

Measuring the Moat

Assessing the Magnitude and Sustainability of Value Creation

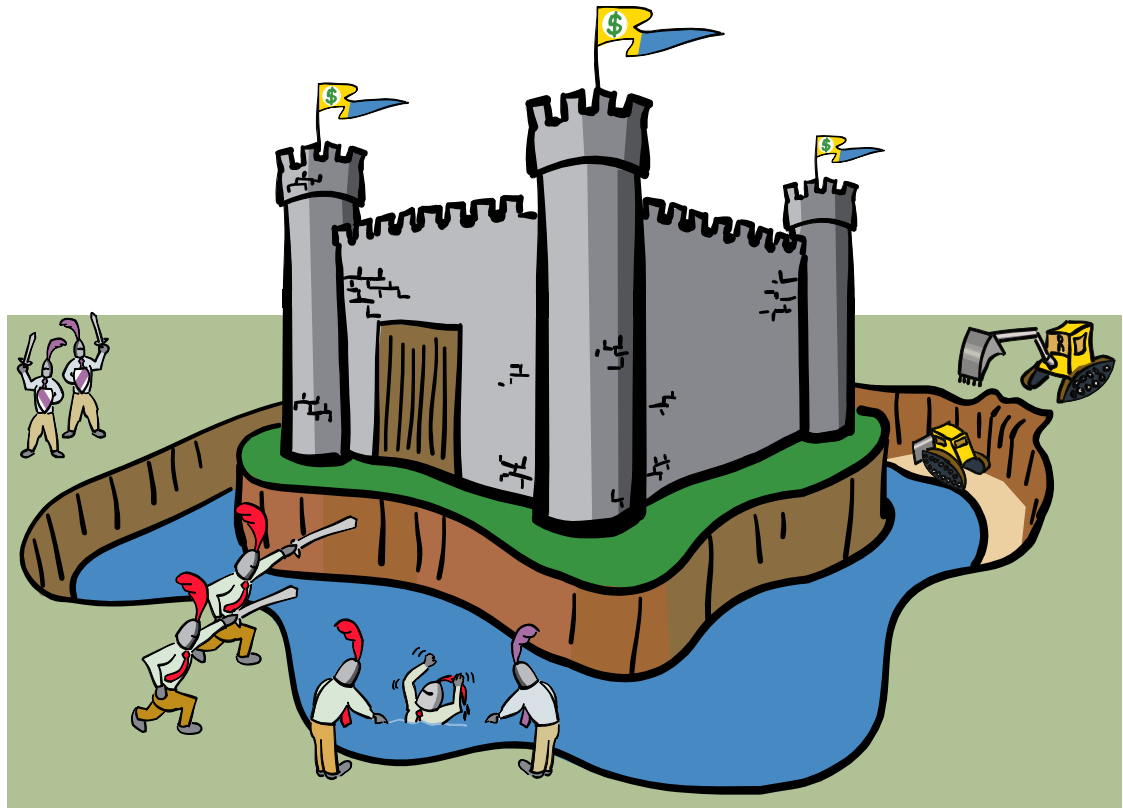


Illustration by Sente Corporation.

- Sustainable value creation is of prime interest to investors who seek to anticipate expectations revisions.
- This report develops a systematic way to explain the factors behind a company's economic moat.
- We cover industry analysis, firm-specific analysis, and firm interaction.

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Executive Summary

- Sustainable value creation has two dimensions—*how much* economic profit a company earns and *how long* it can earn excess returns. Both are of prime interest to investors and corporate executives.
- Sustainable value creation is rare. Competitive forces—including innovation—drive returns toward the cost of capital. Investors should be careful about how much they pay for future value creation.
- Warren Buffett consistently emphasizes that he wants to buy businesses with prospects for sustainable value creation. He suggests that buying a business is like buying a castle surrounded by a moat—a moat that he wants to be deep and wide to fend off all competition. According to Buffett, economic moats are almost never stable; competitive forces assure that they're either getting a little bit wider or a little bit narrower every day. This report seeks to develop a systematic way to explain the factors that determine a company's moat.
- Companies and investors use competitive strategy analysis for two very different purposes. Companies try to generate returns above the cost of capital, while investors try to anticipate revisions in expectations for financial performance that enable them to earn returns above their opportunity cost of capital. If a company's share price already captures its prospects for sustainable value creation, investors should expect to earn a risk-adjusted market return.
- Studies suggest that industry factors dictate about 10-20% of the variation of a firm's economic profitability, and that firm-specific effects represent another 20-40%. So a firm's strategic positioning has a significant influence on the long-term level of its economic profits.
- Industry analysis is the appropriate place to start an investigation into sustainable value creation. We recommend getting a lay of the land—understanding the players, a review of profit pools, and industry stability—followed by a five-forces analysis and an assessment of the likelihood of disruptive technologies.
- A clear understanding of *how* a company creates shareholder value is core to understanding sustainable value creation. We define three broad sources of added value: production advantages, consumer advantages, and external (i.e., government) advantages.
- How firms interact with one another plays an important role in shaping sustainable value creation. We not only consider how companies interact with their competitors through game theory, but also how companies can co-evolve as complementors.
- Brands do not confer competitive advantage in and of themselves. Brands only add value if they increase customer willingness to pay or if they reduce the cost to provide the good or service.
- We provide a complete checklist of questions to guide the strategic analysis (see Appendix A).

Introduction

Ideally, corporate managers try to allocate resources so as to generate attractive long-term returns on investment. Similarly, investors try to buy the stocks of companies that are likely to exceed embedded financial expectations. In both cases, *sustainable value creation* is of prime interest.

What exactly is sustainable value creation? We can think of it across two dimensions. First is the *magnitude* of returns in excess of the cost of capital that a company can, or will, generate. Magnitude considers not only the *return* on investment but also *how much* a company can invest at an above-cost-of-capital rate. Corporate growth only creates value when a company generates returns on investment that exceed the cost of capital.

The second dimension of sustainable value creation is *how long* a company can earn returns in excess of the cost of capital. This concept is also known as fade rate, competitive advantage period (CAP), value growth duration, and T.¹ Despite the unquestionable significance of this longevity dimension, researchers and investors give it scant attention.

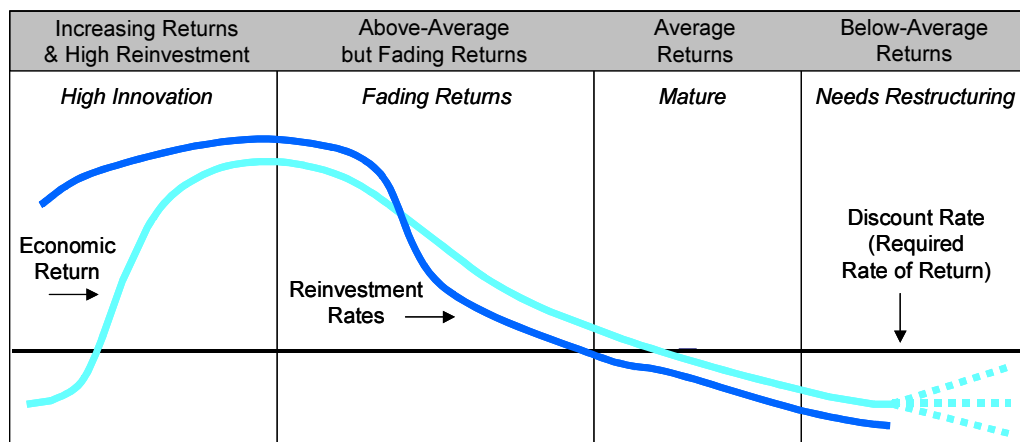
How does sustainable value creation differ from the more popular sustainable competitive advantage? A company must have two characteristics to claim that it has a competitive advantage. The first is that it must generate, or have an ability to generate, returns in excess of the cost of capital. Second, the company must earn a higher rate of economic profit than the average of its competitors.²

As our focus is on sustainable value creation, we want to understand a company's economic performance relative to the cost of capital, not relative to its competitors (although these are intimately linked, as we will see). If sustainable value creation is rare, then sustainable competitive advantage is even more rare, given that it requires a company to perform better than its peers.

We can visualize sustainable value creation by looking at a company's competitive life cycle. (See Exhibit 1.) Companies are generally in one of four phases (see Appendix B for a breakdown by industry):

- *Innovation*. Young companies typically see sharp increases in return on investment and significant investment opportunities. This is a period of rising returns and heavy investment.
- *Fading returns*. High returns attract competition, generally causing economic returns to gravitate toward the cost of capital. In this phase, companies still earn excess returns, but the return trajectory is down, not up. Investment needs also moderate.
- *Mature*. In this phase, the product markets are in competitive equilibrium. As a result, companies here earn their cost of capital on average, but competition within the industry assures that aggregate returns are no higher. Investment needs continue to moderate.
- *Subpar*. Competitive forces often drive returns *below* the cost of capital, requiring companies to restructure. These companies often improve returns by shedding assets, shifting their business model, reducing investment levels, or putting themselves up for sale. Alternatively, these companies can distribute their assets through a bankruptcy filing.

Exhibit 1: A Firm's Competitive Life Cycle

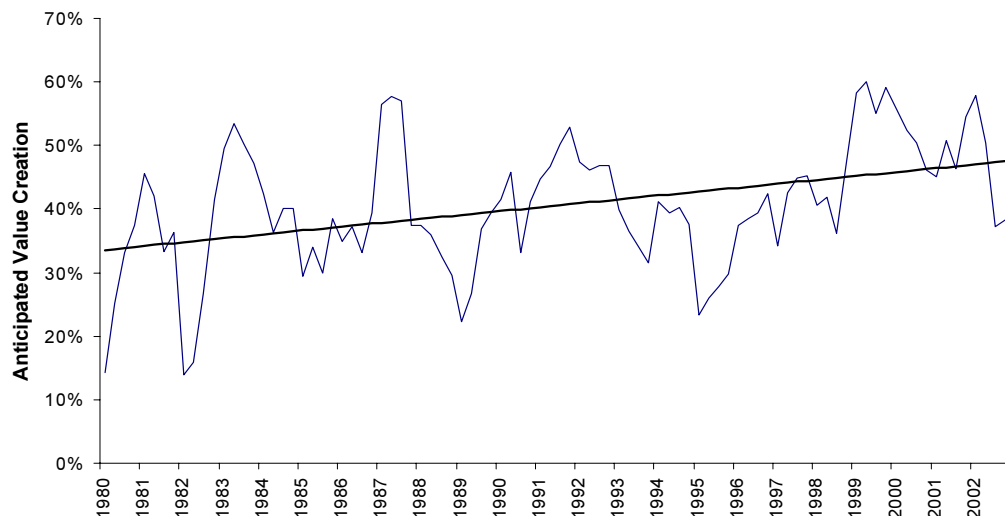


Source: CSFB estimates.

One of the central themes of this analysis is that *competition drives a company's return on investment toward the opportunity cost of capital*. This theme is based on microeconomic theory and is quite intuitive. It predicts that companies generating high economic returns will attract competitors willing to take a lesser, albeit still attractive, return which will drive down aggregate industry returns to the opportunity cost of capital. Researchers have empirically documented this prediction.³ To achieve sustainable value creation, companies must defy the very powerful force of reversion to the mean.

Recent research on the rate of mean reversion reveals a couple of important points. First, the time that an average company can sustain excess returns is shrinking.⁴ This reduction in sustainable value creation reflects the greater pace of innovation and a shift in the composition of public companies (i.e., today there are more young public companies than 25 years ago). Second, reinvestment rates and the variability of economic returns help explain the rate of fade.⁵ For example, a company that generates high returns while investing heavily signals an attractive opportunity to both existent and potential competitors. Success sows the seeds of competition.

Why is sustainable value creation so important for investors? To start, investors pay for value creation. Exhibit 2 provides a very simple proxy for how much value creation investors have anticipated for the S&P 500 since 1980. We establish a baseline value by simply capitalizing the last four quarters of operating net income for the S&P 500 by an estimate of the cost of equity capital.⁶ We attribute any value above and beyond this baseline value to future expected value creation. The exhibit shows that over one-third of the value of the S&P 500 reflects anticipated value creation, a ratio that has increased in recent decades.

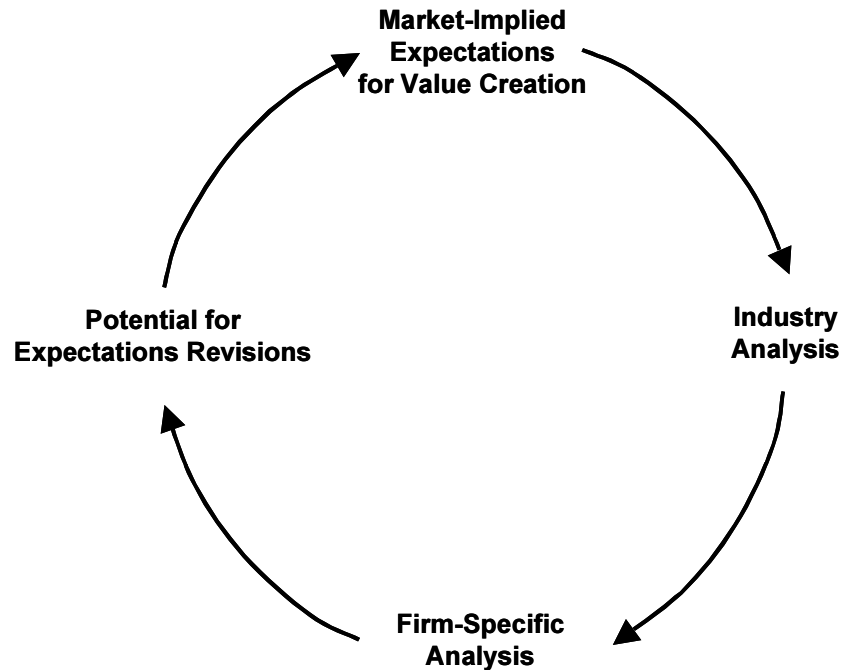
Exhibit 2: Rolling Four-Quarter Anticipated Value Creation

Source: Standard and Poor's, Aswath Damodaran, CSFB estimates.

More significant, sustained value creation is an important source for potential expectations revisions. At this point, we must draw a critical distinction between product markets—the markets for the goods and services that companies produce—and capital markets. Companies seek to understand the industry and competitive landscape so as to make decisions and allocate resources in a way that maximizes long-term economic profits. In contrast, investors seek to understand whether or not the expectations reflected in today's price are likely to be revised up or down.

So companies and investors both use competitive strategy analysis, but for two very different purposes. Companies try to generate returns above the cost of capital, while investors try to anticipate revisions in expectations. If a company's share price already captures its prospects for sustainable value creation, investors should expect to earn a risk-adjusted market return.⁷

We will spend most of our time trying to understand how and why companies attain sustainable value creation in product markets. But we should never lose sight of the fact that *our goal as investors is to anticipate expectations revisions*. Exhibit 3 shows the process and emphasizes the goal of finding and exploiting expectations mismatches.

