

Measuring the Moat

Assessing the Magnitude and Sustainability of Value Creation

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Authors

Michael J. Mauboussin

michael.mauboussin@credit-suisse.com

Dan Callahan, CFA

daniel.callahan@credit-suisse.com

Darius Majd

darius.majd@credit-suisse.com



“The most important thing to me is figuring out how big a moat there is around the business. What I love, of course, is a big castle and a big moat with piranhas and crocodiles.”

Warren E. Buffett

Linda Grant, “Striking Out at Wall Street,” *U.S. News & World Report*, June 12, 1994

- Sustainable value creation is of prime interest to investors who seek to anticipate expectations revisions.
- This report develops a systematic framework to determine the size of a company’s moat.
- We cover industry analysis, firm-specific analysis, and firm interaction.

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Executive Summary

- Sustainable value creation has two dimensions: the magnitude of the spread between a company's return on invested capital and the cost of capital and how long it can maintain a positive spread. Both dimensions are of prime interest to investors and corporate executives.
- Sustainable value creation as the result solely of managerial skill is rare. Competitive forces and endogenous variance 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 and that he wants the moat to be deep and wide to fend off all competition. Economic moats are almost never stable. Because of competition, they are getting a little bit wider or narrower every day. This report develops a systematic framework to determine the size of a company's moat.
- Companies and investors use competitive strategy analysis for two very different purposes. Companies try to generate returns in excess of the cost of capital, while investors try to anticipate revisions in expectations for financial performance. If a company's share price already captures its prospects for sustainable value creation, investors should expect to earn a market rate of return, adjusted for risk.
- Industry effects are the most important in the sustainability of high performance and a close second in the emergence of high performance. However, industry effects are much smaller than firm-specific factors for low performers. For companies that are below average, strategies and resources explain 90 percent or more of their returns.
- The industry is the correct place to start an analysis of sustainable value creation. We recommend understanding the lay of the land, which includes getting a grasp of the participants and how they interact, an analysis of profit pools, and an assessment of industry stability. We follow this with an analysis of the five forces and a discussion of the disruptive innovation framework.
- 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 advantages.
- How firms interact plays a vital role in shaping sustainable value creation. We consider interaction through game theory, co-opetition, and co-evolution.
- Brands do not confer competitive advantage in and of themselves. Customers hire them to do a specific job. Brands that do those jobs reliably and cost effectively thrive. Brands only add value if they increase customer willingness to pay or if they reduce the cost to provide the good or service.
- Regression toward the mean is a powerful force. Empirical results show which industries regress at the fastest rate, providing a useful quantitative complement to the qualitative assessment here.
- Appendix A provides a complete checklist of questions to guide the strategic analysis.

Introduction

Corporate managers seek to allocate resources so as to generate attractive long-term returns on investment. Investors search for stocks of companies that are mispriced relative to expectations for financial results embedded in the shares. In both cases, sustainable value creation is of prime interest.

What exactly is sustainable value creation? We can think of it in two dimensions. First is the magnitude of returns in excess of the cost of capital that a company does, or will, generate. Magnitude considers not only the return on investment but also how much a company can invest at a rate above the cost of capital. 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 the longevity dimension, researchers and investors give it insufficient attention.

How is sustainable value creation distinct from the more popular notion of 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 an economic return that is higher than the average of its competitors.²

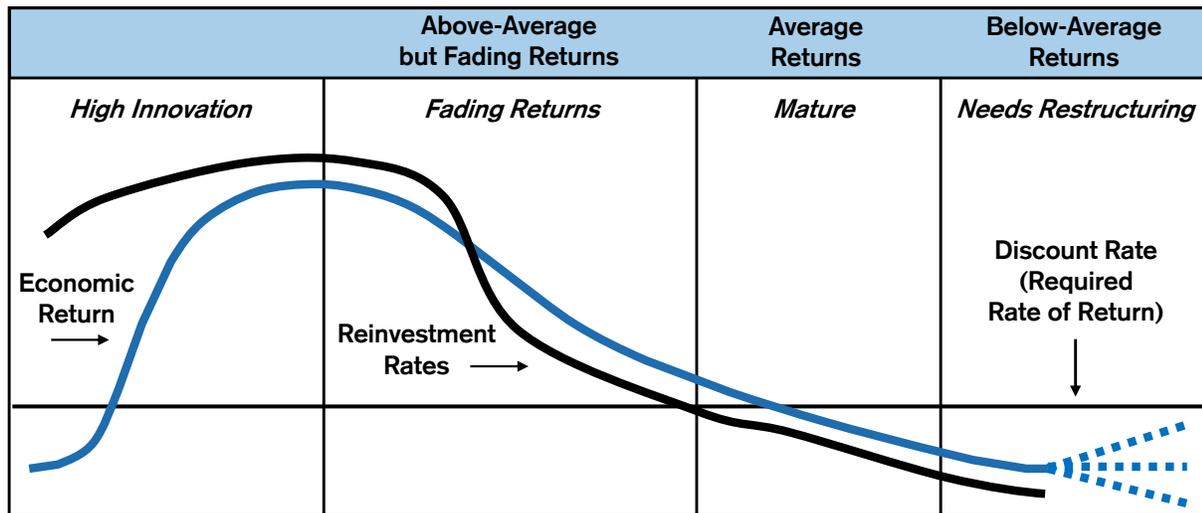
As our focus is on sustainable value creation, we want to understand a company's economic performance relative to the cost of capital, not relative to its competitors. Naturally, these concepts are closely linked. Sustainable value creation is rare, and sustainable competitive advantage is even rarer.

