REFERENCES

Looking inside for competitive advantage

Jay B. Barney

Executive Overview

Strategic managers and researchers have long been interested in understanding sources of competitive advantage for firms. Traditionally, this effort has focused on the relationship between a firm's environmental opportunities and threats on the one hand, and its internal strengths and weaknesses on the other. Summarized in what has come to be known as SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis, this traditional logic suggests that firms that use their internal strengths in exploiting environmental opportunities and neutralizing environmental threats, while avoiding internal weaknesses, are more likely to gain competitive advantages than other kinds of firms.[1]

This simple SWOT framework points to the importance of both external and internal phenomena in understanding the sources of competitive advantage. To date, the development of tools for analyzing environmental opportunities and threats has proceeded much more rapidly than the development of tools for analyzing a firm's internal strengths and weaknesses. To address this deficiency, this article offers a simple, easy-to-apply approach to analyzing the competitive implications of a firm's internal strengths and weaknesses.

The history of strategic management research can be understood as an attempt to "fill in the blanks" created by the SWOT framework; i.e., to move beyond suggesting that strengths, weaknesses, opportunities, and threats are important for understanding competitive advantage to suggest models and frameworks that can be used to analyze and evaluate these phenomena. Michael Porter and his associates have developed a number of these models and frameworks for analyzing environmental opportunities and threats.[2] Porter's work on the "five forces model," the relationship between industry structure and strategic opportunities, and strategic groups can all be understood as an effort to unpack the concepts of environmental opportunities and threats in a theoretically rigorous, yet highly applicable way.

. . . environmental analysis . . . is only half the story.

However, the SWOT framework tells us that environmental analysis—no matter how rigorous—is only half the story. A complete understanding of sources of competitive advantage requires the analysis of a firm's internal strengths and weaknesses as well.[3] The importance of integrating internal with environmental analyses can be seen when evaluating the sources of competitive advantage of many firms. Consider, for example,

—WalMart, a firm that has, for the last twenty years, consistently earned a return on sales twice the average of its industry;

—Southwest Airlines, a firm whose profits continued to increase, despite losses at other U.S. airlines that totaled almost $10 billion from 1990 to 1993; and

—Nucor Steel, a firm whose stock price continued to soar through the 1980s and '90s, despite the fact that the market value of most steel companies has remained flat or fallen during the same time period.[4]

These firms, and many others, have all gained competitive advantages—despite the unattractive, high threat, low opportunity environments within which they operate. Even the most careful and complete analysis of these firms' competitive environments cannot, by itself, explain their success. Such explanations must also include these firms' internal attributes—their strengths and weaknesses—as sources of competitive advantage. Following more recent practice, internal attributes will be referred to as *resources* and *capabilities* throughout the following discussion.[5]

A firm's resources and capabilities include all of the financial, physical, human, and organizational assets used by a firm to develop, manufacture, and deliver products or services to its customers. Financial resources include debt, equity, retained earnings, and so forth. Physical resources include the machines, manufacturing facilities, and buildings firms use in their operations. Human resources include all the experience, knowledge, judgment, risk taking propensity, and wisdom of individuals associated with a firm. Organizational resources include the history, relationships, trust, and organizational culture that are attributes of groups of individuals associated with a firm, along with a firm's formal reporting structure, explicit management control systems, and compensation policies.

In the process of filling in the "internal blanks" created by SWOT analysis, managers must address four important questions about their resources and capabilities: (1) the question of value, (2) the question of rareness, (3) the question of imitability, and (4) the question of organization.

The Question of Value

To begin evaluating the competitive implications of a firm's resources and capabilities, managers must first answer the question of value: Do a firm's resources and capabilities add value by enabling it to exploit opportunities and/or neutralize threats?

The answer to this question, for some firms, has been yes. Sony, for example, has a great deal of experience in designing, manufacturing, and selling miniaturized electronic technology. Sony has used these resources to exploit numerous market opportunities, including portable tape players, portable disc players, portable televisions, and easy-to-hold 8mm video cameras. 3M has used its skills and experience in substrates, coatings, and adhesives, along with an organizational culture that rewards risk taking and creativity, to exploit numerous market opportunities in office products, including invisible tape and Post-It™ Notes. Sony's and 3M's resources—including their specific technological skills and their creative organizational cultures—made it possible for these firms to respond to, and even create, new environmental opportunities.