Exhibit 3: The Link Between Market Expectations and Competitive Strategy

Source: CSFB.

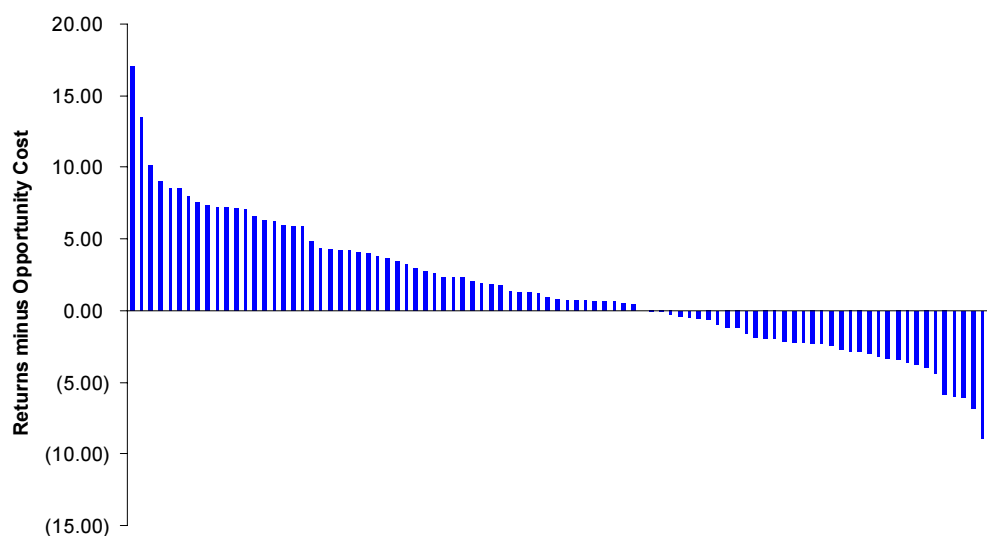
Over the years, legendary investor Warren Buffett has consistently emphasized that he seeks businesses with sustainable competitive advantages. He often invokes the metaphor of a moat. He suggests that buying a business is akin to buying a castle surrounded by a moat. Buffett wants the economic moat around the businesses he buys to be deep and wide to fend off all competition. He goes one step further, noting that economic moats are almost never stable; they're either getting a little bit wider, or a little bit narrower, every day. So he sums up his objective as buying a business where the economic moat is formidable and widening. *Our goal in this report is to develop a systematic way to explain the factors behind a company's moat.*

What Dictates a Company's Destiny?

Peter Lynch quips that investors are well advised to buy a business that's so good that a dummy can run it, because sooner or later a dummy *will* run it.⁸ Lynch's comment begs an important question: What dictates a firm's economic returns? Note that we are not asking what determines a company's share price performance (which we know is a function of expectations revisions), but rather its economic profitability.⁹

Before we answer the question, we can make some empirical observations. Exhibit 4 shows the spread between cash flow return on investment and the cost of capital for over 90 industries in the United States. Our sample includes in excess of 1,500 companies. We see that some industries have positive economic return spreads, some are neutral, and some don't earn the cost of capital.

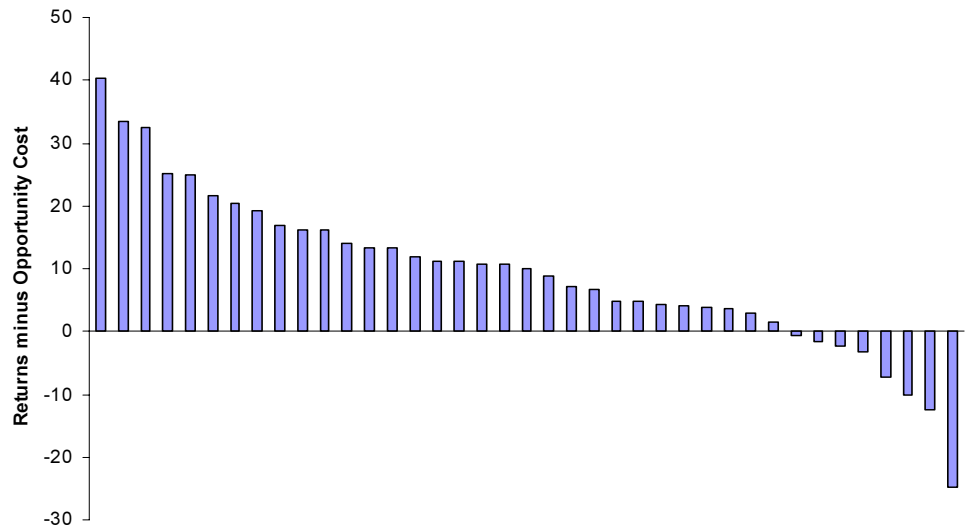
Exhibit 4: Industry Returns Vary from Value-Creating to Value-Destroying



Source: CSFB HOLT estimates.

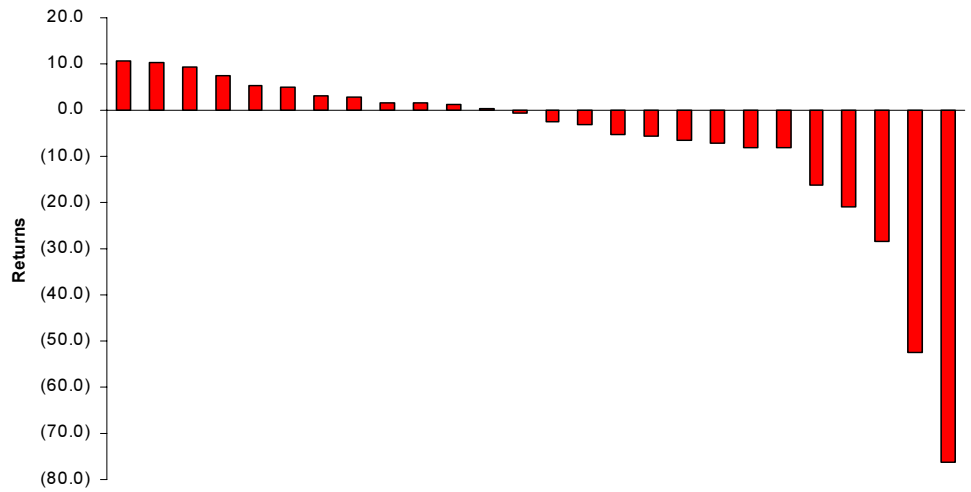
Next, we analyze the companies that make up a value-creating industry (Exhibit 5), a value-neutral industry (Exhibit 6), and a value-destroying industry (Exhibit 7). The important observation is that even the best industries include value-destroying companies, while the worst industries have value-creating companies. That some companies buck the economics of their industry provides some insight about potential sources of economic performance.

Exhibit 5: Financial Service Industry—Value Creating



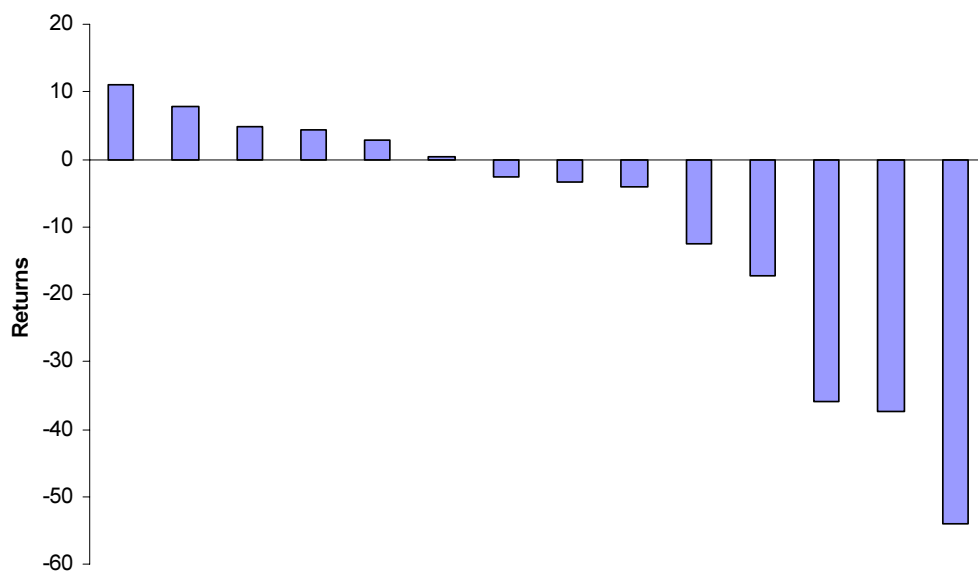
Source: CSFB HOLT estimates.

Exhibit 6: Telecom Equipment Industry—Value Neutral



Source: CSFB HOLT estimates.

Exhibit 7: Wireless Networking Industry—Value Destroying



Source: CSFB HOLT estimates.

A number of studies suggest that industry effects dictate about 10-20% of the variation of a firm's economic profitability, and that firm effects represent another 20-40%. While a significant percentage of the variability in economic profitability remains unexplained, we see that *a firm's strategy and positioning explain roughly twice the profit variability as industry effects do.*¹⁰

So while Lynch's counsel may be wise, the evidence suggests that finding a company in a high-return industry or avoiding a company in a low-return industry is not enough. Finding a good business requires a thorough understanding of both industry and firm-specific circumstances.

A final word before we proceed. Our unit of analysis will be the firm. In many if not most cases the proper unit of analysis is the strategic business unit. This is especially true for multidivision companies that compete in disparate industries. That said, the framework we provide should be sufficiently robust to apply on the divisional level. So for a multidivision company, we recommend aggregating the results after repeating the analysis for each strategic business unit.

Industry Analysis

We start with industry analysis, which we break into three parts:

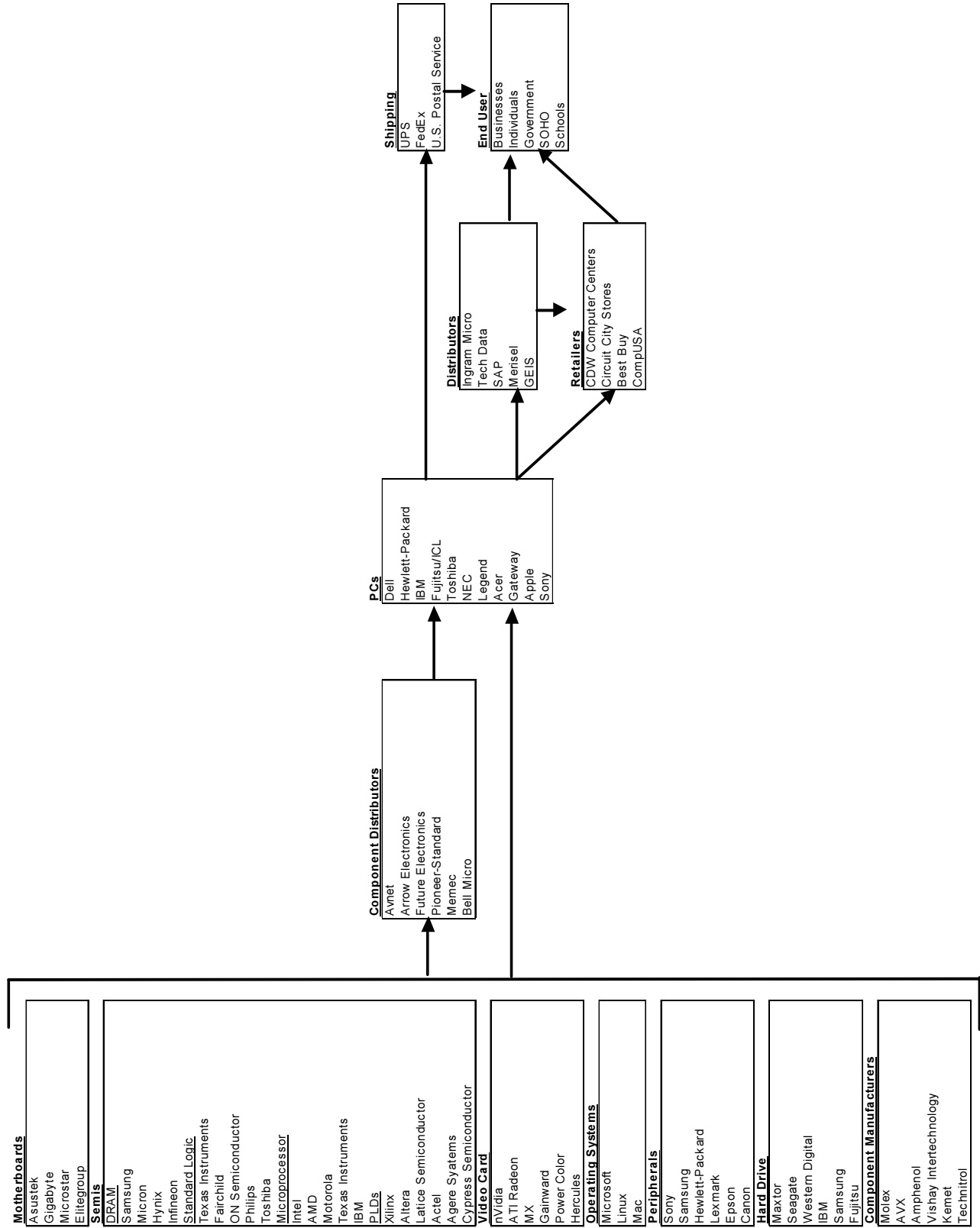
1. *Get the lay of the land.* This includes creating an industry map to understand the players, constructing profit pools to see whether (and why) the distribution of economic profits have changed over time, measuring industry stability, and classifying the industry so as to improve alertness to key issues and opportunities.
2. *Assess industry attractiveness through a five-forces analysis.* Of the five forces, we spend the bulk of our time assessing barriers to entry and rivalry.
3. *Consider the likelihood of disruptive technologies.* We consider the role of innovation and how and why industries evolve from vertical to horizontal integration.

The Lay of the Land

A useful way to start competitive analysis is to create an industry map. A map should include all the players that might have an impact on a company's profitability. The goal of an industry map is to understand the current and potential interactions that ultimately shape the sustainable value creation prospects for the whole industry as well as the individual companies within the industry.

From an industry perspective, you can think of three types of interactions: *supplier* (how much it will cost to get inputs), *customer* (how much someone is willing to pay for the good or service), and *external* (other factors that come into play, like government actions). Exhibit 8 shows an illustration for the personal computer (PC) industry.

Exhibit 8: Personal Computer Industry Map



Source: Company data, CSFB estimates.