Competitive Life Cycle

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:

- **Innovation.** Young companies typically realize a rapid rise in return on investment and significant investment opportunities. Substantial entry into and exit out of the industry are common at this point in the life cycle.
- **Fading returns.** High returns attract competition, generally causing economic returns to move toward the cost of capital. In this phase, companies still earn excess returns, but the return trajectory is down. Investment needs also moderate, and the rate of entry and exit slows.
- **Mature.** In this phase, the market in which the companies compete approaches competitive equilibrium. As a result, companies earn a return on investment similar to the industry average, and competition within the industry ensures that aggregate returns are no higher. Investment needs continue to moderate.
- **Subpar.** Competitive forces and technological change can drive returns below the cost of capital, requiring companies to restructure. These companies can improve returns by shedding assets, shifting their business model, reducing investment levels, or putting themselves up for sale. Alternatively, these firms can file for bankruptcy to reorganize the business or liquidate the firm's assets.

Exhibit 1: A Firm's Competitive Life Cycle



Source: Credit Suisse HOLT®.

Regression toward the mean says that an outcome that is far from average will be followed by an outcome that has an expected value closer to the average. There are two explanations for regression toward the mean in corporate performance. The first is purely statistical. If the correlation between cash flow return on investment (CFROI®) in two consecutive years is not perfect, there is regression toward the mean.

Think of it this way: there are aspects of running the business within management's control, including selecting the product markets it chooses to compete in, pricing, investment spending, and overall execution. Call that skill. There are also aspects of the business that are beyond management's control, such as macroeconomic developments, customer reactions, and technological change. Call that luck. Whenever luck contributes to outcomes, there is regression toward the mean. If year-to-year CFROIs are highly correlated, regression toward the mean happens slowly. If CFROIs are volatile, causing the correlation to be low, regression toward the mean is rapid.

The second explanation for regression toward the mean is that competition drives a company's return on investment toward the opportunity cost of capital. This is based on microeconomic theory and is intuitive. The idea is that companies that generate a high economic return will attract competitors willing to take a lesser, albeit still attractive, return. Ultimately, this process drives industry returns toward the opportunity cost of capital. Researchers have documented the accuracy of this prediction.³ Companies must find a way to defy these powerful competitive forces in order to achieve sustainable value creation.

Recent research on the rate of regression reveals some important observations. First, the time that an average company can sustain excess returns is shrinking. This phenomenon is not relegated to high technology but is evident across a wide range of industries.⁴ This reduction in the period of sustained value creation reflects the greater pace of innovation brought about in part by increased access to, and utilization of, information technology.

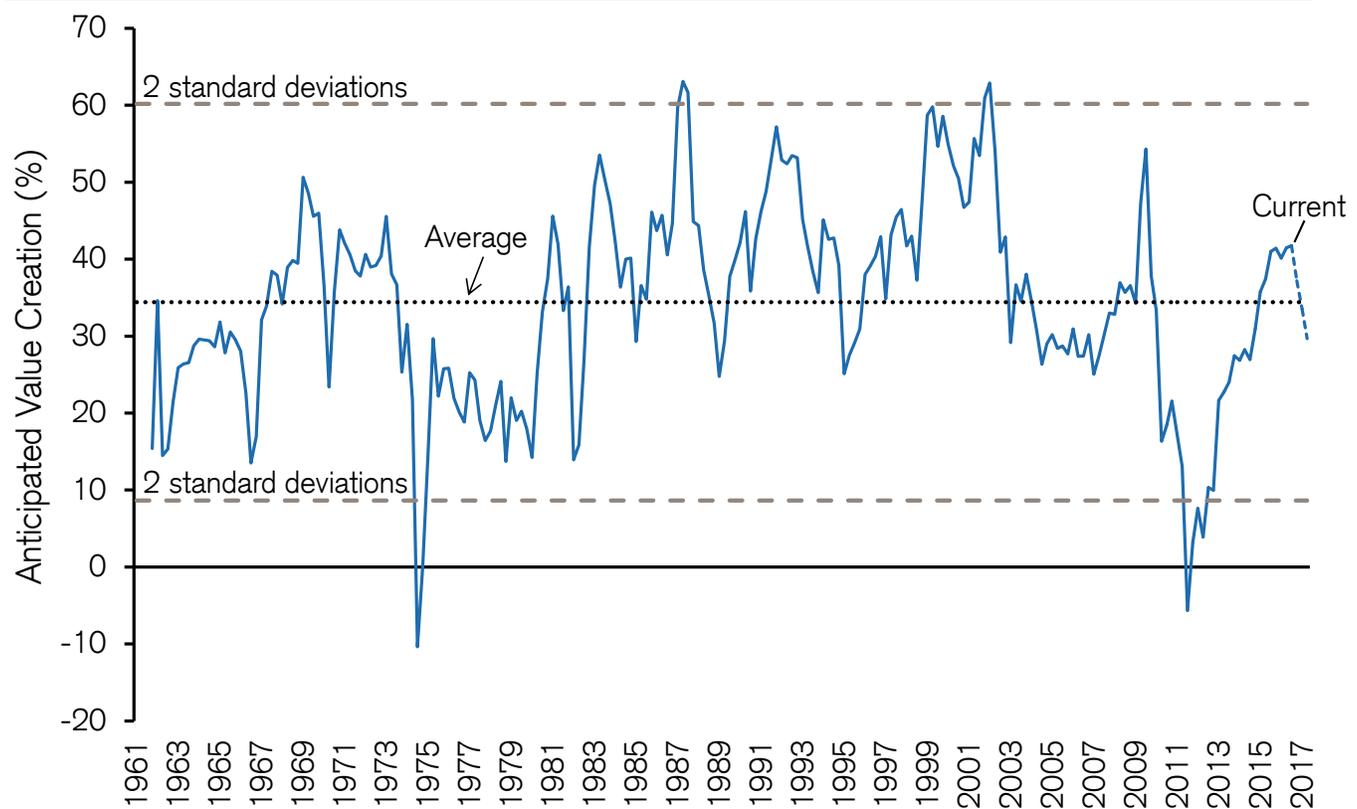
* CFROI® is a registered trademark in the United States and other countries (excluding the United Kingdom) of Credit Suisse Group AG or its affiliates.