Unfortunately, for other firms, the answer to the question of value has been no. For example, USX's long experience in traditional steel-making technology and the traditional steel market made it almost impossible for USX to recognize and respond to fundamental changes in the structure of the steel industry. Because they could not recognize new opportunities and threats, USX delayed its investment in, among other opportunities, thin slab continuous casting steel

manufacturing technology. Nucor Steel, on the other hand, was not shackled by its experience, made these investments early, and has become a major player in the international steel industry. In a similar way, Sears was unable to recognize or respond to changes in the retail market that had been created by WalMart and specialty retail stores. In a sense, Sears' historical success, along with a commitment to stick with a traditional way of doing things, led it to miss some significant market opportunities.[6]

Although a firm's resources and capabilities may have added value in the past, changes in customer tastes, industry structure, or technology can render them less valuable in the future. General Electric's capabilities in transistor manufacturing became much less valuable when semiconductors were invented. American Airlines' skills in managing their relationship with the Civil Aeronautics Board (CAB) became much less valuable after airline deregulation. IBM's numerous capabilities in the mainframe computing business became less valuable with the increase in power, and reduction in price, of personal and mini computers. One of the most important responsibilities of strategic managers is to constantly evaluate whether or not their firm's resources and capabilities continue to add value, despite changes in the competitive environment.

Some environmental changes are so significant that few, if any, of a firm's resources remain valuable in any environmental context.[7] However, this kind of radical environmental change is unusual. More commonly, changes in a firm's environment may reduce the value of a firm's resources in their current use, while leaving the value of those resources in other uses unchanged. Such changes might even *increase* the value of those resources in those other uses. In this situation, the critical issue facing managers is: how can we use our traditional strengths in new ways to exploit opportunities and/or neutralize threats?

Numerous firms have weathered these environmental shifts by finding new ways to apply their traditional strengths. AT&T had developed a reputation for providing high-quality long distance telephone service. It moved rapidly to exploit this reputation in the newly competitive long distance market by aggressively marketing its services against MCI, Sprint, and other carriers. Also, AT&T had traditional strengths in research and development with its Bell Labs subsidiary. To exploit these strengths in its new competitive context, AT&T shifted Bell Labs' mission from basic research to applied research, and then leveraged those skills by forming numerous joint ventures, acquiring NCR, and other actions. Through this process, AT&T has been able to use some of its historically important capabilities to try to position itself as a major actor in the global telecommunications and computing industry.

Another firm that has gone through a similar transformation is the Hunter Fan Company. Formed in 1886, Hunter Fan developed the technology it needed to be the market share leader in ceiling fans used to cool large manufacturing facilities. Unfortunately, the invention of air conditioning significantly reduced demand for industrial fans, and Hunter Fan's performance deteriorated rapidly. However, in the 1970s, rising energy prices made energy conservation more important to home owners. Since ceiling fans can significantly reduce home energy consumption, Hunter Fan was able to move quickly to exploit this new opportunity. Of course, Hunter Fan had to develop some new skills as well, including brass-plating capabilities and new distribution networks. However, by

building on its traditional strengths in new ways, Hunter Fan has become a leader in the home ceiling fan market.[8]

By answering the question of value, managers link the analysis of internal resources and capabilities with the analysis of environmental opportunities and threats.

By answering the question of value, managers link the analysis of internal resources and capabilities with the analysis of environmental opportunities and threats. Firm resources are not valuable in a vacuum, but rather are valuable only when they exploit opportunities and/or neutralize threats. The models developed by Porter and his associates can be used to isolate potential opportunities and threats that the resources a firm controls can exploit or neutralize.

Of course, the resources and capabilities of different firms can be valuable in different ways. This can be true, even if firms are competing in the same industry. For example, while both Rolex and Timex manufacture watches, they exploit very different valuable resources. Rolex emphasizes its quality manufacturing, commitment to excellence, and high-status reputation in marketing its watches. Timex emphasizes its high-volume, low-cost manufacturing skills and abilities. Rolex exploits its capabilities in responding to demand for very expensive watches; Timex exploits its resources in responding to demand for practical, reliable, low-cost timekeeping.

The Question of Rareness

That a firm's resources and capabilities are valuable is an important first consideration in understanding internal sources of competitive advantage. However, if a particular resource and capability is controlled by numerous competing firms, then that resource is unlikely to be a source of competitive advantage for any one of them. Instead, valuable but common (i.e., not rare) resources and capabilities are sources of competitive parity. For managers evaluating the competitive implications of their resources and capabilities, these observations lead to the second critical issue: How many competing firms already possess these valuable resources and capabilities?