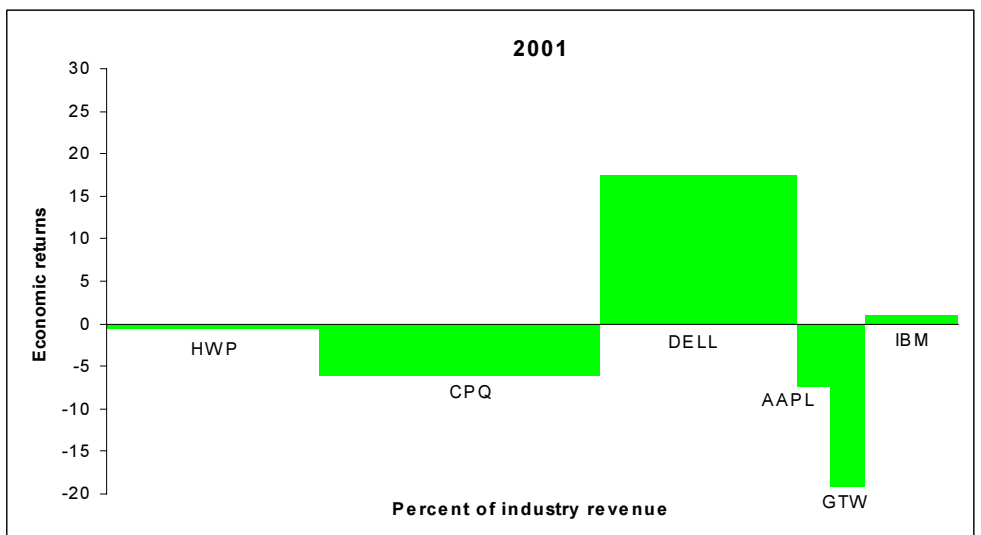
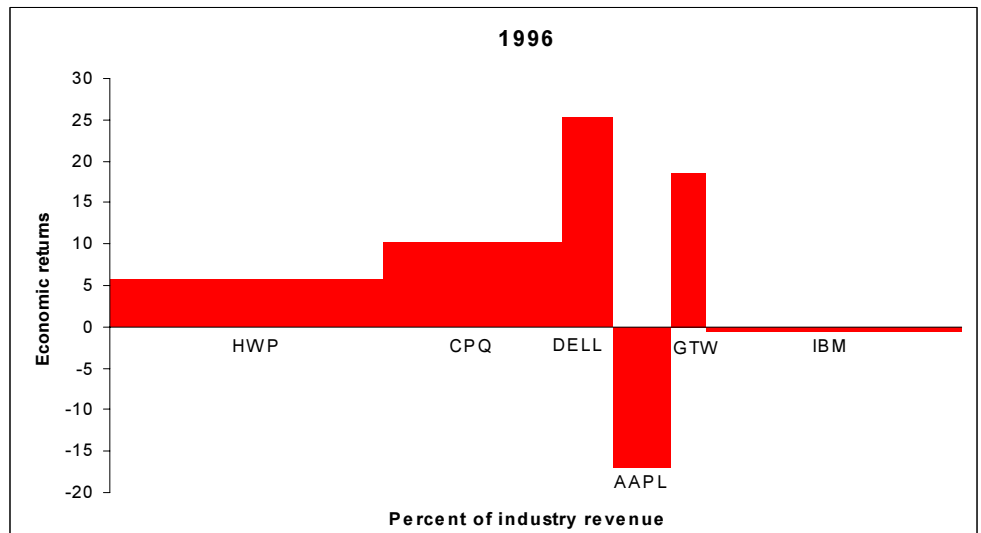
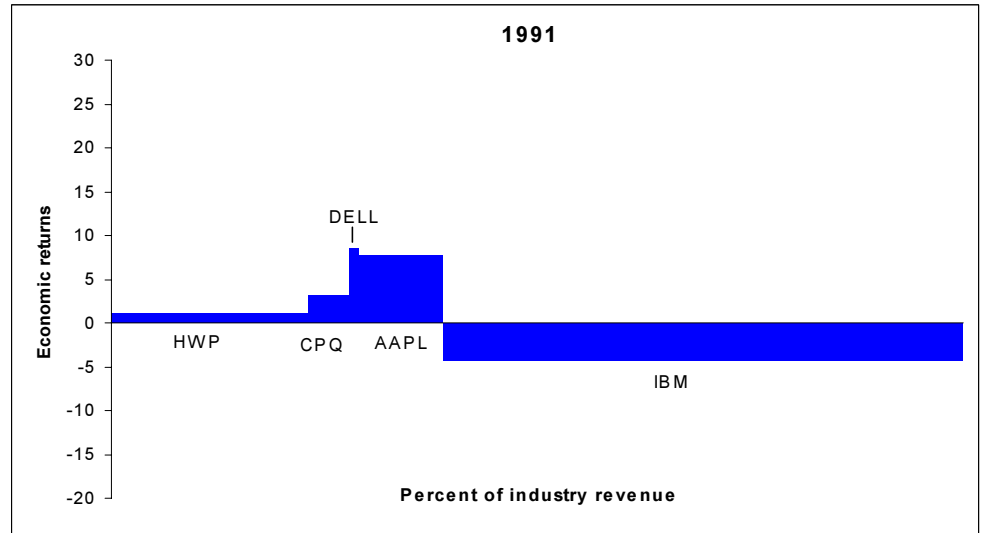
Here are some points to bear in mind as you develop an industry map:

- List firms in order of dominance (typically defined by size).
- Consider *potential new entrants* as well as existing players.
- Understand the nature of the economic interaction between the firms (incentives, payment terms, etc.).
- Evaluate other factors that might influence profitability (e.g., labor).

The next step is to construct a historical profit pool.¹¹ A profit pool shows how the pieces of an industry's value-added pie are distributed. The horizontal axis represents the percentage of the industry (typically measured in sales) and the vertical axis measures economic profitability (cash flow return on investment less the cost of capital). A review of profit pools over time is a good way to see value migrations.

Exhibit 9 shows the profit pool for the leading half-dozen U.S. companies in the PC industry. Creating a narrative to explain the rise and fall of the various competitors can provide important clues about what it takes to generate sustainable value creation. For example, the PC profit pool clearly reveals Dell Computer's (DELL, \$27.43, Outperform, \$32.00) ascendance and Apple's demise. What changed over the years to spur that change in economic position?

Exhibit 9: PC Industry Profit Pools, 1991 to 2001



Source: CSFB HOLT estimates.

Another important issue is industry stability. Stable industries, generally speaking, are more conducive to sustainable value creation. Unstable industries, in contrast, present terrific challenges and opportunities. But the value migration in unstable industries tends to be greater than that of stable industries, making sustainable value creation that much more elusive.

We can measure industry stability a couple of ways. One simple but useful proxy is market-share stability. This analysis looks at the absolute change in market share for the companies within the industry over some period. (We typically use five years.) We then add up the absolute changes and divide the sum by the number of competitors. The lower the average absolute change in the industry, the more stable the industry is.

Exhibit 10 shows the market-share stability for seven industries. We see relative stability in the ready-to-eat cereal, soft drink, and beer markets, while batteries, personal computers, and autos demonstrate greater change.

Exhibit 10: Market-Share Stability

Ready-to-Eat Cereal	1996	2001	5 Year Change
Kellogg's Co	33.0	32.2	0.8
General Mills	27.0	26.9	0.1
Kraft	16.5	15.7	0.8
Private Label	9.5	11.0	1.5
Quaker Oats Company	9.5	9.6	0.1
Other	4.5	4.6	0.1
Total	100.0	100.0	
Average Absolute Change			0.6
Soft Drink	1996	2001	5 Year Change
Coca-Cola	43.1	43.7	0.6
PEPSICO	31.0	31.6	0.6
Cadbury Schweppes	14.6	15.6	1.0
Other	6.6	5.3	1.3
Cott	2.9	3.8	0.9
Royal Crown	1.8	0.0	1.8
Total	100.0	100.0	
Average Absolute Change			1.0
Beer	1996	2001	5 Year Change
Anheuser-Busch	45.4	48.8	3.4
Miller	21.9	19.3	2.6
Coors	10.0	11.0	1.0
Other	6.8	5.4	1.4
Pabst (includes Stroh)	11.7	5.0	6.7
Heineken	1.6	5.0	3.4
Labatt USA	1.2	2.0	0.8
Gambrinus	0.6	1.8	1.2
Barton	0.8	1.7	0.9
Total	100.0	100.0	
Average Absolute Change			1.3
Metal Cans	1996	2001	5 Year Change
Ball Corp.	33.0	32.0	1.0
Metal Container Corp. (private)	20.0	22.0	2.0
American National Can	27.0	22.0	5.0
Crown, Cork and Seal	19.0	20.0	1.0
Other	1.0	4.0	3.0
Total	100.0	100.0	
Average Absolute Change			2.4
Auto	1996	2001	5 Year Change
General Motors	31.3	28.1	3.2
Ford	25.4	21.9	3.5
Other	13.9	19.6	5.7
Chrysler	16.2	13.2	3.0
Toyota	7.7	10.1	2.5
Honda	5.6	7.0	1.5
Total	100.0	100.0	
Average Absolute Change			2.8
Personal Computer	1996	2001	5 Year Change
Other	42.9	43.9	1.0
HP	14.7	18.0	3.3
Dell	4.3	12.9	8.6
IBM	9.0	6.2	2.8
Fujitsu/ICL	3.7	4.5	0.8
NEC	10.0	3.5	6.5
Gateway	2.7	3.0	0.3
Toshiba	3.9	2.9	1.1
Apple	5.2	2.6	2.6
Acer	3.4	2.5	0.9
Total	100.0	100.0	
Average Absolute Change			2.8
Battery	1996	2001	5 Year Change
Duracell	38.0	35.7	2.3
Eveready	36.9	31.1	5.8
Rayovac	16.3	19.0	2.7
Others	8.8	14.2	5.4
Total	100.0	100.0	
Average Absolute Change			4.1

Source: Company data, CSFB analyst estimates.

Another proxy for industry stability is pricing trends. Price changes reflect a host of factors, including cost structure (fixed versus variable), entry and exit dynamics, technological change (e.g., Moore's Law), and rivalry. All else being equal, more stable pricing tends to reflect more stable industries. Exhibit 11 shows the pricing trends for about 25 industries, classified as slow-, medium-, and fast-cycle businesses. Sustaining value creation in a fast-cycle industry is a challenge.

Exhibit 11: Pricing Stability

Industry	Period	Price Change (Ann. Avg.)
Slow-cycle markets		
Hospital room per day	1987-97	+4.1%
College tuition	1987-97	+3.8%
Funeral expenses	1987-97	+3.7%
Medical care services	1987-97	+2.5%
Cable television	1987-97	+2.2%
Prescription drugs	1987-97	+1.9%
Movie admissions	1987-97	+0.7%
Standard-cycle markets		
Paper products	1985-95	+0.7%
Fresh whole chicken	1987-97	+0.5%
Beer	1987-97	-0.4%
Agricultural machinery	1985-95	-0.7%
Passenger cars	1987-97	-1.2%
Electric lamps	1987-97	-1.5%
Household refrigerators	1987-97	-1.9%
Power tools	1987-97	-2.2%
Fast-cycle markets		
Home electronic equipment	1987-97	-3.5%
Personal computers	1991-95	-4.3%
Microwave ovens	1982-89	-4.6%
Analog integrated circuits	1981-89	-4.8%
Digital PBXs	1985-89	-4.9%
Memory chips	1991-97	-7.0%
Antilock braking systems	1987-97	-8.6%
Electronic wristwatches (LED/LCD)	1973-83	-10.0%
Fully suspended bicycles	1992-93	-17.0%
Early personal computers	1980-83	-29.9%

Source: Jeffrey R. Williams, *Renewable Advantage* (New York: The Free Press, 2000), 11.

Before you turn to an industry analysis using the five-forces framework, it's useful to classify the industry you're analyzing. The analytical process remains the same no matter which class the industry falls into. But the classification does provide guidance as to what issues you need to emphasize as you step through the analysis. For example, the challenges in a mature industry are likely to be quite distinct from those in an emerging industry. Exhibit 12 provides some broad classifications and the types of opportunities you can associate with each.

Exhibit 12: Industry Structure and Strategic Opportunities

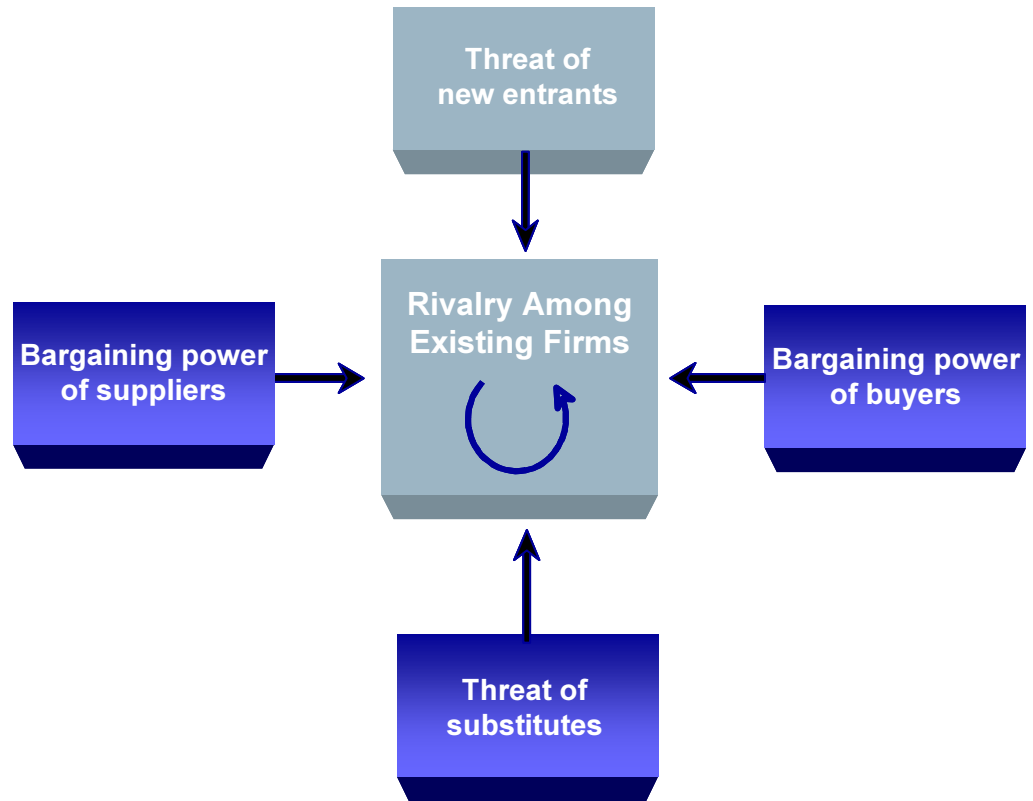
Industry Structure	Opportunities
Fragmented industry	Consolidation: - Discover new economies of scale - Alter ownership structure
Emerging industry	First-mover advantages: - Technological leadership - Preemption of strategically valuable assets - Creation of customer switching costs
Mature industry	Product refinement Investment in service quality Process innovation
Declining industry	Leadership strategy Niche strategy Harvest strategy Divestment strategy
International industry	Multinational opportunities Global opportunities Transnational opportunities
Network industry	First-mover advantages “Winner-takes-all” strategies
Hypercompetitive industry	Flexibility Proactive disruption

Source: Jay B. Barney, *Gaining and Sustaining Competitive Advantage* (Upper Saddle River, NJ: Prentice-Hall, Inc., 2002), 110.