Second, the absolute level of returns and the level of investment are positively related to the rate of fade.⁵ A company that generates a high return on investment while investing heavily signals an attractive opportunity to both existing 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 looks at the S&P 500 since 1961 and provides a proxy for how much value creation investors have been willing to pay for. We establish a steady-state value by 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 then attribute any value above the steady-state to expected value creation.

The exhibit shows that 40 percent of the value of the S&P 500 today reflects anticipated value creation, above the average of the last 55 years. Following a sharp drop in 2011 to a level near a 50-year low, the expectations for value creation have risen to a level modestly above the long-term average.

Exhibit 2: Rolling Four Quarter Anticipated Value Creation, 1961-2017E



Source: Standard & Poor's, Aswath Damodaran, Credit Suisse.
 Note: As of November 1, 2016.

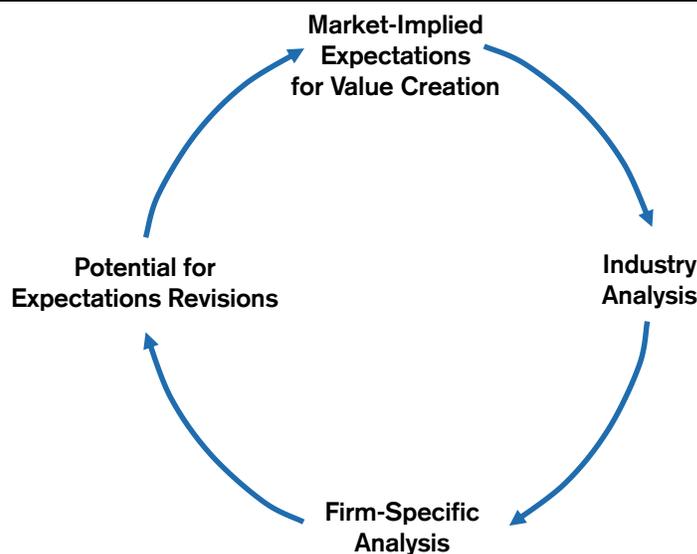
More significant, sustained value creation is an important source of expectations revisions. There is a crucial distinction between product markets and capital markets. Companies try to understand the industry and competitive landscape in their product markets so as to allocate resources in a way that maximizes long-term economic profit. Investors seek to understand whether today's price properly reflects the future and whether expectations are likely to be revised up or down.

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. Investors

should anticipate earning a market return, adjusted for risk, if a company's share price already captures its prospects for sustainable value creation. But companies that can create value longer than the market expects generate excess returns with volatility that is lower than expected.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 revisions in expectations. 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: Credit Suisse.