Consider, for example, two firms competing in the global communications and computing industries: NEC and AT&T. Both these firms are developing many of the same capabilities that are likely to be needed in these industries over the next decade. These capabilities are clearly valuable, although—since at least these two firms, and maybe others, are developing them—they may not be rare. If they are not rare, they cannot—by themselves—be sources of competitive advantage for either NEC or AT&T. If either of these firms is to gain competitive advantages, they must exploit resources and capabilities that are different from the communication and computing skills they are *both* cited as developing. This may be part of the reason why AT&T recently restructured its telecommunications and computer businesses into separate firms.[9]

While resources and capabilities must be rare among competing firms in order to be a source of competitive advantage, this does not mean that common, but valuable, resources are not important. Indeed, such resources and capabilities may be essential for a firm's survival. On the other hand, if a firm's resources are valuable and rare, those resources may enable a firm to gain at least a temporary competitive advantage. WalMart's skills in developing and using point-of-purchase data collection to control inventory have given it a competitive advantage over K-Mart, a firm that until recently has not had access to this timely information. Thus, for many years, WalMart's valuable point-of-purchase inventory control systems were rare, at least relative to its major U.S. competitor, K-Mart.[10]

The Question of Imitability

A firm that possesses valuable and rare resources and capabilities can gain, at least, a temporary competitive advantage. If, in addition, competing firms face a cost disadvantage in imitating these resources and capabilities, firms with these special abilities can obtain a sustained competitive advantage. These observations lead to the question of imitability: Do firms without a resource or capability face a cost disadvantage in obtaining it compared to firms that already possess it?

Obviously, imitation is critical to understanding the ability of resources and capabilities to generate sustained competitive advantages. Imitation can occur in at least two ways: duplication and substitution. Duplication occurs when an imitating firm builds the same kinds of resources as the firm it is imitating. If one firm has a competitive advantage because of its research and development skills, then a duplicating firm will try to imitate that resource by developing its own research and development skills. In addition, firms may be able to substitute some resources for other resources. If these substitute resources have the same strategic implications and are no more costly to develop, then imitation through substitution will lead to competitive parity in the long run.

So, when will firms be at a cost disadvantage in imitating another's resources and capabilities, either through duplication or substitution? While there are numerous reasons why some of these internal attributes of firms may be costly to imitate, most of these reasons can be grouped into three categories: the importance of history in creating firm resources; the importance of numerous "small decisions" in developing, nurturing, and exploiting resources; and the importance of socially complex resources.

The Importance of History. As firms evolve, they pick up skills, abilities, and resources that are unique to them, reflecting their particular path through history. These resources and capabilities reflect the unique personalities, experiences, and relationships that exist in only a single firm. Before the Second World War, Caterpillar was one of several medium-sized firms in the heavy construction equipment industry struggling to survive intense competition. Just before the outbreak of war, the Department of War (now the Department of Defense) concluded that, in order to pursue a global war, they would need one worldwide supplier of heavy construction equipment to build roads, air strips, army bases, and so forth. After a brief competition, Caterpillar was awarded this contract and, with the support of the Allies, was able to develop a worldwide service and supply network for heavy construction equipment at very low cost.

After the war, Caterpillar continued to own and operate this worldwide service and supply network. Indeed, Caterpillar management still advertises their ability to deliver any part, for any piece of Caterpillar equipment, to any place in the world, in under two days. By using this valuable capability, Caterpillar was able to become the dominant firm in the heavy construction equipment industry. Even today, despite recessions and labor strife, Caterpillar remains the market share leader in most categories of heavy construction equipment.[11]

Consider the position of a firm trying to duplicate Caterpillar's worldwide service and supply network, at the same cost as Caterpillar. This competing firm would have to receive the same kind of government support that

Caterpillar received during World War II. This kind of government support is very unlikely.

It is interesting to note that at least one firm in the heavy construction equipment industry has begun to effectively compete against Caterpillar: Komatsu. However, rather than attempting to duplicate Caterpillar's service and supply network, Komatsu has attempted to exploit its own unique design and manufacturing resources by building machines that do not break down as frequently. Since Komatsu's machines break down less frequently, Komatsu does not require as extensive a worldwide service and supply network as Caterpillar. In this sense, Komatsu's special design and manufacturing skills in building machines that break down less frequently may be a strategic substitute for Caterpillar's worldwide service and supply network.[12]

In general, whenever the acquisition or development of valuable and rare resources depends upon unique historical circumstances, those imitating these resources will be at a cost disadvantage building them. Such resources can be sources of sustained competitive advantage.