Industry Attractiveness—Five-Forces Analysis

Michael Porter’s well-known five-forces framework (see Exhibit 13) remains one of the best ways to assess an industry’s attractiveness.¹² Porter argues that the collective strength of the five forces determines an industry’s potential for value creation. He stresses that although this potential varies from industry to industry, an individual company’s strategy ultimately dictates the company’s sustainable value creation.

Exhibit 13: Michael Porter's Five Forces That Shape Industry Structure



Source: Michael E. Porter, *Competitive Strategy* (New York: The Free Press, 1980), 4.

While analysts often treat Porter's five forces with equal emphasis, we believe that two of them—threat of entry and rivalry—are so important that they warrant special, in-depth treatment. Further, our firm-specific analysis will make a finer point on some of the other forces. But for now, here's a quick look at supplier power, buyer power, and substitution threat.¹³

- *Supplier power* is the degree of leverage a supplier has with its customers in areas like price, quality, and service. An industry that cannot pass on to its customers price increases from its powerful suppliers is destined to be unattractive. Suppliers are well positioned if they are more concentrated than the industry they sell to, if substitute products do not burden them, or if their products have significant switching costs. They are also in a good position if the industry they serve represents a relatively small percentage of their sales volume, or if the product is critical to the buyer. Sellers of commodity goods to a concentrated number of buyers are in a much more difficult position than sellers of differentiated products to a diverse buyer base.
- *Buyer power* is the bargaining strength of the buyers of a product or service. It is a function of buyer concentration, switching costs, levels of information, substitute products, and the offering's importance to the buyer. Informed, large buyers have much more leverage over their suppliers than do uninformed, diffused buyers.

- *Substitution threat* addresses the existence of substitute products or services, as well as the likelihood that a potential buyer will switch to a substitute product. A business faces a substitution threat if its prices are not competitive and if comparable products are available from competitors. Substitute products limit the prices that companies can charge, placing a ceiling on potential returns.

Barriers to entry is arguably the most important of Porter's five forces. Before we delve into the factors that help determine impediments to entry, we believe it is worthwhile to review the empirical research on entry and exit.

Timothy Dunne, Mark Roberts, and Larry Samuelson (DRS) did the most widely cited study of entry and exit rates.¹⁴ DRS studied in excess of 250,000 U.S. manufacturing firms over a 20-year span ended in the early 1980s.

A fascinating way to summarize the DRS findings is to imagine a hypothetical industry in the year 2002 that has 100 firms with sales of \$1 million each. If the historical patterns of entry and exit in U.S. industries held true, the following would be true:¹⁵

- *Entry and exit will be pervasive.* After five years, between 30 and 40 new firms will have entered the industry, and will have combined annual sales of \$12-20 million. Half of these entrants will be diversified firms competing in other markets, and half new firms. Simultaneously, 30 to 40 firms with aggregate sales of \$12-20 million will leave the industry. So the industry will experience a 30-40% turnover in firms, with the entering and exiting firms representing 12-20% of the industry's volume.
- *Companies entering and exiting tend to be smaller than the established firms.* A typical entrant is only about one-third the size of an incumbent, with the exception of diversifying firms that build new plants. These diversifying firms, which represent less than 10% of total new entrants, tend to be the same size as the incumbents.
- *Most entrants do not survive ten years, but those that do thrive.* Of the 30 to 40 firms that enter between 2002 and 2007, roughly 60% will exit by 2012. But the survivors will nearly double their size by 2012.
- *Entry and exit rates vary substantially by industry.* DRS research shows that low barriers to entry and low barriers to exit tend to go together

You should first review the history of entry and exit in an industry. If there has been a lot of entry and exit—suggesting entry and exit barriers are low—sustainable value creation will be elusive.

But what influences the entry decision in the first place? On a broad level, potential entrants weigh the expected incumbent reactions, the anticipated payoff size, and the magnitude of exit costs. We'll explore each of these in more detail.¹⁶

Let's first take a look at the expectations of incumbent reaction to a potential new entry. Four specific factors indicate the likely veracity of incumbent reaction: asset specificity, the level of the minimum efficient production scale, excess capacity, and incumbent reputation.

For a long time, economists thought that a firm's commitment to a market was a function of the amount of assets it had dedicated to the market. More recently, though, economists have realized it's not the amount of assets that matters, but rather *the*

degree to which those assets are specific to that market. If a firm's assets are only valuable in a specific market, that firm is likely to fight harder to maintain its position.

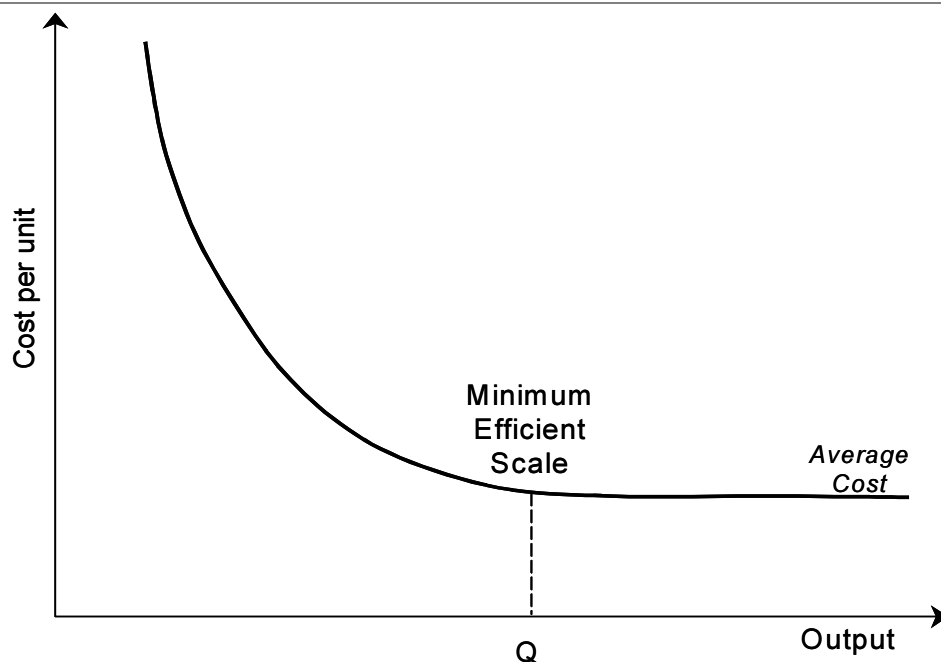
A classic illustration is a railroad versus an airline. Say a company builds a railroad track from New York to Chicago. That asset can only be used for one thing: to move a train back and forth between those two cities. That firm, as a result, will go to great lengths to protect its position.¹⁷ Now consider an airline that has a flight from New York to Chicago. If that route proves uneconomic for any reason, the airline can reroute that plane.

Asset specificity can take a number of forms, including site (assets located next to one another for efficiency); physical (assets tailored to a specific transaction); dedicated (assets that satisfy a particular buyer); and human (workers that develop skills, knowledge, or know-how).¹⁸

The next factor is production scale. For many industries, especially high-fixed-cost industries, unit costs decline as output rises—to a point. A firm enjoys economies of scale when its unit costs decline as the result of its volume gains. At some point, however, companies no longer see lower unit costs with incremental output (constant returns to scale). The minimum efficient scale of production is the smallest amount of volume a company must produce to minimize its unit costs.

The minimum efficient scale of production tells a potential entrant what market share it must gain to be able to price its goods competitively. It also sizes an entrant's upfront capital commitment. So when the minimum efficient scale of production is high relative to the size of the total market, a potential entrant is looking at the not-so-enticing prospects of having to price its products way below its average cost for some time just to get to scale. And the steeper the decline in the cost curve, the less likely the entry. The main way an entrant can try to offset its production cost disadvantage is to differentiate its product, allowing the firm to charge a price premium versus the rest of the industry.

Exhibit 14: Minimum Efficient Scale as a Barrier to Entry



Source: Sharon M. Oster, *Modern Competitive Analysis* (Oxford: Oxford University Press, 1999), 62.

A third factor in weighing incumbent reaction is excess capacity. The logic here is quite straightforward. Assuming that demand remains stable, an entrant that comes into an industry with too much capacity increases the excess capacity of each of the incumbents. If the industry has economies of scale in production, the cost of idle capacity rises. As a result, incumbents work hard to maintain their market share. So a new entrant will spur a drop in prices. This prospect deters entry.

The final factor is incumbent reputation. Firms usually compete across various markets over an extended time. As a result, they gain reputations as being tough—ready to fight at the least provocation—or as more accommodating. A firm's reputation, readily backed by actions as well as words, can seriously color an entrant's decision.

Another important shaper of barriers to entry is the magnitude of the entrant's anticipated payoff. There is no assurance that an entrant will capture attractive economic profits if the incumbent has a sufficient advantage. Incumbent advantages come in a number of forms, including precommitment contracts, licenses and patents, learning curve benefits, and network effects.

The first incumbent advantage is precommitment contracts. Often, companies secure important future transactions using long-term contracts. These contracts are often efficient and reduce a company's search costs. An incumbent with a contract in place is daunting for a potential entrant.

Precommitment contracts can take a number of forms. One is if an incumbent has favorable access to an essential raw material. For example, after World War II aluminum producer Alcoa (AA, \$23.25, Outperform, \$29.40) signed exclusive contracts with all of the producers of high-grade bauxite, a key material in aluminum production. Potential entrants were deterred by an inability to access bauxite on the same favorable terms as Alcoa.

Another form of precommitment contract is a long-term deal with customers. In the mid-1980s, there were two producers of the sweetener aspartame, Monsanto (*NutraSweet*) and Holland Sweetener Company. Following the 1987 patent expiration of aspartame in Europe, Holland entered that market. The competition did drive down the price of aspartame 60%, but Holland lost money. Holland Sweetener had its eye on the U.S. market, where patent expiration was set for 1992. But in a classic precommitment move, Monsanto signed long-term contracts to supply both Coca-Cola (KO, \$45.87, Outperform, \$57.00) and PepsiCo (PEP, \$43.18, Neutral, \$43.00), effectively shutting Holland out of the U.S.¹⁹

Precommitment can also include quasi-contracts, like a pledge to always provide a good or service at the lowest cost. Since new entrants rarely have the scale to compete with incumbents, such pledges, if credible, deter entry.

Licenses and patents also shape a potential entrant's payoff for common-sense reasons. A number of industries require a license or certification from the government to do business. Acquiring licenses or certifications is costly, hence creating a barrier for an entrant.

Patents are also an important entry barrier. But the spirit of a patent is somewhat different than that of a license. The intent of a patent is to allow the innovator to receive an appropriate return on investment. Most innovations require substantial upfront costs. So a free-market system needs a means to compensate innovators to encourage their activities. Patents do not discourage innovation, but they do deter entry for a limited time into protected activities.

Learning curves can also serve as a barrier to entry. The learning curve refers to an ability to reduce unit costs as a function of cumulative experience. Researchers have studied the learning curve for hundreds of products. The data show that for the median firm, a doubling of cumulative output reduces unit costs by about 20%.²⁰ A company can enjoy learning curve benefits without enjoying economies of scale, and vice versa. But frequently, the two go hand in hand.

Another important incumbent advantage that can weigh on an entrant's payoff is network effects. Network effects exist when the value of a product or service increases as more members use that product. As an example, online auctioneer eBay (EBAY, \$68.73, Outperform, \$80.00) is attractive to the user precisely because so many buyers and sellers congregate there. In a particular category, positive feedback often assures that one network becomes dominant: eBay has not only weathered competitive onslaughts, but has also strengthened its position. These winner-take-most markets deter entry.²¹

The last point, to reiterate a point from DRS's analysis of entry and exit, is that a link exists between barriers to entry and barriers to exit. High exit costs discourage entry. The *magnitude* of investment an entrant requires and the *specificity* of the assets generally defines exit barriers. Low investment needs and general assets are consistent with low barriers to entry.

So how do companies *actually* deter entry? Robert Smiley surveyed product managers about their strategies.²² While his sample was limited to consumer products companies, and there may be other biases in the sample, the results are instructive nonetheless. (See Exhibit 15.) The first three strategies—learning curve, advertising, and R&D/patents—create high entry costs. The last three—reputation, limit pricing, and excess capacity—shape judgments of post-entry payoffs. Virtually all managers reported use of one or more entry-detering strategies.

Exhibit 15: Reported Use of Entry-Detering Strategy

	Learning Curve	Advertising	R&D/ Patents	Reputation	Limit Pricing	Excess Capacity
<i>New Products</i>						
Frequently	26%	62%	56%	27%	8%	22%
Occasionally	29	16	15	27	19	20
Seldom	45	22	29	47	73	48
<i>Existing Products</i>						
Frequently		52%	31%	27%	21%	21%
Occasionally		26	16	22	21	17
Seldom		21	54	52	58	62

Source: Robert Smiley, "Empirical Evidence on Strategic Entry Deterrence", International Journal of Industrial Organization, Vol. 6, June 1988, 172.

Rivalry among firms addresses how fiercely companies compete with one another along dimensions such as price, service, new-product introductions, and advertising. In almost all industries, coordination in these areas improves the collective good. For example, if competitors coordinate their pricing, their economic returns benefit.

But there is always a tension between coordinating and cheating. A firm that cheats (e.g., lowers its price) in the face of industry coordination stands to gain disproportionately. So we can think of rivalry as understanding, for each firm, the

tradeoffs between coordination and cheating. Lots of coordination suggests low rivalry and attractive economic returns. Intense rivalry makes it difficult for firms to generate high returns.

Coordination is difficult if there are lots of competitors. In this case, each firm considers itself a minor player and is more likely to think individualistically. A concentration ratio is a common way to measure the number and relative power of firms in an industry. The U.S. government calculates concentration ratios as the percent of value shipments that the top four companies in an industry represent. Exhibit 16 shows the concentration for 27 industries.

Exhibit 16: Percent of Shipment Value from the Industry's Four Largest Companies

Industry Group	Percent of Value of Shipments Accounted for by the 4 Largest Cos.
Breakfast Cereal	82.9
Confectionary from purchased chocolate	65.2
Aerospace product & parts	62.3
Motor vehicle	49.7
Engine, turbine, & power transmission equipment	42.5
Beverage	40.9
Doll, toy, & game	40.0
Communications equipment	36.5
Meat product	35.0
Semiconductor & other electronic component	34.3
Soap, cleaning compound, & toilet preparation	33.7
Glass & glass product	31.0
Bakeries and tortilla	28.6
Petroleum & coal products	26.0
Navigational, measuring, medical & control instruments	24.1
Computer & electronic product	19.1
Paper	18.5
Apparel	17.6
Medical equipment & supplies	16.3
Electric equipment, appliance, & component	14.8
Textile mills	13.8
Primary metal	13.8
Chemical	11.9
Machinery	11.5
Wood product	10.5
Plastics & rubber products	8.2
Fabricated metal product	3.5

Source: U.S. Census Bureau, Concentration Ratios in Manufacturing — 1997 Economic Census, June 2001.