Economic Moats

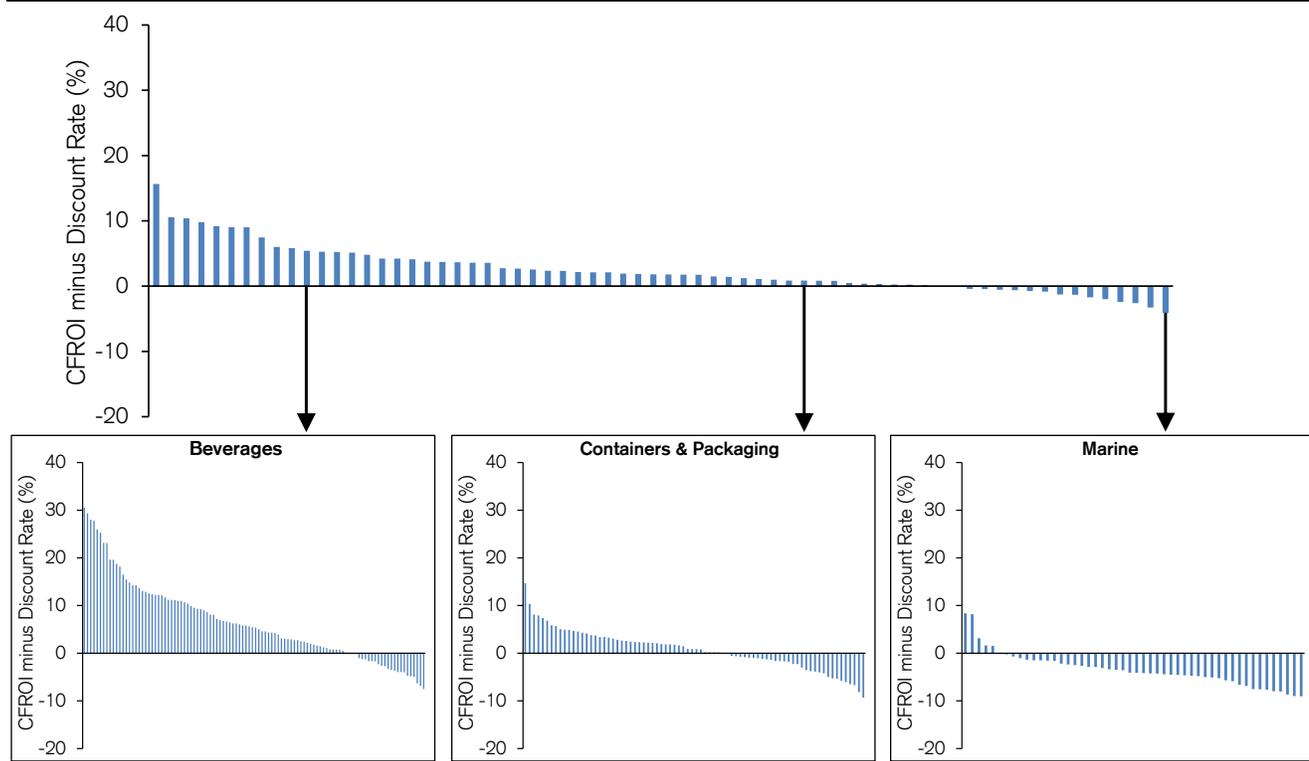
Warren Buffett, the chairman of Berkshire Hathaway, has emphasized over the years that he looks for businesses with sustainable competitive advantages. He suggests that buying a business is akin to buying a castle surrounded by a moat. Buffett wants the economic moat to be deep and wide to fend off all competition. He goes a step further by noting that economic moats are almost never stable. Moats either get a little bit wider or a little bit narrower every day.⁸ This report develops a systematic framework to determine the size of a company's moat.

What Dictates a Company's Destiny?

Peter Lynch, who skillfully ran Fidelity's Magellan mutual fund for more than a decade, quipped that investors are well advised to buy a business that's so good that an idiot can run it, because sooner or later an idiot *will* run it.⁹ Lynch's comment introduces an important question: What dictates a firm's economic returns? We are not asking what determines a company's share price performance, which is a function of expectations revisions, but rather its economic profitability.¹⁰

Before we answer the question, we can make some empirical observations. The top panel of Exhibit 4 shows the spread between CFROI and the cost of capital for 68 global industries, as defined by MSCI's Global Industry Classification Standard (GICS), using median returns over the past five fiscal years. The sample includes more than 10,000 public 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: Credit Suisse HOLT.

Note: Data through latest fiscal year as of 10/25/16.

The bottom panel of Exhibit 4 shows the spread between CFROI and the cost of capital for the companies in three industries: one that creates value, one that is value neutral, and one that destroys value. The central observation is that even the best industries include companies that destroy value and the worst industries have companies that create value. That some companies buck the economics of their industry provides insight into the potential sources of economic performance. Industry is not destiny.

Finding a company in an industry with high returns or avoiding a company in an industry with low returns is not enough. Finding a good business capable of sustaining high performance requires a thorough understanding of the conditions for the industry and the firm.

A final word before we proceed. Our unit of analysis will be the firm. In most cases, the proper unit of analysis is the strategic business unit. This is especially true for multidivisional companies that compete in disparate industries. The following framework is applicable on a divisional level. So we recommend conducting the analysis for each strategic business unit of a multidivisional company and aggregating the results.

Industry Analysis

We have established that industry effects and firm effects are relevant in understanding corporate performance. The question is in what proportion.¹¹

Anita McGahan and Michael Porter, two prominent scholars of business strategy, analyzed roughly 58,000 firm-year observations for U.S. businesses from 1981-1994.¹² They assessed the impact of four factors on the sustainability and emergence of abnormal profitability:

- **Year.** The year effect captures the economic cycle. You can think of it as the macroeconomic factors that influence all businesses in the economy.
- **Industry.** Industry effects refer to how being part of a particular industry affects firm performance. A firm may benefit from industry effects if the industry has an attractive structure, including high barriers to entry.
- **Corporate-parent.** A corporate-parent effect arises when a business within a diversified firm on average underperforms or outperforms its industry. For example, the corporate-parent effect was positive for Taco Bell, which saw its profitability improve in the 1980s following its acquisition by PepsiCo.
- **Segment-specific.** This effect captures the characteristics unique to a firm that drive its performance relative to rivals within the same industry. Such characteristics may include a firm’s resources, positioning, or how effectively its managers execute strategy.