The Importance of Numerous Small Decisions. Strategic managers and researchers are often enamored with the importance of "Big Decisions" as determinants of competitive advantage. IBM's decision to bring out the 360 series of computers in the 1960s was a "Big Decision" that had enormous competitive implications until the rise of personal computers. General Electric's decision to invest in the medical imaging business was a "Big Decision" whose competitive ramifications are still unfolding. Sometimes such "Big Decisions" are critical in understanding a firm's competitive position. However, more and more frequently, a firm's competitive advantage seems to depend on numerous "small decisions" through which a firm's resources and capabilities are developed and exploited. Thus, for example, a firm's competitive advantage in quality does not depend just upon its announcing that it is seeking the Malcolm Baldridge Quality Award. It depends upon literally hundreds of thousands of decisions made each day by employees in the firm—small decisions about whether or not to tighten a screw a little more, whether or not to share a small idea for improvement, or whether or not to call attention to a quality problem.[13] From the point of view of sustaining a competitive advantage, "small decisions" have some advantages over "Big Decisions." In particular, small decisions are essentially invisible to firms seeking to imitate a successful firm's resources and capabilities. "Big Decisions," on the other hand, are more obvious, easier to describe, and, perhaps, easier to imitate. While competitors may be able to observe the consequences of numerous little decisions, they often have a difficult time understanding the sources of the advantages.[14] A case in point is The Mailbox, Inc., a very successful firm in the bulk mailing business in the Dallas-Ft. Worth market. If there was ever a business where it seems unlikely that a firm would have a sustained competitive advantage, it is bulk mailing. Firms in this industry gather mail from customers, sort it by postal code, and then take it to the post office to be mailed. Where is the competitive advantage here? And yet, The Mailbox has enjoyed an enormous market share advantage in the Dallas-Ft. Worth area for several years. Why?

When asked, managers at The Mailbox have a difficult time describing the sources of their sustained advantages. Indeed, they can point to *no* "Big

Decisions" they have made to generate this advantage. However, as these managers begin to discuss their firm, what becomes clear is that their success does not depend on doing a few big things right, but on doing lots of little things right. The way they manage accounting, finance, human resources, production, or other business functions, separately, is not exceptional. However, to manage all these functions so well, and so consistently over time is truly exceptional. Firms seeking to compete against The Mailbox will not have to imitate just a few internal attributes; they will have to imitate thousands, or even hundreds of thousands of such attributes—a daunting task indeed.[15]

The Importance of Socially Complex Resources. A final reason that firms may be at a cost disadvantage in imitating resources and capabilities is that these resources may be socially complex. Some physical resources (e.g., computers, robots, and other machines) controlled by firms are very complex. However, firms seeking to imitate these physical resources need only purchase them, take them apart, and duplicate the technology in question. With just a couple of exceptions (including the pharmaceutical and specialty chemicals industries), patents provide little protection from the imitation of a firm's physical resources.[16] On the other hand, socially complex resources and capabilities—organizational phenomena like reputation, trust, friendship, teamwork and culture—while not patentable, are much more difficult to imitate. Imagine the difficulty of imitating Hewlett Packard's (HP) powerful and enabling culture. One of the most important components of HP's culture is that it supports and encourages teamwork and cooperation, even across divisional boundaries. HP has used this socially complex capability to enhance the compatibility of its numerous products, including printers, plotters, personal computers, mini-computers, and electronic instruments. By cooperating across these product categories, HP has been able to almost double its market value, all without introducing any radical new products or technologies.[17]

In general, when a firm's resources and capabilities are valuable, rare, and socially complex, those resources are likely to be sources of sustained competitive advantage.

In general, when a firm's resources and capabilities are valuable, rare, and socially complex, those resources are likely to be sources of sustained competitive advantage. One firm that apparently violates this assertion is Sony. Most observers agree that Sony possesses some special management and coordination skills that enables it to conceive, design, and manufacture high quality, miniaturized consumer electronics. However, it appears that every time Sony brings out a new miniaturized product, several of its competitors quickly duplicate that product, through reverse engineering, thereby reducing Sony's technological advantage. In what way can Sony's socially complex miniaturization skills be a source of sustained competitive advantage, when most of Sony's products are quickly imitated?

The solution to this paradox depends on shifting the unit of analysis from the performance of Sony's products over time to the performance of Sony over time. After it introduces each new product, Sony experiences a rapid increase in sales and profits associated with that product. However, this leads other firms to reverse engineer the Sony product and introduce their own version. Increased competition leads the sales and profits associated with the new product to be reduced. Thus, at the level of individual products introduced by Sony, Sony apparently enjoys only very short-lived competitive advantages.

However, by looking at the total returns earned by Sony across all of its new products over time, the source of Sony's sustained competitive advantage

becomes clear. By exploiting its capabilities in miniaturization, Sony is able to constantly introduce new and exciting personal electronics products. No one of these products generate a sustained competitive advantage. However, over time, across several such product introductions, Sony's capability advantages do lead to a sustained competitive advantage.[18]

The Question of Organization

A firm's competitive advantage potential depends on the value, rareness, and imitability of its resources and capabilities. However, to fully realize this potential, a firm must also be organized to exploit its resources and capabilities. These observations lead to the question of organization: Is a firm organized to exploit the full competitive potential of its resources and capabilities?