Naturally, the flip side suggests that fewer firms lead to more opportunity for coordination. To reinforce this point, empirical studies show that most of the price-fixing cases that the government prosecutes involve industries with fewer-than-average firms.²³

Taking this analysis one step further, it's not only the number of firms that matter, but also the size distribution of those firms. A dominant firm in an otherwise fragmented industry may be able to impose discipline on the other firms. In industries with several similar-size firms, rivalry tends to be significant.

A widely used measure of industry balance is the Herfindahl-Hirschman index. The index is equal to 10,000 times the sum of the square of each company's market share.

For instance, for an industry with four companies and market shares of 40%, 30%, 20%, and 10%, the index would be 3,000. (Take $10,000 \times [(.4)^2 + (.3)^2 + (.2)^2 + (.1)^2]$.) Many economists characterize Herfindahl-Hirschman index readings in excess of 1,800 as industries with reduced rivalry. Exhibit 17 shows the U.S.-government calculated index for 27 industries.

Exhibit 17: Herfindahl-Hirschman Index for Selected Industries

Industry Group	Herfindahl-Hirschman Index for 50 Largest Companies
Motor vehicle	2,505.8
Breakfast Cereal	2,445.9
Aerospace product & parts	1,636.9
Confectionary from purchased chocolate	1,600.6
Engine, turbine, & power transmission equipment	596.2
Beverage	531.5
Doll, toy, & game	495.9
Soap, cleaning compound, & toilet preparation	495.4
Communications equipment	449.0
Semiconductor & other electronic component	413.7
Meat product	392.6
Glass & glass product	359.0
Petroleum & coal products	350.0
Bakeries and tortilla	281.2
Navigational, measuring, medical & control instruments	207.5
Paper	173.3
Medical equipment & supplies	137.5
Computer & electronic product	136.6
Electric equipment, appliance, & component	105.9
Apparel	100.6
Primary metal	97.4
Textile mills	94.4
Chemical	76.6
Machinery	55.4
Wood product	52.7
Plastics & rubber products	30.2
Fabricated metal product	8.5

Source: U.S. Census Bureau, Concentration Ratios in Manufacturing—1997 Economic Census, June 2001.

Another influence of rivalry is firm homogeneity. If companies within an industry are similar—say in incentives, ownership structure, and corporate philosophy—rivalry may be less intense. Homogeneity is a particularly important consideration for global industries where competing companies often have asymmetric objectives.

Asset specificity, an issue we addressed in the context of entry barriers, also plays a role in rivalry. Specific assets encourage a company to stay in an industry even under trying circumstances because the company has no other use for the assets. In this context, assets include physical assets like railroad tracks as well as intangible assets like brands.

Demand variability, even if it is exogenous, also shapes coordination costs, and hence rivalry. When demand variability is high, companies have a difficult time coordinating their internal activities and a very difficult time coordinating with competitors.

Variable demand is a particularly important consideration in industries with high fixed costs. In these industries, companies often add too much capacity at points of peak demand. This capacity, while necessary at the peak, is massively excessive at the trough and spurs even more intense competition. The condition of variable demand and high fixed costs describes many commodity industries, which is why their rivalry is so bitter and consistent excess economic returns are so rare.

A final consideration in rivalry is industry growth. When the pie of potential excess economic profits grows, companies can create shareholder value without undermining their competitors. The game is not zero-sum. In contrast, stagnant industries are zero-sum games, and the only way to increase value is to take it from others. So a decelerating industry growth rate is often concomitant with a rise in rivalry.

Disruption and Disintegration

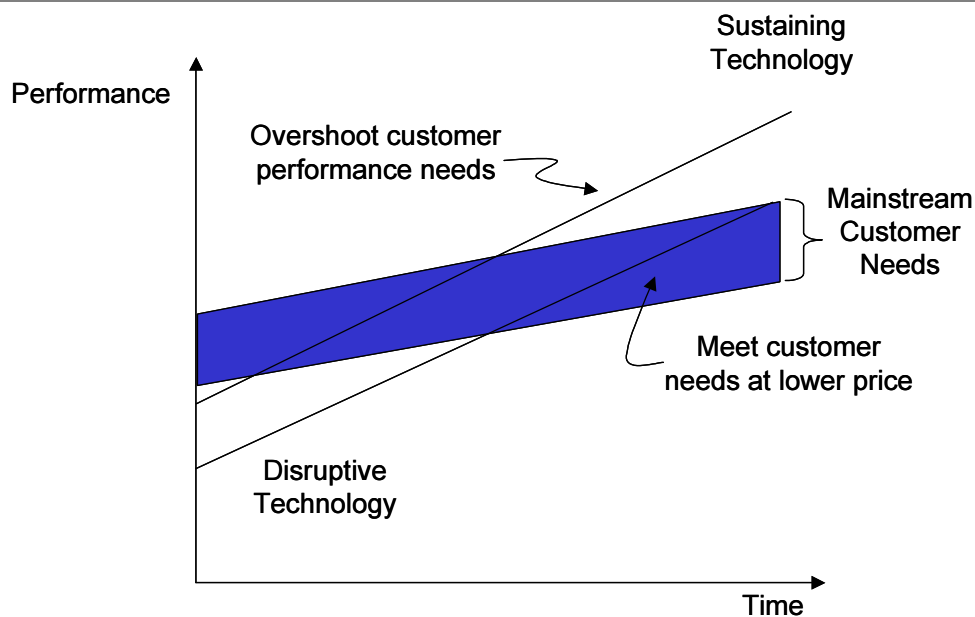
While the strategy literature has historically been effective at identifying the determinants of industry attractiveness, it has been lacking in its treatment of the innovation process. In recent years, Clayton Christensen's disruptive technology framework has filled that gap. Christensen's work exposes a pattern by which great companies fail and new innovations take hold. Ironically, he notes that many companies fail to retain their leadership positions, even though great managers are making sound decisions based on widely accepted management principles.²⁴

Christensen starts by distinguishing between *sustaining* and *disruptive* technologies. Sustaining technologies foster product improvement. They can be incremental, discontinuous, or even radical. But sustaining technologies operate within a defined value network—the “context within which a firm identifies and responds to customers' needs, solves problems, procures input, reacts to competitors, and strives for profit.”²⁵ In direct contrast, disruptive technologies offer the market a very different value proposition. Products based on disruptive technologies may initially appeal only to relatively few customers who value features such as low price, smaller size, or greater convenience. Furthermore, Christensen finds that these technologies generally underperform established products in the near term.

For example, the personal computer disrupted the minicomputer in the early 1980s. But a minicomputer user couldn't switch to a PC, because a PC wasn't good enough to support the necessary applications when it was first launched. Thus it is not surprising that leading companies (like Digital Equipment in the case of the PC) often overlook, ignore, or dismiss disruptive technologies in the early phases of the technology.

Technologies often progress faster than the market demands. (See Exhibit 18.) Established companies commonly provide customers with more than they need or more than they are ultimately willing to pay for. This allows disruptive technologies to emerge, because even if they do not meet the demands of users today, they could become fully performance-competitive tomorrow.

Exhibit 18: Christensen's Disruptive Technology Framework



Source: Clayton M. Christensen, *The Innovator's Dilemma* (Boston: Harvard Business School Press, 1997), xvi.

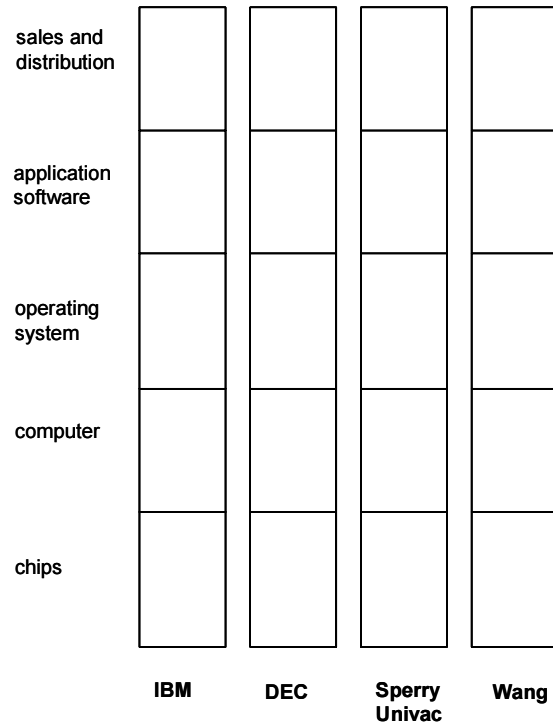
Passing over disruptive technologies may appear rational for established companies, because disruptive products generally offer low margins, operate in insignificant or emerging markets, and are not in demand by the company's most profitable customers. As a result, companies that listen to their customers and practice conventional financial discipline are apt to disregard disruptive technologies.

The disruptive technology framework offers other important insights as well. The first is that when the performance of a sustaining technology exceeds the high end of the consumer's threshold, it not only allows for the emergence of disruptive technology, but also shifts the basis of competition away from performance toward speed-to-market and delivery flexibility.²⁶ So the basis of competition in the more traditional segments of a market could change quite significantly. An analysis of the personal computer industry reveals that as performance became less important, business models based on delivery efficiency became more prominent. Dell was ideally positioned to take advantage of this shift.

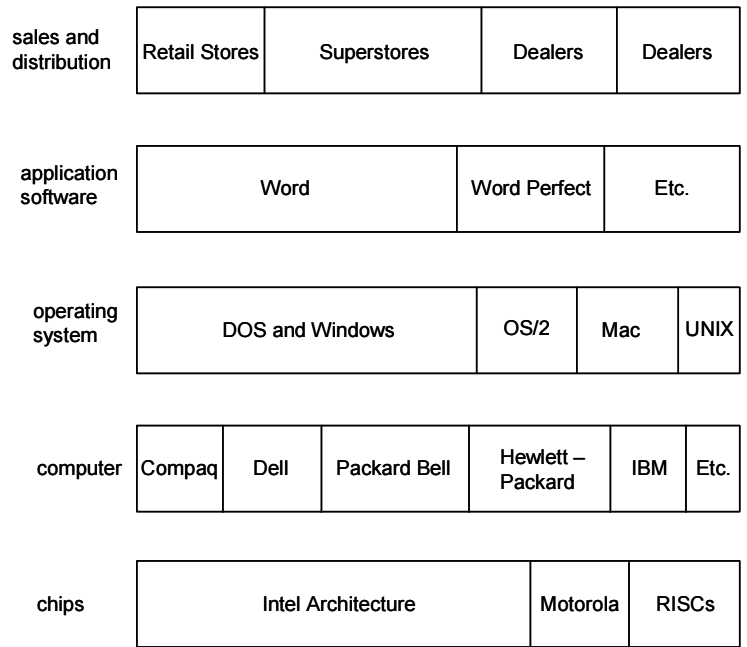
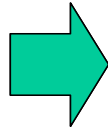
Another critical insight is that while industries are developing (i.e., while they are at the low end of the required performance band), vertically integrated firms tend to dominate because of the high coordination costs. Examples include automobiles and computers. But as the industry approaches the point where product performance outstrips consumer demand, the industry tends to standardize and "dis-integrate" into horizontal segments. (See Exhibit 19.) Christensen's work offers a useful way to understand and anticipate when an industry is likely to flip from vertical to horizontal. Further, Christensen argues that as the industry migrates from vertical to horizontal, the value often migrates to the suppliers.

Exhibit 19: Disintegration of the Computer Industry

The Vertical Computer Industry – Circa 1980



The Horizontal Computer Industry – Circa 1995



Source: Andrew S. Grove, *Only the Paranoid Survive* (New York: Doubleday, 1999), 44.

An industry profit pool is a good way to see value migrations as the result of industry disintegration. Take another look at Exhibit 9. Apple Computer's (AAPL, \$15.19, Neutral, \$18.00) share of the PC industry's profit pool evaporated over the past dozen years, while Dell Computer's has grown. We can translate this framework directly into the economic profit pools of the industry.

Industry analysis provides important background for understanding a company's current or potential performance. But as we noted earlier, firm specific factors explain twice as much of the variation in economic returns as industry factors do. So we now turn to analyzing the firm.

Firm-Specific Analysis

Core to understanding sustainable value creation is a clear understanding of *how* a company creates shareholder value. A company's ability to create value is a function of the strategies it pursues, as well as how it chooses to interact with competitors and important noncompetitors.

We first provide a fundamental framework for value creation. We then consider the various ways a company can add value. Finally, we delve into firm interaction using game theory and principles of co-evolution.

A Framework for Added-Value Analysis

Adam Brandenburger and Harbourne Stuart offer a very concrete and sound definition of how a firm adds value.²⁷ Their equation is deceptively simple:

Value created = willingness-to-pay of the buyer – opportunity cost of the supplier

The equation basically says that the value a company creates is the difference between what it gets for its product or service and what it costs to produce that product (including the opportunity cost of capital). The key to the equation is thinking through what the terms mean.

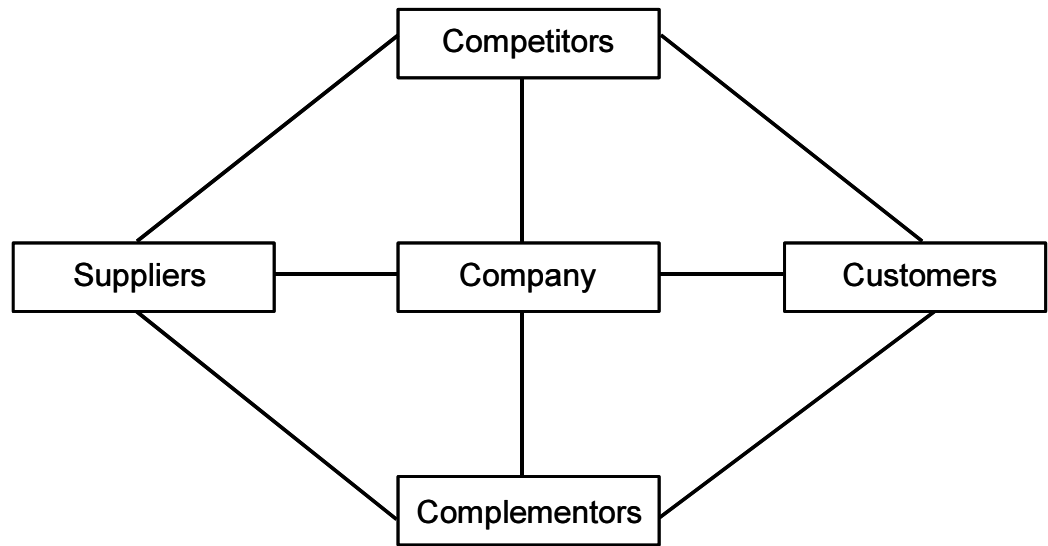
Let's start with willingness to pay. Imagine that someone handed you a brand new tennis racket. Clearly, that would be good for you. Now imagine that the same person started withdrawing money from your bank account, starting with small sums. The amount of money at which you are indifferent to having the racket or having the cash is the definition of willingness to pay.