Exhibit 5 summarizes McGahan and Porter’s results. They define sustainability of profits as “the tendency of abnormally high or low profits to continue in subsequent periods.” Emergence looks backward from the current year and measures the contributions to abnormal profits through time. High performers are those companies that generate profits in excess of the median of their industry, and low performers are those below the median.

Exhibit 5: Importance of Various Factors on Abnormal Profitability

	Sustainability		Emergence	
	High Performers	Low Performers	High Performers	Low Performers
Year	3%	-7%	2%	-5%
Industry	44%	12%	37%	13%
Corporate-Parent	19%	-4%	18%	2%
Segment-Specific	34%	99%	43%	90%

Source: Anita M. McGahan and Michael E. Porter, “The emergence and sustainability of abnormal profits,” *Strategic Organization*, Vol. 1, No. 1, February 2003, 79-108.

McGahan and Porter found that industry effects are most important in the sustainability of high performance and a close second in the emergence of high performance behind segment-specific effects. However, industry effects are much smaller than segment-specific effects for low performers. The strategies and resources of below-average companies explain 90 percent or more of their returns in the case of either sustainability or emergence. Business managers and analysts searching for emerging or sustained competitive advantages might also note that the economic cycle is not important to the sustainability or emergence of performance.

We break the industry analysis into three parts:

1. **Get the lay of the land.** This includes creating an industry map to understand the competitive landscape, constructing profit pools to see how the distribution of economic profits has changed over time, measuring industry stability, and classifying the industry so as to improve alertness to the main issues and opportunities.
2. **Assess industry attractiveness through an analysis of the five forces.** Of the five forces, we spend the bulk of our time assessing barriers to entry and rivalry.
3. **Consider the likelihood of being disrupted by innovation.** We consider the role of disruptive innovation and why industries transition from vertical to horizontal integration.

The Lay of the Land

Industry Map

Creating an industry map is a useful way to start competitive analysis.¹³ A map should include all the companies and constituents 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 for the individual companies within the industry.

From an industry point of view, 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 a good or service), and external (other factors that come into play, such as government action). Exhibit 6 shows an illustration for the U.S. airline industry. Clients can create industry maps for specific companies using Credit Suisse's PEERs tool, which analyzes a company's supply chain. Peers can be accessed within RAVE, Credit Suisse's research database, which also provides access to the forecasts of Credit Suisse analysts and a variety of other tools.

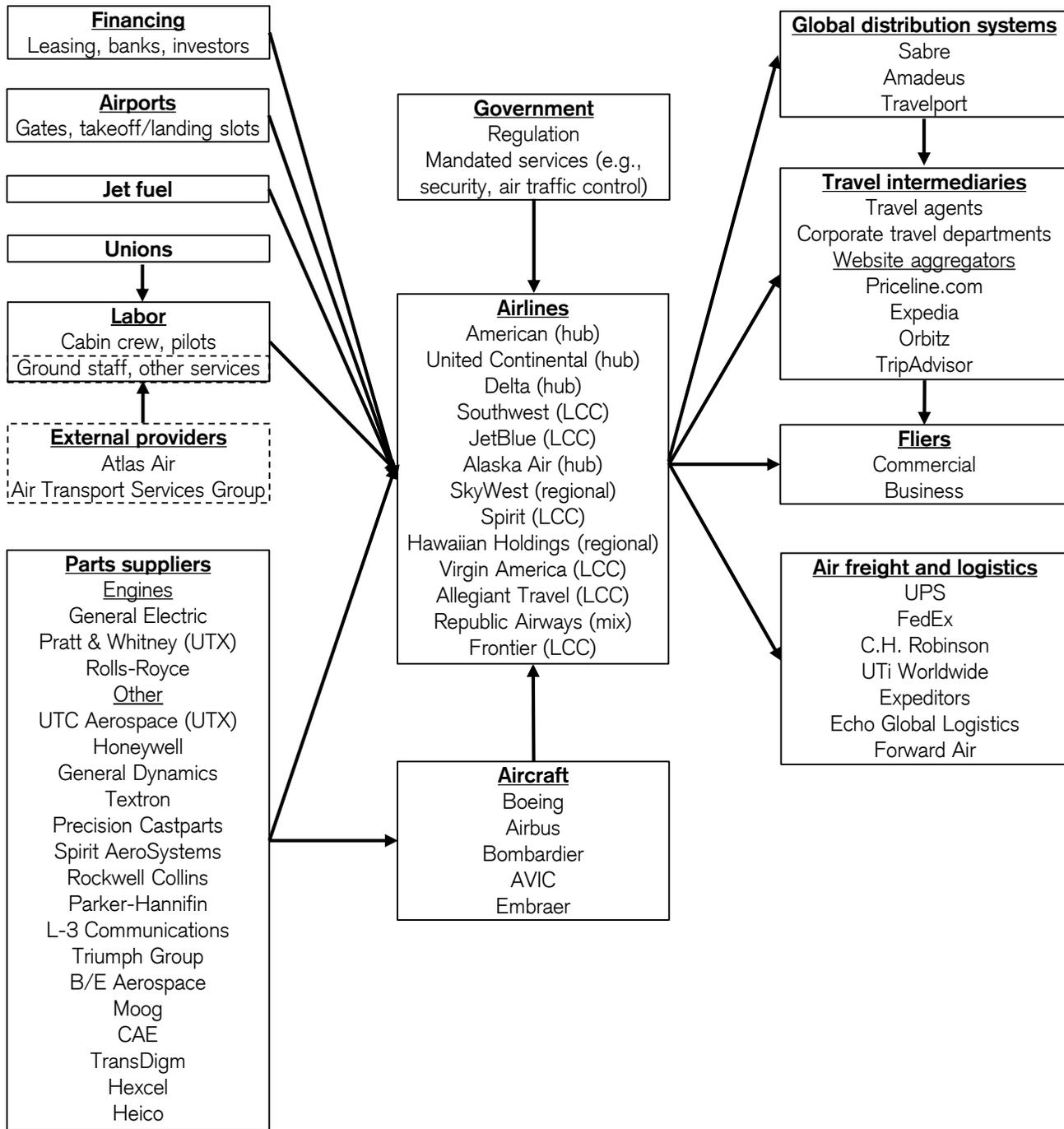
Here are some points to bear in mind as you develop an industry map:

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

A study by Lauren Cohen and Andrea Frazzini, professors of finance, suggests that investors may benefit from paying close attention to industry maps. The researchers examined how shocks to one firm rippled through to other firms via supply or demand links. They tested whether the market adequately incorporated the information that one firm released into the stock prices of its partner firms. They found that investors fail to adequately incorporate such information, creating a profitable trading strategy.

Cohen and Frazzini state that "the monthly strategy of buying firms whose customers had the most positive returns in the previous month, and selling short firms whose customers had the most negative returns, yields abnormal returns of 1.55% per month, or an annualized return of 18.6% per year." There is also evidence that analysts who cover both suppliers and customers provide more accurate earnings forecasts.¹⁴

Exhibit 6: U.S. Airline Industry Map



Source: Credit Suisse.
 Note: LCC = low-cost carrier.

Profit Pool

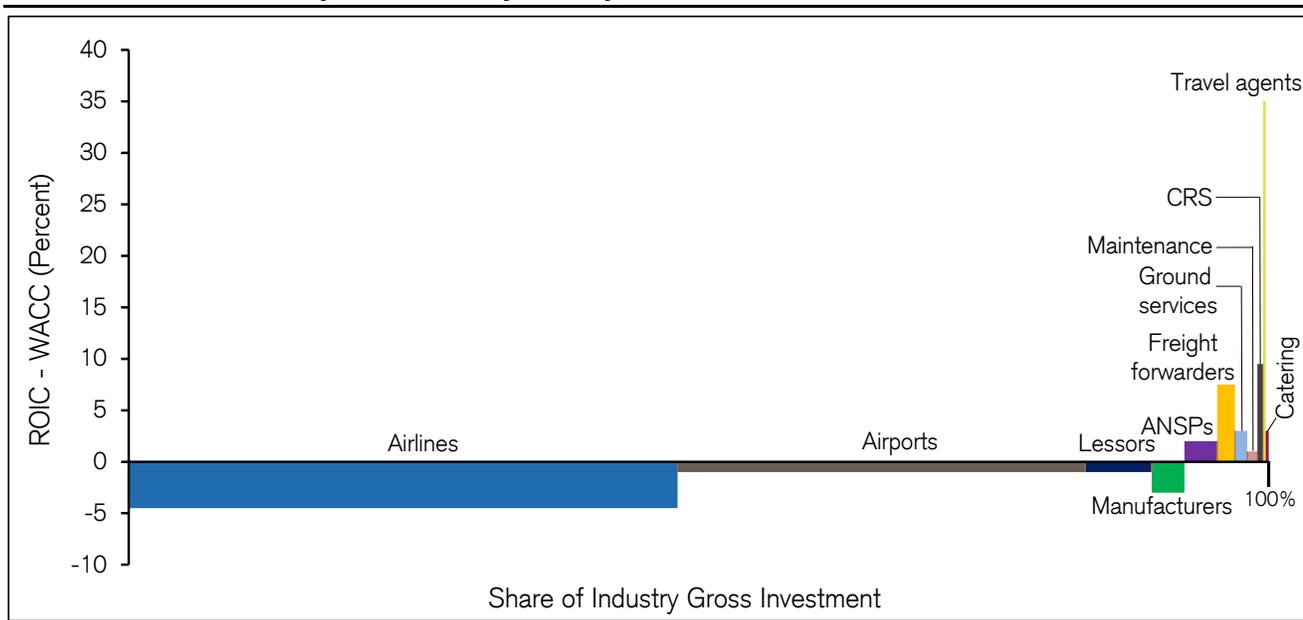
The next step is to construct a profit pool.¹⁵ A profit pool shows the distribution of an industry's value creation at a point in time. The horizontal axis measures size, typically invested capital or sales as a percentage of the industry, and the vertical axis measures economic profitability (e.g., CFROI minus the discount rate). As a result, the area of each rectangle—the product of invested capital and economic return—is the total value added for that sector or company. For example, a company that has \$200 million of invested capital and a spread of 5 percentage points between its CFROI and discount rate generates \$10 million in economic profit (\$10 million = \$200 million x .05). The total profit pool of the industry is the sum of the added value for all of the companies.