Numerous components of a firm's organization are relevant when answering the question of organization, including its formal reporting structure, its explicit management control systems, and its compensation policies. These components are referred to as *complementary resources* because they have limited ability to generate competitive advantage in isolation. However, in combination with other resources and capabilities, they can enable a firm to realize its full competitive advantage.[19]

Much of Caterpillar's sustained competitive advantage in the heavy construction industry can be traced to its becoming the sole supplier of this equipment to Allied forces in the Second World War. However, if Caterpillar's management had not taken advantage of this opportunity by implementing a global formal reporting structure, global inventory and other control systems, and compensation policies that created incentives for its employees to work around the world, then Caterpillar's potential for competitive advantage would not have been fully realized. These attributes of Caterpillar's organization, by themselves, could not be a source of competitive advantage; i.e., adopting a global organizational form was only relevant for Caterpillar because it was pursuing a global opportunity. However, this organization was essential for Caterpillar to realize its full competitive advantage potential.

In a similar way, much of WalMart's continuing competitive advantage in the discount retailing industry can be attributed to its early entry into rural markets in the southern United States. However, to fully exploit this geographic advantage, WalMart needed to implement appropriate reporting structures, control systems, and compensation policies. We have already seen that one of these components of WalMart's organization—its point-of-purchase inventory control system—is being imitated by K-Mart, and thus, by itself, is not likely to be a source of sustained competitive advantage. However, this inventory control system has enabled WalMart to take full advantage of its rural locations by decreasing the probability of stock outs and by reducing inventory costs.

While a complementary organization enabled Caterpillar and WalMart to realize their full competitive advantage, Xerox was prevented from taking full advantage of some of its most critical valuable, rare, and costly-to-imitate resources and capabilities because it lacked such organizational skills. Through the 1960s and early 1970s, Xerox invested in a series of very innovative technology development research efforts. Xerox managed this research effort by creating a stand alone research laboratory (Xerox PARC, in Palo Alto, California), and by assembling a large group of highly creative and innovative

scientists and engineers to work there. Left to their own devices, these scientists and engineers developed an amazing array of technological innovations, including the personal computer, the "mouse," windows-type software, the laser printer, the "paperless office," ethernet, and so forth. In retrospect, the market potential of these technologies was enormous. Moreover, since these technologies were developed at Xerox PARC, they were rare. Finally, Xerox may have been able to gain some important first mover advantages if they had been able to translate these technologies into products, thereby increasing the cost to other firms of imitating these technologies.

Unfortunately, Xerox did not have an organization in place to take advantage of these resources. For example, no structure existed whereby Xerox PARC's innovations could become known to managers at Xerox. Indeed, most Xerox managers—even many senior managers—were unaware of these technological developments through the mid-1970s. Once they finally became aware of them, very few of the innovations survived Xerox's highly bureaucratic product development process—a process where product development projects were divided into hundreds of minute tasks, and progress in each task was reviewed by dozens of large committees. Even those innovations that survived the product development process were not exploited by Xerox managers. Management compensation at Xerox depended almost exclusively on maximizing current revenue. Short-term profitability was relatively less important in compensation calculations, and the development of markets for future sales and profitability was essentially irrelevant. Xerox's formal reporting structure, its explicit management control systems, and its compensation policies were all inconsistent with exploiting the valuable, rare, and costly-to-imitate resources developed at Xerox PARC. Not surprisingly, Xerox failed to exploit any of these potential sources of sustained competitive advantage.[20]

This set of questions can be applied in understanding the competitive implications of phenomena as diverse as the "cola wars" in the soft drink industry and competition among different types of personal computers.

The Competitive Implications of the "Cola Wars"

Almost since they were founded, Coca-Cola, Inc. and PepsiCo, Inc. have battled each other for market share in the soft drink industry. In many ways, the intensity of these "cola wars" increased in the mid-1970s with the introduction of PepsiCo's "Pepsi Challenge" advertising campaign. While significant advertising and other marketing expenditures have been made by both these firms, and while market share has shifted back and forth between them over time, it is not at all clear that these efforts have generated competitive advantages for either Coke or Pepsi.

Obviously, market share is a very valuable commodity in the soft drink industry. Market share translates directly into revenues, which, in turn, has a large impact on profits and profitability. Strategies pursued by either Coke or Pepsi designed to acquire market share will usually be valuable.

But are these market share acquisition strategies rare or does either Coca-Cola or Pepsi have a cost advantage in implementing them? Both Coca-Cola and PepsiCo are marketing powerhouses; both have enormous financial capabilities and strong management teams. Any effort by one to take share away can instantly be matched by the other to protect that share. In this sense, while

Coke's and Pepsi's share acquisition strategies may be valuable, they are not rare, nor does either Coke or Pepsi have a cost advantage in implementing them. Assuming that these firms are appropriately organized (a reasonable assumption), then the cola wars should be a source of competitive parity for these firms.