The flip side describes opportunity cost. A firm takes some resources away from its supplier. Opportunity cost is the cash amount that makes the supplier perceive the new situation (cash) as equivalent to the old situation (resources).

Brandenburger and Stuart then go on to define four simple strategies to create more value: increase the willingness to pay of your customers; reduce the willingness to pay of your competitors; reduce the opportunity cost of your suppliers; and increase the opportunity cost of suppliers to your competitors. This framework also fits well with Porter's generic strategies to achieve competitive advantage—low-cost producer (production advantage) and differentiation (consumer advantage).

Brandenburger teamed up with colleague Barry Nalebuff to create what they call a "value net."²⁸ We present the value net slightly differently than the authors do, but the components and configuration are identical. (See Exhibit 20.) On the left are the firm's suppliers. On the right are the firm's customers. Between the suppliers and customers are the company, its competitors, and its complementors—a term we will define in much more detail below. For now, the point is that companies beyond a firm's suppliers, customers, and competitors can affect the amount of added value that it can capture.

Exhibit 20: Added-Value Analysis—The Value Net



Source: Adapted from Adam M. Brandenburger and Barry J. Nalebuff, *Co-opetition* (New York: Doubleday, 1996), 17.

The value net fits comfortably into Michael Porter's traditional five-forces and value-chain analysis, but adds an important element: Strategy is not only about risk and downside, it's also about opportunity and upside. Industrial organization economics has historically stressed non-cooperative game theory, a reasonable framework in well-established industries near product price equilibrium. In contrast, cooperative game theory recognizes that many industries are more dynamic and offer opportunities to cooperate as well as to compete.

Sources of Added Value

We can define three broad sources for added value: production advantages, consumer advantages, and external (i.e., government) issues. Note that there is substantial overlap between this analysis and the industry analysis, but here we are zooming in on the firm.

Firms with *production advantages* create value by delivering products that have a larger spread between perceived consumer benefit and cost than their competitors, primarily by outperforming them on the cost side. We distill production advantages into two parts: process and scale economies.

Here are some issues to think through to determine whether or not a firm has a process advantage:

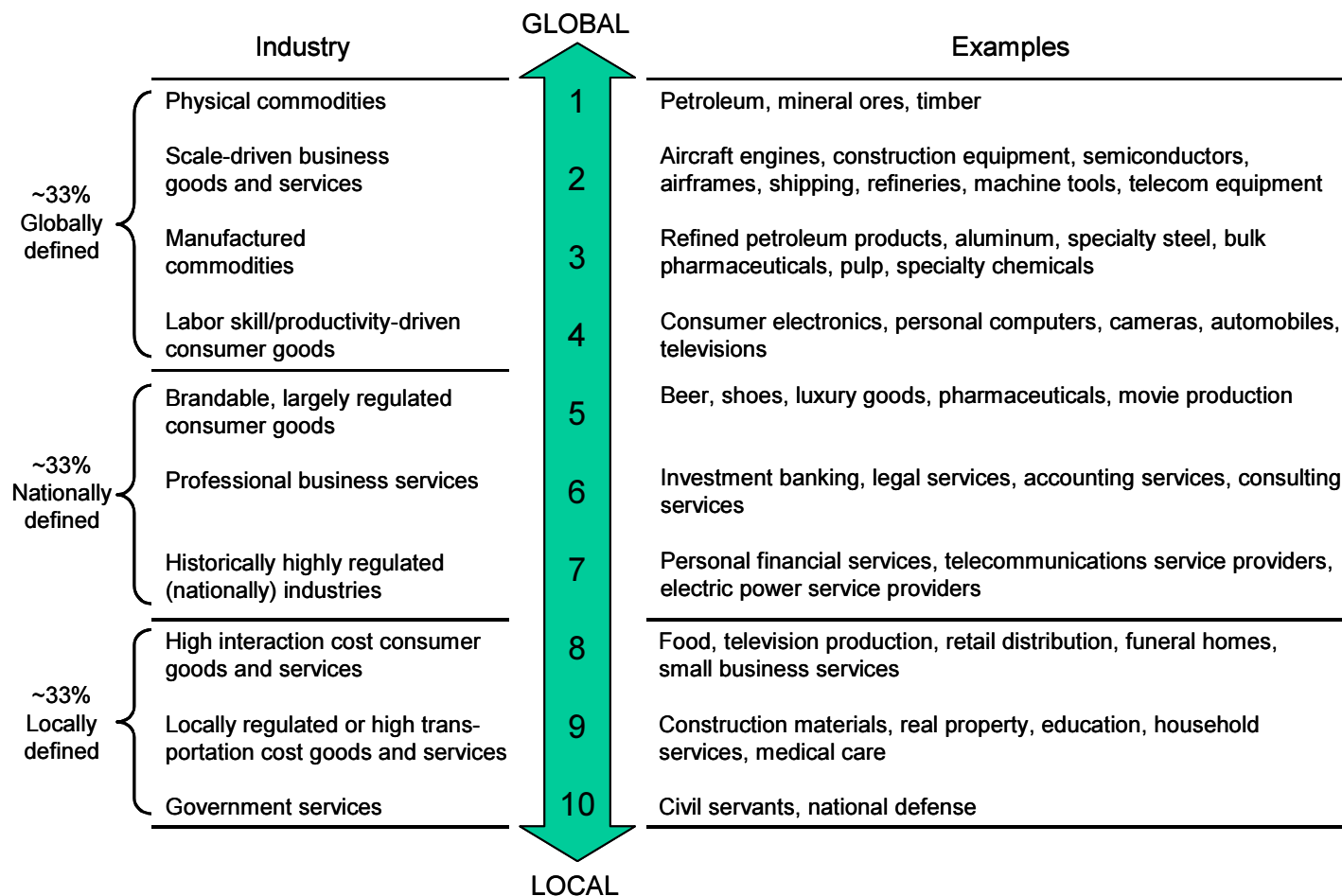
- *Indivisibility.* Economies of scale are particularly important in high-fixed-cost businesses. Fixed costs are associated with indivisibility in the production process. Indivisibility means that a company can't scale down its production costs beyond a minimum level even if output is low. Bakery distribution routes are an example. If a bakery wants to service a region, it must have a bakery, trucks, and drivers. These parts are indivisible, and a firm must bear their cost no matter what bread demand looks like. At the same time, if the trucks go from half to completely full, fixed costs don't change much.

- *Complexity.* Simple processes are easy to imitate and are unlikely to be a source of advantage. More complex processes, in contrast, require more know-how or coordination capabilities and can be a source of advantage. For example, Gillette spent over \$200 million to develop the Sensor shaving system. Most of the spending went to technology breakthroughs, and the company earned 29 patents to protect the process.
- *Rate of change in process cost.* For some industries, the production costs decline over time as a result of technological advances. For example, the process-related cost of building a distribution company today is less than in the past because of technology, but the cost in the future is likely to be lower than today for the same reason. For industries with declining process costs, the incumbent has learning curve advantages while the challenger has the advantage of potentially lower future cost. So the analysis must focus on the trade-off between learning advantages and future cost advantages.
- *Protection.* Look for patents, copyrights, trademarks, and operating rights that protect a firm's process. Research suggests that patent-protected products as a group generated higher economic returns than any single industry.²⁹
- *Resource uniqueness.* The example of Alcoa's bauxite contract is a good illustration of access to a unique resource.

Economies of scale are the second category of potential production advantage. We start by noting that economies of scale are hard to achieve, and the bigger the domain, the harder it is. For example, global economies of scale are significantly more difficult to attain than regional economies of scale.

McKinsey analysis suggests that currently about one-third of all industries are global, one-third are national, and one-third are regional. (See Exhibit 21.) Their analysis also suggests that industries are becoming increasingly global over time. Since global scale economies are hard to achieve the implication is that sustainable value creation is, and will continue to be, hard to achieve as well.

Exhibit 21: Various Industries and Their Stages of Globalization



Source: Lowell Bryan, Jane Fraser, Jeremy Oppenheim and Wilhelm Rall, Race for the World (Boston: Harvard Business School Press, 1999), 45.

Some areas to consider when determining whether or not a company has scale advantages include:

- Distribution.* Does the firm have local, regional, or national distribution scale? We would note that very few firms have national distribution scale. Most businesses have, at best, regional distribution advantages. One good example is retail. Wal-Mart (WMT, \$51.38, Outperform, \$65.00) built its business in the 1970s and 1980s through regional distribution advantages. Most retailers have only regional advantages, and often fail to generate economic profitability outside their core markets.

One useful way to assess distribution strength is to look at the firm's operations and revenues on a map. Firms likely have some advantages where assets and revenue are clustered.

- Purchasing.* Some firms can purchase raw materials at lower prices as the result of scale. For instance, Home Depot (HD, \$27.29, Outperform, \$40.00) was able to tack over 200 basis points on to its gross margins in the late 1990s. The company attributed its margin expansion to a lower cost of merchandising resulting from product line reviews and increased sales of imported products. In

other words, Home Depot used its size to get the best possible price from its suppliers. Increasingly, large firms are lowering their supplier's opportunity cost by providing the supplier with better information about demand.

- *Research and development.* Economies of scope, related to economies of scale, exist when a company lowers its unit costs as it pursues a variety of activities. A significant example is research-and-development spillovers, in which the ideas that arise in one research project transfer to other projects. Companies that increase the diversification of their research portfolios can often find applications for their ideas better than they could when their research portfolios were smaller.³⁰
- *Advertising.* The advertising cost per consumer for a product is a function of the cost per consumer of sending the message and the reach. If the fixed costs in advertising (e.g., ad preparation, negotiating with the broadcaster) are roughly the same for small and large companies, the larger company will have a cost per potential consumer advantage because it can spread its costs over a much larger base.

Even if two companies can advertise on a national scale, the larger one has an advantage. Say both McDonald's (MCD, \$17.40, Neutral, \$21.00) and Wendy's (WEN, \$28.18, Outperform, \$40.00) have equally effective national advertising campaigns. That McDonald's has many more stores than Wendy's lowers McDonald's per store advertising cost, giving it an advantage.

If you suspect a firm has production advantages, carefully think through why its costs are relatively lower than its competitors. Also, practical experience suggests that firms with production advantages often have lower gross margins than companies with consumer advantages.

Consumer advantage is the second broad source of added-value. Firms with consumer advantages also create value by delivering products that have a larger spread between perceived consumer benefit and cost than its competitors, but it does that primarily by outperforming competitors on the benefit side.

Here are some characteristic features of companies with consumer advantages:³¹

- *Habit and high horizontal differentiation.* A product is horizontally differentiated when some consumers prefer it to competing products. This source of advantage is particularly significant if consumers use the product habitually. The product need not be unambiguously *better* than competing products, it just has features that some consumers find attractive, and other consumers may not. Soft drinks are an example. Competing with Coca-Cola is hard because many consumers habitually drink Coke and are fiercely attached to the product.³²
- *Experience goods.* An experience good is a product that consumers can assess only when they've tried it. Search goods, in contrast, are products that a consumer can easily assess at the time of purchase (e.g., hockey pucks or office furniture). With experience goods, a company can enjoy differentiation based on image, reputation, or credibility. Experience goods are often technologically complex.
- *High switching costs (lock-in).* Customers must bear costs when they switch from one information system to another. The magnitude of switching costs

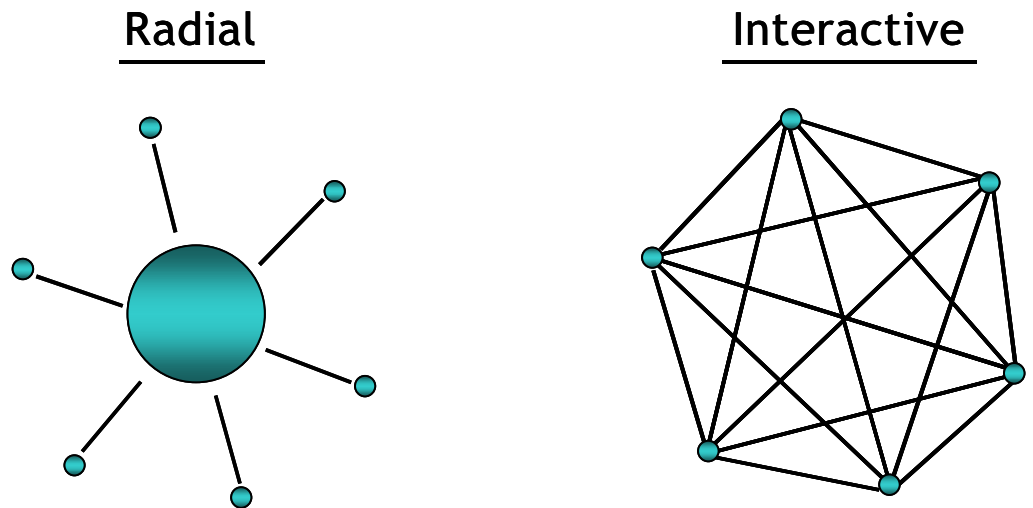
determines the degree to which a customer is locked in. Sometimes switching costs are large and obvious (e.g., \$100 million for a company to replace its network) and sometimes they're small but significant (e.g., \$100 per customer for 1 million customers to switch insurance providers). Exhibit 22 provides a breakdown of various forms of lock-in and their associated switching costs.

Exhibit 22: Types of Lock-In and Associated Switching Costs

Type of Lock-In	Switching Costs
Contractual commitments	Compensatory or liquidated damages
Durable purchases	Replacement of equipment; tends to decline as the durable ages
Brand-specific training	Learning a new system, both direct costs and lost productivity; tends to rise over time
Information and databases	Converting data to new format; tends to rise over time as collection grows
Specialized suppliers	Funding of new supplier; may rise over time if capabilities are hard to find/maintain
Search costs	Combined buyer and seller search costs; includes learning about quality of alternatives
Loyalty programs	Any lost benefits from incumbent supplier, plus possible need to rebuild cumulative use

Source: Carl Shapiro and Hal R. Varian, *Information Rules* (Boston: Harvard Business School Press, 1999), 117.

- *Network effects.* Network effects can be an important source of consumer advantage, especially in information-based businesses. You can think of two types of generic networks (Exhibit 23). The first is a hub-and-spoke network, where the hub feeds the nodes. Examples include most airlines and retailers. In these networks, network effects are muted.

Exhibit 23: Network Effects Are Stronger in Interactive Than in Radial Networks

Source: CSFB.

The second type is an interactive network, where the nodes are connected to one another—either physically (like telephone wires) or virtually (like the same software). Network effects tend to be significant for interactive networks, because as more people use the good or service, it becomes more useful.

A key idea behind interactive networks is positive feedback. If more than one interactive network is competing for customers, the network that pulls ahead will tend to benefit from positive feedback, leading to a winner-take-most outcome. So the dominant network not only gets the most users (contributing to scale benefits), but also switching costs for those customers rise as the network becomes more and more significant. The canonical example of this *de facto* standard setting is Microsoft's PC operating system business.