To understand the overall profitability of an industry, it is useful to analyze the average profitability over a full business cycle, which is generally three to five years.¹⁶ But average profitability doesn't reveal how value has migrated over time. Profit pools are particularly effective because they allow you to trace the increases or decreases in the components of the value-added pie. One effective approach is to construct a profit pool for today, five years ago, and ten years ago and then compare the results over time.

Exhibit 7 is a profit pool for the airlines industry. (See Appendix B for the health care sector.) It shows the main components in the industry's value chain including airlines, airports, and a variety of services. You can see from the horizontal axis that airlines and airports use the majority of the capital invested in the industry. These are also the businesses with among the lowest economic returns, which the vertical axis reflects.

Some businesses generate strong returns, including computer reservations systems (CRS), travel agents, freight forwarders, and various service jobs. But with so little capital invested, they are too small to offset the value destruction from airlines and airports. As a consequence, the industry as a whole destroyed an average of \$17 billion of shareholder capital per year through the 2004-11 business cycle, according to the International Air Transport Association.¹⁷

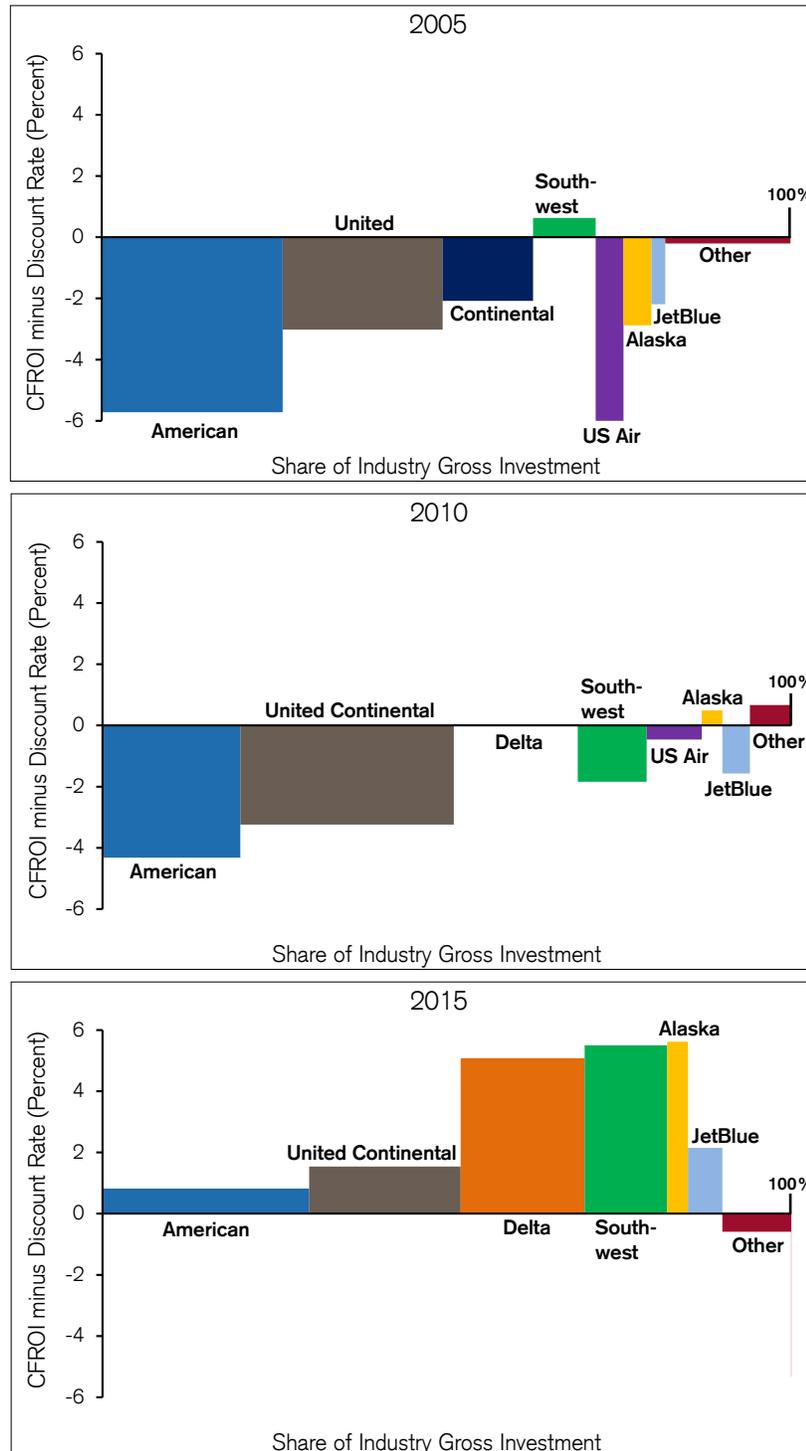
Exhibit 7: Airline Industry Profit Pool by Activity, 2004-2011



Source: Based on IATA, "Profitability and the air transport value chain," IATA Economics Briefing No. 10, June 2013, 19-20. CRS = computer reservations systems; ANSP = air navigation service provider.