This has, apparently, been the case. For example, Pepsi originally introduced its "Pepsi Challenge" advertising campaign in the Dallas-Ft. Worth market. After six months of the Pepsi Challenge—including price discounts, coupon campaigns, numerous celebrity endorsements, and so on—Pepsi was able to double its share of the Dallas-Ft. Worth market from 7% to 14%. Unfortunately, the retail price of Pepsi's soft drinks, after six months of the Pepsi Challenge, was approximately one half the pre-challenge level. Thus Pepsi doubled its market share, but cut its prices in half—exactly the result one would expect in a world of competitive parity.[21]

It is interesting to note that both Coca-Cola and Pepsi are beginning to recognize the futility of going head to head against an equally skilled competitor in a battle for market share to gain competitive advantages. Instead, these firms seem to be altering both their market share and other strategies. Coke, through its Diet Coke brand name, is targeting older consumers with advertisements that use personalities from the '50s, '60s, and '70s (e.g., Elton John and Gene Kelly). Pepsi continues its focus on attracting younger drinkers with its "choice of a new generation" advertising campaigns. Coke continues its traditional focus on the soft drink industry, while Pepsi has begun diversifying into fast food restaurants and other related businesses. Coke has extended its marketing efforts internationally, whereas Pepsi focuses mostly on the market in the United States (although it is beginning to alter this strategy). In all these ways, Coke and Pepsi seem to be moving away from head-to-head competition for market share, and moving towards exploiting *different* resources.

The Competitive Position of the Macintosh Computer

Building on earlier research conducted by Xerox PARC, Apple Computer developed and marketed the first user-friendly alternative to DOS-based personal computers, the Macintosh. Most Macintosh users have a passion for their computers that is usually reserved for personal relationships. Macintosh users shake their heads and wonder why DOS-based computer users don't wake up and experience the "joy of Macintosh."

The first step in analyzing the competitive position of the Macintosh is to evaluate whether or not "user friendliness" in a personal computer is valuable; i.e., does it exploit an environmental opportunity and/or neutralize an environmental threat? While user friendliness is not a requirement of all personal computer users, it is not unreasonable to conclude that many of these computer users, other things being equal, would prefer working on a user friendly machine compared with a user unfriendly machine. Thus, the Macintosh computer does seem to respond to a real market opportunity.

When the Macintosh was first introduced, was user friendliness rare? At that time, DOS-based machines were essentially the only alternative to the Macintosh, and DOS-based software, in those early days, was anything but user friendly. Thus, the Macintosh was apparently both valuable and rare, and thus a source of at least a temporary competitive advantage for Apple.

Was the user-friendliness of the Macintosh costly to imitate? At first, it seemed likely that user-friendly software would rapidly be developed for DOS-based machines, and thus that the user-friendly Macintosh would only enjoy a temporary competitive advantage. However, history has shown that user friendliness was not easy to imitate.

Imitation of the user-friendly Macintosh by DOS-based machines was slowed by a combination of at least two factors. First, the Macintosh hardware and software system had originally been developed by teams of software, hardware, and production engineers all working in Apple Computer. The teamwork, trust, commitment, and enthusiasm that these Apple employees enjoyed while working on Macintosh technology was difficult for other computer firms to duplicate, since most of those firms specialized either in hardware design and manufacturing (e.g., IBM) or software development (e.g., Microsoft, Lotus). In other words, the socially complex resources that Apple was able to bring to bear in the Macintosh project were difficult to duplicate in vertically non-integrated computer hardware and software firms.

Second, Apple management had a different conception of the personal computer and its future than did managers at IBM and other computer firms. At IBM, for example, computers had traditionally meant mainframe computers, and mainframe computers were expected to be complicated and difficult to operate. User friendliness was never an issue in IBM mainframes (users of IBM's JCL know the truth of that assertion!), and thus was not an important concern when IBM entered into the personal computer market. However, at Apple, computers were Jobs' and Wozniak's toys—a hobby, to be used for fun. If management's mindset is that "computers are supposed to be fun," then it suddenly becomes easier to develop and build user-friendly computers.

Obviously, these two mindsets—IBM's "computers are complex tools run by technical specialists" versus Apple's "computers are toys for everyone"—were deeply embedded in the cultures of these two firms, as well as those firms that worked closely with them. Such mindsets are socially complex, slow to change, and difficult to imitate. It took some time before the notion that a computer should be (or even could be) easy to use came to prominence in DOS-based systems.[22] Only recently, after almost ten years (an eternity in the rapidly changing personal computer business), has user-friendly software for DOS-based machines been developed. With the introduction of Windows by Microsoft, the rareness of Macintosh's user friendliness has been reduced, as has been the competitive advantage that Macintosh had generated.

Interestingly, just as Windows software was introduced, Apple began to radically change its pricing and product development strategies. First Apple cut the price of the Macintosh computer, reflecting the fact that user friendliness was not as rare after Windows as it was before Windows. Second, Apple seems to have recognized the need to develop new resources and capabilities to enhance their traditional user-friendly strengths. Rather than only competing with other hardware and software companies, Apple has begun developing strategic alliances with several other computer firms, including IBM and Microsoft. These alliances may help Apple develop the resources and capabilities they need to remain competitive in the personal computer industry over the next several years.