The pattern of cumulative users of an interactive network follows an S-curve, similar to the diffusion of other innovations. However, the S-curve tends to be steeper for interactive networks.³³ Everett Rogers found that the plot of new adopters to a technology or network—really a derivative of the S-curve—follows a normal distribution. Technology strategist Geoff Moore used this familiar pattern as the basis of technology strategy and investing.³⁴

Judging the source and longevity of a company's added value is central to understanding the likelihood of sustainable value creation. Experience suggests that consumer advantages often show up on the income statement as high gross margins. Exhibit 24 summarizes various functional areas and what strategies to assess when looking for producer or consumer advantages.³⁵

Exhibit 24: Sources of Added-Value and Functional Area Strategies

Functional Areas	Source of Added Value	
	Production Advantage	Consumer Advantage
Product and Marketing Strategies	<ul style="list-style-type: none"> - Standardized products - Narrow price-cost margins with prices lower than competition - Little or modest product promotion or advertising - Modest postsale servicing or maintenance 	<ul style="list-style-type: none"> - Customized products - Wide price-cost margins, with prices higher than competition - Emphasis on building products, image through branding, advertising, and product promotion - Extensive postsale service/ maintenance - Generous warranties
Production Operations Strategies	<ul style="list-style-type: none"> - Large mass-production facilities to exploit economies of scale - Capacity added behind demand to ensure full utilization - Products made to inventory, with tight controls on inventory levels 	<ul style="list-style-type: none"> - Willingness to sacrifice scale in favor of customization and flexible response to unpredictable customer demand - Capacity added in anticipation of demand to ensure product availability and minimize chances of stockouts - Products made to order
Engineering and Design	<ul style="list-style-type: none"> - Products designed for manufacturability 	<ul style="list-style-type: none"> - Products designed to create benefits for customers or lower their costs
Research and Development Strategies	<ul style="list-style-type: none"> - R&D emphasizes process innovations, rather than new products or basic research 	<ul style="list-style-type: none"> - R&D emphasized product innovations and basic research more than process
Human Resources/ Organizations and Control Strategies	<ul style="list-style-type: none"> - "Traditional" managerial style, characterized by formal procedure and rigid hierarchy - Tough bargaining posture with workers - Tight administrative systems emphasizing cost control 	<ul style="list-style-type: none"> - Less formal managerial style, fewer formal procedures, less rigid hierarchy to promote innovation and entrepreneurship

Source: David Besanko, David Dranove, and Mark Shanley, *Economics of Strategy—2nd Ed.* (New York: John Wiley & Sons, 2000), 420.

The final source of added value is external, or government-related. Issues here include subsidies, tariffs, quotas, and both competitive and environmental regulation. Changes in government policies can have a meaningful impact on added value. Consider the impact of deregulation on the airline and trucking industries, emission standards for diesel engines, and steel tariffs.

Firm Interaction—Competition and Cooperation

How a firm interacts with other firms plays an important role in shaping sustainable value creation. Here we not only consider how companies interact with their competitors, but also how companies can co-evolve.

Game theory is one of the best tools to understand interaction. Game theory forces managers to put themselves in the shoes of other players rather than viewing games solely from their own perspective.

The classic two-player example of game theory is the prisoner's dilemma.³⁶ We can recast the prisoner's dilemma in a business context by considering a simple case of capacity addition. Say two competitors, A and B, are considering adding capacity. If competitor A adds capacity and B doesn't, A gets an outsized payoff. Likewise, if B adds capacity and A doesn't, B gets the large payoff. If neither expands, A and B aren't as well-off as if one alone had added capacity. But if both add capacity, they're worse-off of than if they had done nothing. Exhibit 25 shows the payoffs for the various scenarios.

Exhibit 25: Capacity and the Prisoner's Dilemma

		Competitor B	
		Don't Expand	Add Capacity
Competitor A	Don't Expand	A B 35 35 35	A B 40 25 25
	Add Capacity	A B 25 40 40	A B 30 30 30

Source: CSFB.

Pankaj Ghemawat provides a more sophisticated example from a major pharmaceutical company's actual pricing study.³⁷ Here, a challenger is readying to launch a substitute for one of the incumbent's most profitable products. The incumbent's challenge is to determine the pricing strategy that maximizes the value of its established product. Exhibit 26 shows the payoffs given various assumptions. This analysis allowed the incumbent's management to view the situation from the *challenger's* perspective, versus considering only what it hoped the challenger would do.

Exhibit 26: The Payoff Matrix in the Face of a Challenger Product Launch

Incumbent (I's) Price	Challenger (C's) Price			
	Very Low	Low	Moderate	High
No price change	350/190	507/168	585/129	624/116
C has large price advantage	418/163	507/168		
C has small price advantage	454/155	511/138		
I neutralizes C's advantage	428/50	504/124	585/129	669/128

Source: Pankaj Ghemawat, *Strategy and the Business Landscape* (Upper Saddle River, NJ: Prentice-Hall, Inc., 2001), 77.

In our simple capacity and product launch cases, we treated competitor interaction as if it were a onetime event. In reality, companies interact with one another all the time. So we can enhance our perspective by considering *repeated* games.

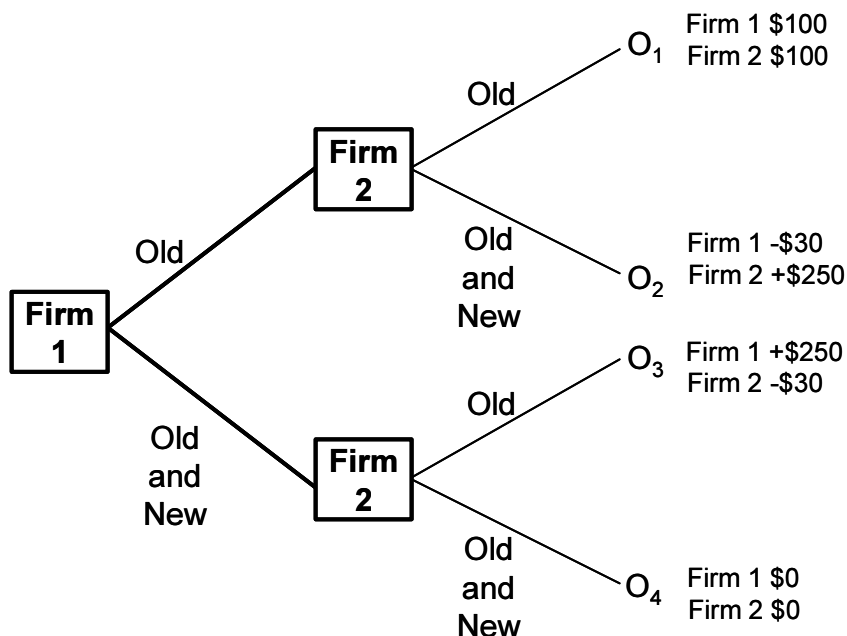
Social scientist Robert Axelrod ran a tournament to see which strategy was most successful in an iterated prisoner's dilemma.³⁸ The winner was tit for tat. Tit for tat starts by cooperating, but then mimics its competitor's last move. So if a competitor cuts price, a company employing tit for tat would cut price as well. If the competitor then raises prices, tit for tat immediately follows. In practice, tit for tat is effective only if companies can judge clearly the intentions of their competitors.

We have found game theory particularly useful in considering pricing strategies and capacity additions.³⁹ A thorough review of a firm's pricing actions and capacity shifts, as well as for the industry, can provide important perspective on rivalry and rationality. The institutional memory, especially for cyclical businesses, appears too short to recognize circumstances in which aiming for cooperation is the most profitable strategy.

The way to go beyond the payoff matrix that considers only onetime interaction is to build a tree based on *sequential* actions. The approach here is similar to strategy in chess: look ahead and reason back.⁴⁰

Exhibit 27 is an example of a game tree developed by Sharon Oster. Firm 1 is considering whether to continue only with its first product or to add a second product. In either case, Firm 2 can respond with its own product move. The payoffs at the end of the tree show the economic consequences of the various scenarios. In reality, such analysis can be tricky because the range of alternatives is large. But these game trees can provide important perspective on competitive interaction, and hence the prospects for sustainable value creation.

Exhibit 27: Mapping Sequential Moves



Source: Sharon M. Oster, *Modern Competitive Analysis* (Oxford: Oxford University Press, 1999), 252.

Our discussion so far has focused on competition. But thoughtful strategic analysis also recognizes the role of co-evolution, or cooperation, in business. Not all business relationships are conflictual. Sometimes companies *outside* the purview of a firm’s competitive set can heavily influence its value creation prospects.

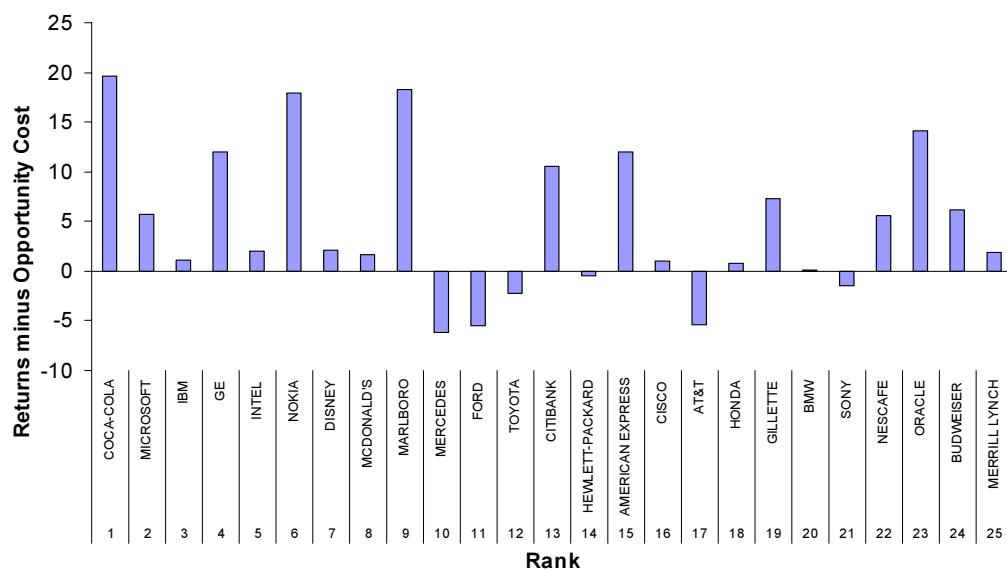
Consider the example of DVD makers (software) and DVD player makers (hardware). These companies do not compete with one another. But the more DVD titles that are available, the more attractive it will be for a consumer to buy a DVD player and vice versa. Another example is the Wintel standard—added features on Microsoft’s operating system required more powerful Intel microprocessors, and more powerful microprocessors could support updated operating systems. Complementors make the added value pie bigger. Competitors fight over a fixed pie.

What about Brands?

When queried about sustainable competitive advantage, many executives and investors cite the importance of brands. How significant are brands?

We can start with an empirical observation: Of the companies that own the top fifteen most valuable brands, as measured by brand consultant Interbrand, four do not earn their cost of capital.⁴¹ (See Exhibit 28.) So a brand is clearly not sufficient to ensure that a company earns economic profits, much less sustainable economic profits.

Exhibit 28: Brand Popularity Does Not Translate into Value Creation



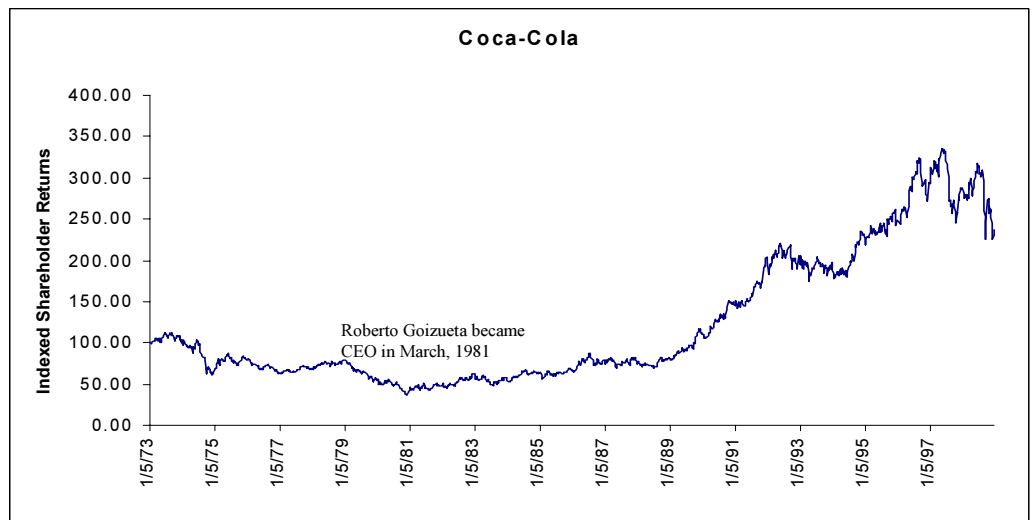
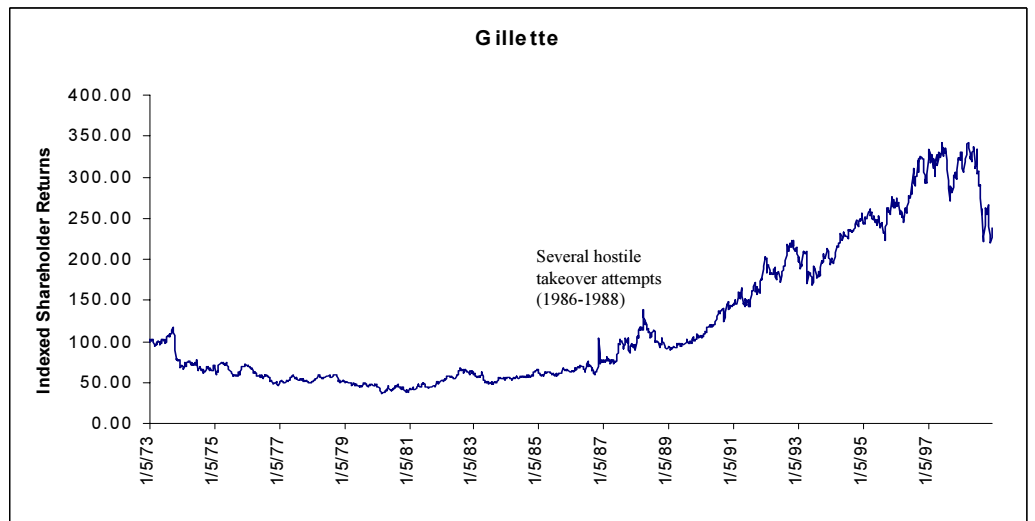
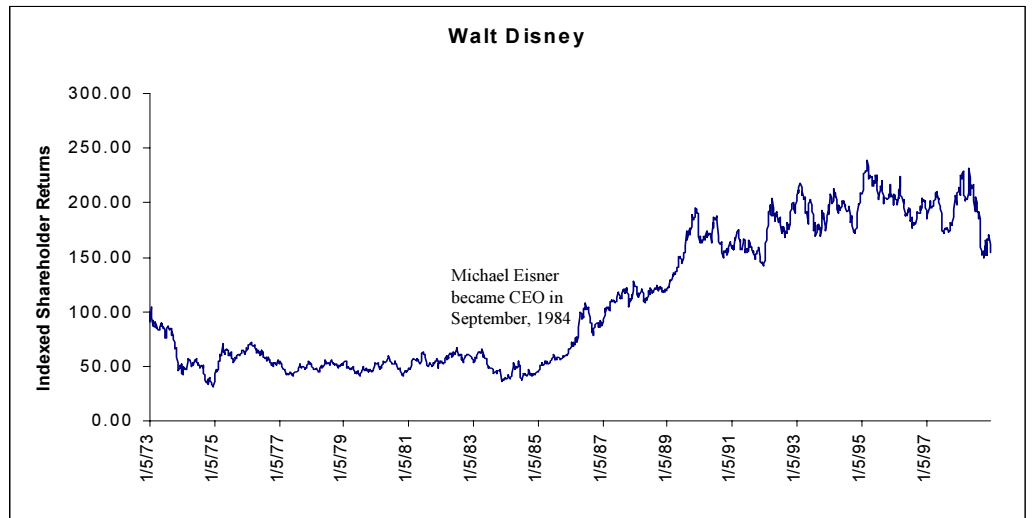
Source: Interbrand, CSFB HOLT.

