in the chip industry. They must also have the cognitive capabilities to learn at a competitive rate. All firms that hope to compete successfully in an industry must have a set of human resources whose level of sophistication does not seriously deviate from the optimal level for that industry. Resources that meet industry standards at the infrastructure level are a necessary prerequisite to successful participation in that industry, but they are not sufficient for sustained competitive advantage.

The case of resources that are key at the functional level is seen in cell 3 of Figure 4. 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 advantage. However, possessing a resource that is key at the functional level is neither necessary nor sufficient for competitive advantage. Such possession is not necessary because competitive advantage could be provided by a resource which is key at the infrastructure level. Such possession is not sufficient because it does not preclude the necessity of having basic resources.

Resources which are key at the infrastructure level are in cell 4 of Figure 4. In this case, being key depends upon having a unique configuration of resources. Such a unique profile is proposed by Teece *et al* (1997) when they suggest that organizations strive for a position of dynamic capabilities. Such a configuration will provide competitive advantage only if the firm is the only one in the industry to have achieved it. Such a unique configuration will give considerable competitive advantage, even if the organization has no resources which are key at the functional level. Further, an organization may have a resource profile which is essentially the same as other players in the industry except that it has one unique resource. If an organization can position just one resource closer to the industry optimum than those of competitors, competitive advantage will be fostered. However, key resources at the infrastructure level, like those at the functional level, are neither necessary nor sufficient for competitive advantage. They are not sufficient because basic resources are necessary, as described above. They are not necessary because a resource that is key at the functional level may give competitive advantage when there are no key resources at the infrastructure level.

It will be helpful to review the states of necessity and sufficiency of the cells in Figure 4. For an organization to attain competitive advantage, basic and key resources are both

necessary but not sufficient. A firm must have the fundamentals for participation in its industry (basic resources) and at least one resource that provides unique competitive advantage (key resource). Basic resources must be in place at both the infrastructure and functional levels. If a firm misses the basics at either level it cannot compete. For competitive advantage, there must be at least one resource which is key at either the infrastructure or functional level. It is not necessary to have a resource that is key at both levels.

It is now possible to consider the relationship of the ideas presented in the current paper to those usually presented in the RBV. The RBV focuses upon unique resources which provide sustained competitive advantage, and most statements of it draw upon examples which are at the functional level of analysis. For these reasons it is centred primarily upon cell 3 in Figure 4. Its conceptual home is with resources which are key at the functional level. In contrast, the current paper is centred on cell 2. It has focused upon resource configurations which are internally congruent and congruent with the environment. Relatively little attention has been given to issues associated with gaining a unique competitive position by assembling a unique resource infrastructure. So the present paper, as an extension of the RBV, is somewhat complementary to it. It opens up a new realm of analysis which does not contradict or compete with the RBV. In addition, Figure 4 makes it clear that the model presented in the present paper and the RBV suggest avenues of further theoretical development for each other. Most notably, the RBV suggests that the analysis at the infrastructure level could be usefully extended by considering the ways in which uniqueness at this level could provide sustained competitive advantage. Using the terminology suggested above, the consideration of emerging resources might be an important part of such explorations. The model presented in this paper

suggests that the RBV could be usefully extended by integrating its understanding of unique, key resources with an understanding of resources which are basic at both the functional and infrastructure levels.

CONCLUSION

The four theoretical dimensions proposed here for characterizing resources and the environment, and their integration in Figures 2 and 3, provide a broad view of some issues that must be understood and dealt with if an organization is to achieve a competitive position. The theoretical analysis of the environment and the three resource types identified by Barney has shown that there are broad characteristics of these elements which must be congruent if an organization is to achieve a competitive position, including one utilizing dynamic capabilities. The issue of how to acquire and/or develop resources that provide a unique competitive position is thus partially addressed. This model also permits a more specific articulation of the premise of the RBV that even though particular individual resources may not be unique to an organization, a firm can attain competitive advantage by assembling a unique array of congruent resources.

The most important additions to our thinking about resources, positions and dynamic capabilities are as follow. There is now a more theoretically specific way of describing the three major categories of resources identified by Barney (1991), and the organizational environment. There is now a clear theoretical way for specifying the position of an organization and its degree of congruence with its environment. There is now a clear theoretical basis for stating that dynamic capabilities cannot be imposed upon just any base of resources. The resource infrastructure must be self-congruent and of a nature that will sustain

dynamic capabilities (as opposed to one suitable for sustaining static capabilities). Thus, some of the most important precepts of the RBV have now been given much clearer theoretical specification. New avenues for further theoretical extensions of the RBV have also been suggested by making the distinctions between basic and key resources, and between the functional and infrastructure levels of analysis. In short, considerable progress has been made in answering Wernerfelt's (1995) call for a more detailed mapping of resources.

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Figure 1

CORRESPONDING MOTIVES

LEVELS OF SOPHISTICATION	ALDERFER	MASLOW	MCCLELLAND
High	**Growth needs**	**Self-actualization needs**	**Need for achievement**
	Relatedness needs	**Esteem needs**	**Need for power**
		Belongingness needs	**Need for affiliation**
Low	**Existence needs**	**Safety needs**	
		Physiological needs	

Below each theorist's name are the needs in his hierarchy in descending order of sophistication. Needs in the same row have approximately the same levels of sophistication.