The Management Challenge

In the end, this discussion reminds us that sustained competitive advantage cannot be created simply by evaluating environmental opportunities and threats, and then conducting business only in high-opportunity, low-threat environments. Rather, creating sustained competitive advantage depends on the unique resources and capabilities that a firm brings to competition in its environment. To discover these resources and capabilities, managers must look inside their firm for valuable, rare and costly-to-imitate resources, and then exploit these resources through their organization.

Endnotes

[1] The original SWOT framework was proposed and developed by E. Learned, C. Christiansen, K. Andrews, and W. Guth in *Business Policy* (Homewood, IL: Irwin, 1969). Though the field of strategic management has evolved a great deal since then, this fundamental SWOT framework, as an organizing principle, has remained unchanged. See for example Michael Porter, "The Contributions of Industrial Organization to Strategic Management," *Academy of Management Review,* 6, 1981, 609-620; and Jay Barney, "Firm Resources and Sustained Competitive Advantage," *Journal of Management,* 17, 1991, 99-120.

[2] Porter's work is described in detail in M. Porter, *Competitive Strategy* (New York, NY: Free Press, 1980), and M. Porter, *Competitive Advantage* (New York, NY: Free Press, 1985).

[3] A variety of different authors have begun to explore the competitive implications of a firm's internal strengths and weaknesses. Building on some seminal insights by Edith Penrose [*The Theory of the Growth of the Firm* (New York, NY: Wiley, 1959)], this work has come to be known as the Resource-Based View of the Firm. Resource-based scholarly work includes: Birger Wernerfelt, "A Resource-Based View of the Firm," *Strategic Management Journal,* 5, 1984, 171-180; Richard Rumelt, "Toward a Strategic Theory of the Firm," in R. Lamb (ed.), *Competitive Strategic Management* (Englewood Cliffs, NJ: Prentice-Hall, 1984), 556-570; Jay Barney, "Strategic Factor Markets," *Management Science,* 41, 1980, 1231-1241; and Jay Barney, "Organizational Culture: Can It Be A Source of Sustained Competitive Advantage?" *Academy of Management Review,* 11, 1986, 791-800. The framework developed in this article draws most closely from Jay Barney, "Firm Resources and Sustained Competitive Advantage," *op.cit.*

[4] For more detailed discussions of the internal resources and capabilities of these firms, see Pankaj Ghemewat, "WalMart Stores' Discount Operations," Case No. 9-387-018 (Harvard Business School, 1986); S. Chakravarty, "Hit 'Em Hardest with the Mostest," *Forbes,* 148, September 16, 1991, 48-54; and Pankaj Ghemewat, "Nucor at a Crossroad," Case No. 9-793-039 (Harvest Business School, 1992).

[5] Different terms have been used to describe these internal phenomena, including core competencies (C. K. Prahalad and Gary Hamel, "The Core Competence of the Organization," *Harvard Business Review,* 90, 1990, 79-93), firm resources (Birger Wernerfelt, *op.cit.*, and Jay B. Barney, "Firm Resources and Sustained Competitive Advantage") and firm capabilities (George Stalk, Phillip Evans, and Lawrence Shulman, "Competing on Capabilities: The New Rules of Corporate Strategy," *Harvard Business Review,* March-April, 1992, 57-69). While distinctions among these terms can be drawn, for our purposes they can, and will, be used interchangeably.

[6] For details, see B. Schlender, "How Sony Keeps the Magic Going," *Fortune,* 125, February 24, 1992, 76-84; L. Krogh, J. Praeger, D. Sorenson, and J. Tomlinson, "How 3M Evaluates Its R&D Programs," *Research Technology Management,* 31, November/December, 1988, 10-14; Richard Rosenbloom, "Continuous Casting Investments at USX Corporation," Case No. 9-392-232 (Harvard Business School, 1990); and Cynthia Montgomery, "Sears, Roebuck and Co. in 1989," Case No. 9-391-147 (Harvard Business School, 1989).

[7] This kind of environmental or technological shift is called a Schumpeterian revolution, and firms in this setting have little systematic hope of gaining competitive advantages, unless the competitive environment shifts again, although they can be lucky. See Jay B. Barney, "Types of Competitors and the Theory of Strategy: Toward an Integrative Framework," *Academy of Management Review,* 1986, 791-800.

[8] For a discussion of AT&T's attempt to develop new resources and capabilities, see D. Kirkpatrick, "Could AT&T Rule the World?" *Fortune,* 127, May 17, 1993, 54-56. Hunter Fan's experience was described through personal communication with managers there, and in a publication celebrating Hunter Fan's 100th anniversary in 1986.