We believe the best way to approach brands is to think through the added-value lens. Does the brand increase willingness to pay? The answer is affirmative if the brand confers horizontal differentiation. So your willingness to pay might be higher for a brand if you're in the habit of using that product (Coke versus Pepsi, or Pepsi versus Coke), have an emotional connection to it, trust the product, or believe the product brings you social status.

Less likely, brands may reduce supplier opportunity cost. A fledgling supplier often tries to land a prestigious company, even at a discounted price, as part of its effort to establish credibility. To the degree that brand plays a role in the perception of prestige or credibility, it can reduce supplier opportunity cost, and hence increase added value for the branded company.

Exhibit 29 shows that brand itself is not a source of competitive advantage. The exhibit examines the total shareholder returns versus the S&P 500 for the stewards of three top brands, Disney (DIS, \$16.87, Outperform, \$24.00), Gillette (G, \$29.92, Not Rated), and Coca-Cola. Each panel shows a similar pattern: a period of significant share price underperformance followed by a change in strategy and a period of sustained outperformance. In every case, the brand was well known before and after the company performed well. The brand is not the key to competitive advantage; the key is how the company uses the brand to generate added value.

Exhibit 29: Brand Alone Does Not Create Value



Source: Datastream.

What about Management Skill?

Without a doubt, management skill is essential to understanding sustainable value creation. Management skill entails both fashioning the strategy—the subject of this analysis—and execution of the strategy. While execution is critical, a detailed treatment of the subject lies beyond the scope of this report.

One classic example of the importance of execution is Home Depot. In an effort to secure financing in its early days, Home Depot provided an executive from a foreign-based firm with access to the company's early plans, including store blueprints and expansion intentions. After the parent company decided against an investment in Home Depot, the executive turned around and started a copycat business in states where Home Depot hadn't yet expanded. The business floundered even with all of Home Depot's numbers and business plans. Home Depot eventually acquired the failing competitor.⁴²

The core of execution is in three processes—the people process, the strategy process, and the operations process. Executives must choose and promote people in light of the strategic and operational realities. Strategy must take into account the company's ability to execute it. And managers need to link operations to strategic goals and human capacity.⁴³

Large companies have a particular challenge because of the significant complexity of managing a large employee base. Companies must find organizational structures that allow them sufficient flexibility in a fast-changing world.

Another important related topic is management incentives. Sustainable value creation requires a constant balancing act between delivering current results and allocating the appropriate resources to assure a vibrant and value-creating business in the future. Incentives can play a central role in shaping this tenuous balance.

Bringing It All Back Together

Stock prices reflect expectations for future financial performance. Accordingly, an investor's task is to anticipate revisions in those expectations. A firm grasp on the prospects for value creation is a critical facet of this analysis. But value creation itself is no assurance of superior stock price performance if the market fully anticipates that value creation.

The expectations investing process has three parts:⁴⁴

1. *Estimate price-implied expectations.* We first read the expectations embedded in a stock with a long-term discounted cash flow model. We use a DCF model because it mirrors the way the market prices stocks.
2. *Identify expectations opportunities.* Once we understand expectations, we apply the appropriate strategic and financial tools to determine where and when revisions are likely to occur. A proper expectations analysis reveals whether a stock price is most sensitive to revisions in a company's sales, operating costs, or investment need, so that investors can focus on the revisions that matter most. The strategic analysis in this report is the heart of security analysis, and provides the surest means to anticipate expectations revisions.
3. *Buy, sell, or hold.* Using expected-value analysis, we are now in a position to make informed buy, sell, or hold decisions.

A thorough analysis of a company's prospects for sustainable value creation is essential. This analysis can then intelligently inform a financial model, to determine whether or not a particular stock offers prospects for superior returns.

Appendix A: Value-Creation Checklist

What stage of the competitive life cycle is the company in?
 Is the company currently earning a return above its cost of capital?
 What is the trend in return on capital—are returns increasing, decreasing, or stable?
 What is the trend in the company's investment spending?

Lay of the Land

What percentage of the industry does each player represent?
 What is each player's level of profitability?
 What have the historical trends in market share been?
 How stable is the industry?
 How stable is market share?
 What have pricing trends looked like?
 What class does the industry fall into—fragmented, emerging, mature, declining, international, network, or hypercompetitive?

Five Forces

How much leverage do suppliers have?
 Can companies pass supplier increases to customers?
 Are there substitute products available?
 Are there switching costs?
 How much leverage do buyers have?
 How informed are the buyers?

Barriers to Entry

What are the entry and exit rates like in the industry?
 What are the anticipated reactions of incumbents to new entrants?
 What is the reputation of incumbents?
 What is the level of asset specificity?
 What is the minimum efficient production scale?
 Is there excess capacity in the industry?
 Is there a way to differentiate the product?
 What is the anticipated payoff for a new entrant?
 Do incumbents have precommitment contracts?
 Do incumbents have licenses or patents?
 Are there learning curve benefits in the industry?

Rivalry

Is there pricing coordination?
 What is the industry concentration?
 What is the size distribution of firms?
 How similar are the firms (incentives, corporate philosophy, ownership structure)?
 Is there demand variability?
 Are there high fixed costs?
 Is the industry growing?

Disruption/Disintegration

Is the industry vulnerable to disruptive technology?
 Do new technologies foster product improvements?
 Is the technology progressing faster than the market's needs?
 Have established players passed the performance threshold?
 Is the industry organized vertically, or has there been a shift to horizontal markets?

Firm Specific

Does the firm have production advantages?

Is there instability in the business structure?

Is there complexity requiring know-how or coordination capabilities?

How quickly are the process costs changing?

Does the firm have any patents, copyrights, trademarks, etc.?

Are there economies of scale?

What does the firm's distribution scale look like?

Are assets and revenue clustered geographically?

Are there purchasing advantages with size?

Are there economies of scope?

Are there diverse research profiles?

Are there consumer advantages?

Is there habit or horizontal differentiation?

Do people prefer the product to competing products?

Are there lots of product attributes that customers weigh?

Can customers only assess the product through trial?

Is there customer lock-in? Are there high switching costs?

Is the network radial or interactive?

What is the source and longevity of added value?

Are there external sources of added value (subsidiaries, tariffs, quotas, and competitive or environmental regulations)?

Firm Interaction—Competition and Coordination

Are there complementors to the industry?

Is the added value growing because of other companies? Or, do new companies take share from a fixed-value pie?

Brands

Does the brand increase willingness to pay?

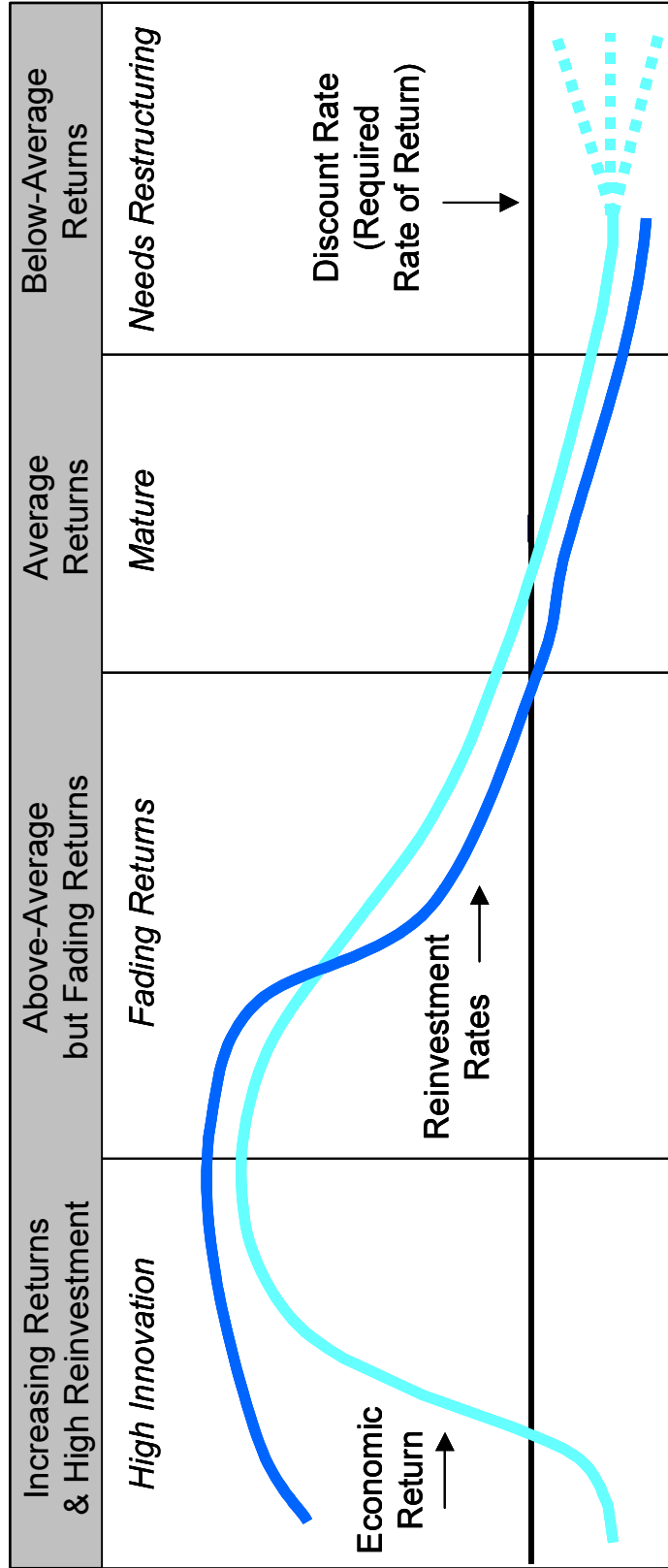
Do customers have an emotional connection to the brand?

Do customers trust the product because of the name?

Does the brand imply social status?

Can you reduce supplier operating cost with your name?

Appendix B: Competitive Life Cycle and CFROI



Low CFROI	CFROI 7-10%	CFROI > 10%	CFROI 7-10%	Average CFROI	Low CFROI
High Reinvestment Biotech Communication Equipment Internet Software Telecom Services	Flat or Rising Banks Beverages Food Products Health Care Equipment Household Products Media Personal Products Real Estate	CFROI > 10% Building Products Commercial Services Construction & Engineering Diversified Financials Health Care Providers Household Durables Tobacco	Fading Aerospace & Defense Air Freight & Couriers Containers & Packaging Distributor Electrical Equipment Food & Drug Retailing Hotels Restaurant & Leisure IT Consulting & Services Machinery Pharmaceuticals Specialty Retail Trading Companies	Average CFROI Auto Components Automobiles Chemicals Computers & Peripherals Construction Materials Electronic Equipment & Instruments Energy Equipment & Services Industrial Conglomerates Insurance Leisure Equipment & Products Metals & Mining Multi-line Retail Office Electronic Oil & Gas Paper & Forest Products Semi Equipment & Products Textiles & Apparel	Low CFROI Airlines Marine Road & Rail Utilities

CFROI equals Cash Flow Return on Investment. Classifications as of 12/6/02.

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Source: CSFB HOLT estimates.

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- ⁶ See http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/implpr.html.
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- ¹⁴ Timothy Dunne, Mark J. Roberts, and Larry Samuelson, "Patterns of firm entry and exit in U.S. manufacturing industries," *RAND Journal of Economics*, Vol. 19, 4, Winter 1988, 495-515.
- ¹⁵ Here we follow (nearly verbatim) the fabulous presentation format of Besanko, Dranove, and Shanley, 327-328.
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- ¹⁷ We saw a similar example with CSX and Norfolk Southern's competition to deliver coal to Gainesville, Florida. See Adam M. Brandenburger and Barry J. Nalebuff, *Co-opetition* (New York: Doubleday, 1996), 76-80.

- ¹⁸ Besanko, Dranove, and Shanley, 151.
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- ³¹ *Ibid.*, 415-420.
- ³² Bruce C. N. Greenwald, Judd Kahn, Paul D. Sonkin and Michael van Biema, *Value Investing: From Graham to Buffett and Beyond* (New York: John Wiley & Sons, 2001), 77-78.
- ³³ Everett M. Rogers, *The Diffusion of Innovation* (New York: Free Press, 1995).
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- ³⁶ For an excellent resource, see <http://plato.Stanford.edu/entries/prisoner-dilemma/#oth>.
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Companies Mentioned (Price as of 12 Dec 02)

Dell Computer Corporation (DELL, \$27.43, OUTPERFORM, TP \$32)
 Coca-Cola Company (KO, \$45.87, OUTPERFORM, TP \$57)
 PepsiCo, Inc. (PEP, \$43.18, NEUTRAL, TP \$43)
 Alcoa Inc. (AA, \$23.25, OUTPERFORM, TP \$29.4)
 eBay Inc. (EBAY, \$68.73, OUTPERFORM, TP \$80)
 Apple Computer Inc. (AAPL, \$15.19, NEUTRAL, TP \$18)
 Wal-Mart Stores, Inc. (WMT, \$51.38, OUTPERFORM, TP \$65)
 Home Depot, Inc. (HD, \$27.29, OUTPERFORM, TP \$40)
 McDonald's Corp (MCD, \$17.4, NEUTRAL, TP \$21)
 Wendys International, Inc. (WEN, \$28.18, OUTPERFORM, TP \$40)
 Walt Disney Company (DIS, \$16.87, OUTPERFORM, TP \$24)
 Gillette Co. (G, \$29.92)

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