Figure 2

DIMENSIONS AND SUB-DIMENSIONS OF THE ENVIRONMENT AND RESOURCES

ENVIRONMENT

Environment:	low uncertainty .....high uncertainty
Stability:	high.....low
Complexity:	low.....high

ORGANIZATIONAL CAPITAL RESOURCES (STRUCTURE)

Structure:	low flexibility.....high flexibility
Formalization:	high.....low
Centralization:	high.....low

PHYSICAL CAPITAL RESOURCES (TECHNOLOGY)

Technology:	routine.....non-routine
Variability:	low.....high
Analyzability:	high.....low

HUMAN CAPITAL RESOURCES (PEOPLE)

People:	low sophistication.....high sophistication
Motivation:	existence.....relatedness.....growth
Cognition:	low power.....high power

Figure 3

ENVIRONMENTS, RESOURCES AND POSITIONS

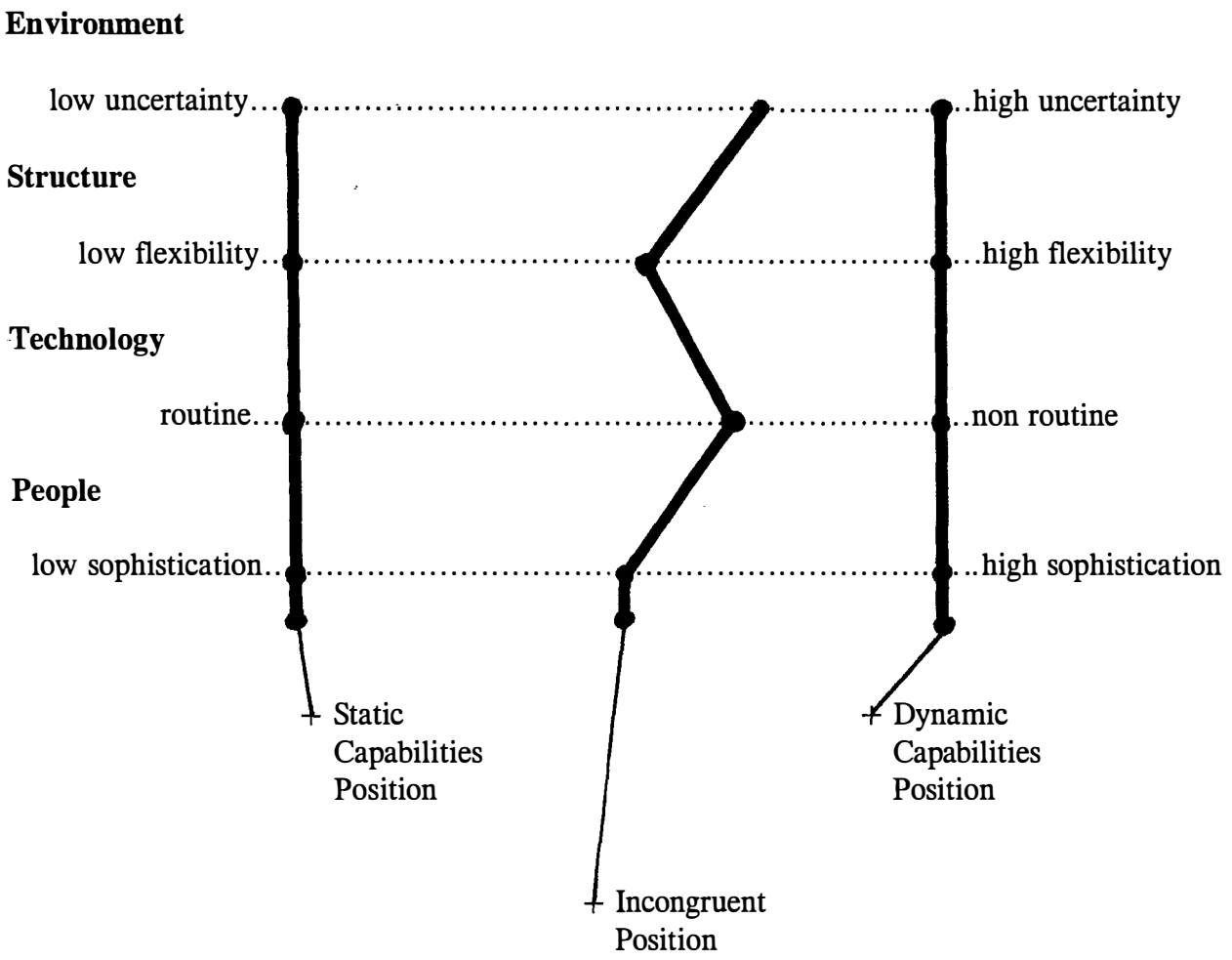

Figure 4

Four Facets of Resource Analysis

	Basic Resources	Key Resources
Functional Level of Analysis	Cell 1	Cell 3
Infrastructure Level of Analysis	Cell 2	Cell 4

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