[9] Prahalad and Hamel's 1990 discussion of NEC's attempt to develop the resources needed to compete in the global telecommunications and computer industry is insightful, especially in comparison to Kirkpatrick's discussion of AT&T's efforts in *Fortune.*

[10] WalMart's point of purchase inventory control system and the impact of WalMart's rural stores on its performance, are described in Ghemewat, *op.cit.*, 1986. K-Mart's inventory control response to WalMart is described in L. Steven's "Front Line Systems," *Computerworld,* 26, 1992, 61-63.

[11] See M.G. Rukstad and J. Horn, "Caterpillar and the Construction Equipment Industry in 1988," Case No. 9-389-097 (Harvard Business

School, 1989).

[12] Komatsu's response to Caterpillar's competitive advantage is described in C.A. Bartlett and U.S. Rangan, "Komatsu Ltd.," Case No. 9-385-277 (Harvard Business School, 1985).

[13] See Richard Blackburn and Benson Rosen, "Total Quality and Human Resources Management: Lessons Learned from Baldridge Award-winning Companies," *Academy of Management Executive*, 7, 1993, 49-66.

[14] These invisible assets have been described by H. Itami, *Mobilizing Invisible Assets* (Cambridge, MA: Harvard University Press, 1987).

[15] Personal communication.

[16] See E. Mansfield, "How Rapidly Does New Industrial Technology Leak Out?" *Journal of Industrial Economics*, 34, 1985, 217-223; and E. Mansfield, M. Schwartz, and S. Wagner, "Imitation Costs and Patents: An Empirical Study," *Economic Journal*, 91, 1981, 907-918.

[17] See S.K. Yoder, "A 1990 Reorganization at Hewlett Packard Already Is Paying Off," *Wall Street Journal*, July 22, 1991, Section Ak, 1+. This is not to suggest that socially complex resources and capabilities do not change andevolve in an organization. They clearly do. Nor does this suggest that managers can never radically alter a firm's socially complex resources and capabilities. Such transformational leaders do seem to exist, and do have an enormous impact on these resources in a firm. Managers such as the late Mike Walsh at Tenneco, Lee Iacocca at Chrysler, and Jack Welch at General Electric apparently have been such leaders. However, this kind of leadership is a socially complex phenomenon, and thus very difficult to imitate. Even if a leader in one firm can transform its socially complex resources and capabilities, it does not necessarily mean that other firms will be able to imitate this feat at the same cost. The concept of transformational leaders is discussed in N. Tichy, *The Transformational Leader* (New York, NY: Wiley, 1986).

[18] See Schlender, *op.cit.*

[19] See Raphael Amit and Paul Schoemaker, "Strategic Assets and Organizational Rent," *Strategic Management Journal*, 14, 1993, 33-46; David Teece, "Profiting From Technological Innovation," *Research Policy*, 15, 1986, 285-305; and Ingemar Dierickx and Karel Cool, "Asset Stock Accumulation and Sustainability of Competitive Advantage," *Management Science*, 35, 1989, 1504-1511, for a discussion of complementary resources and capabilities. Of course, complementary organizational resources are part of a firm's overall resource and capability base, and thus the competitive implications of these resources could be evaluated using the questions of value, rareness, and imitability. However, the question of organization is included in this discussion to emphasize the particular importance of complementary organizational resources in enabling a firm to fully exploit its competitive advantage potential.

[20] Xerox's organizational problems with Xerox PARC are described, in detail, in David T. Kearns and David A. Nadler, *Prophets in the Dark* (New York, NY: Harper Collins, 1992); Douglas K. Smith and Robert C. Alexander, *Fumbling the Future* (New York, NY: William Morrow, 1988); and L. Hooper, "Xerox Tries to Shed Its Has Been Image with a Big New Machine," *Wall Street Journal*, September 20, 1990, Section A, 1+.

[21] See A.E. Pearson and C.L. Irwin, "Coca-Cola vs. Pepsi-Cola (A)," Case No. 9-387-108 (Harvard Business School, 1988), for a discussion of the cola wars, and their competitive implications for Coke and Pepsi.

[22] See D.B. Yoffie, "Apple Computer—1992," Case No. 9-792-081 (Harvard Business School, 1992), for a complete discussion of Apple, IBM, and Apple's new strategies for the 1990s.

About the Author

Jay Barney is a professor of management and holder of the Bank One Chair for Excellence in Corporate Strategy at the Max M. Fisher College of Business, The Ohio State University. He received his undergraduate degree from Brigham Young University, and his master's and doctorate from Yale University. He served on the faculties of UCLA and Texas A&M University before joining the faculty at Ohio State in 1994. Professor Barney's research focuses on the relationship between idiosyncratic firm skills and capabilities and sustained competitive advantage.