We can also construct a profit pool of the leading companies within an industry. Exhibit 8 shows profit pools for the U.S. airline companies for 2005, 2010, and 2015. The horizontal axis represents 100 percent of the capital invested in the industry by public companies. These charts provide a bottom-up view of the industry's migration from value destruction to value creation.

Exhibit 8: Airline Industry Profit Pools by Company, 2005-2015



Source: Credit Suisse HOLT.

Most airlines destroyed value over the first half of the decade, consistent with the industry's history of weak returns on capital as the result of low barriers to entry and high fixed costs. Even the low-cost, point-to-point carriers struggled despite a history of outperforming the legacy carriers. But the performance of all the major airlines improved considerably in recent years, with the six largest companies earning above their cost of capital by 2015. Factors that drove the improvement include a sharp decline in the price of oil, better capacity utilization, and extensive consolidation following a slew of bankruptcies.¹⁸ The x-axis shows that the top four carriers increased their market share from roughly 70 percent in 2005 to 80 percent in 2015.

Industry Stability

Industry stability is another important metric. Generally speaking, stable industries are more conducive to sustainable value creation. Unstable industries present substantial competitive challenges and opportunities. The value migration in unstable industries is 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 the steadiness of market share. This analysis looks at the absolute change in market share for the companies within an 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 market share, the more stable the industry.

Exhibit 9 shows the market share stability for four industries. There is relative stability in automobile manufacturing, while personal computers and mobile phones show moderate change, and there is substantial change in the smartphone market. Our rule of thumb is that absolute average changes of 2.0 or less over five years constitute a stable industry.

Exhibit 9: Market Share Stability, 2010-2015

Auto Manufacturers (U.S. Market)	2010	2015	5-Year Change
General Motors	19%	18%	2%
Ford Motor Company	17%	15%	2%
Toyota Motor Corporation	15%	14%	1%
Honda Motor Company	11%	9%	2%
Chrysler Group/FCA	9%	13%	3%
Nissan Motor Company	8%	9%	1%
Hyundai-Kia	8%	8%	0%
Volkswagen Group	3%	3%	0%
BMW-Mini	2%	2%	0%
Subaru	2%	3%	1%
Mazda	2%	2%	0%
Daimler	2%	2%	0%
Other	2%	2%	1%
Total	100%	100%	
Average Absolute Change			1%
Personal Computers (Global by Units)	2010	2015	5-Year Change
Others	48%	52%	4%
Hewlett-Packard	16%	13%	3%
Acer Group	12%	5%	7%
Dell Inc	11%	10%	1%
Lenovo Group	9%	14%	6%
Asus	5%	5%	1%
Total	100%	100%	
Average Absolute Change			3%
Mobile Phones (Global)	2010	2015	5-Year Change
Other	40%	49%	9%
Nokia/Microsoft	29%	7%	22%
Samsung	18%	21%	3%
LG Electronics	7%	4%	3%
Apple	3%	11%	8%
ZTE	2%	3%	1%
Huawei	2%	5%	4%
Total	100%	100%	
Average Absolute Change			7%
Smartphones (Global)	2010	2015	5-Year Change
Nokia	34%	0%	34%
Other	27%	48%	21%
Research in Motion	17%	0%	16%
Apple	15%	16%	1%
Samsung	7%	23%	16%
Huawei	0%	7%	7%
Xiaomi	0%	5%	5%
Total	100%	100%	
Average Absolute Change			14%

Source: Company data, Gartner, Nielsen, Credit Suisse.

Another way to measure industry stability is the trend in pricing. Price changes reflect a host of factors, including cost structure (fixed versus variable), entry and exit dynamics, macroeconomic variables, technological change (e.g., Moore's Law and Wright's Law), and rivalry. All else being equal, more stable pricing reflects more stable industries. Warren Buffett places special emphasis on pricing power. He said, "The single most important decision in evaluating a business is pricing power. If you've got the power to raise prices without losing business to a competitor, you've got a very good business. And if you have to have a prayer session before raising the price 10 percent, then you've got a terrible business."¹⁹ Exhibit 10 shows the pricing trends for a variety of industries, classified as slow-, medium-, and fast-cycle businesses. Sustaining value creation in a fast-cycle industry is a challenge.

Exhibit 10: Pricing Stability, 2009-2014

Industry	Average Annual Price Change
Slow-cycle markets	
Dental Laboratories	7.7%
Rail and Transportation	4.4%
Breweries	3.4%
Standard-cycle markets	
Highways and Streets	3.0%
Motor and Generator Manufacturing	2.8%
Bread and Bakery Product Manufacturing	2.5%
Fast-cycle markets	
Warehousing and Storage	-1.3%
Wireless Telecommunications Carriers (Except Satel	-2.3%
Electronics and Appliance Stores	-2.5%

Source: U.S. Department of Commerce Bureau of Economic Analysis; Based on Jeffrey R. Williams, Renewable Advantage (New York: The Free Press, 2000), 11.

Industry Classification

Before turning 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 category 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 11 provides some broad classifications and the types of opportunities you should associate with each.

Exhibit 11: Industry Structure and Strategic Opportunities

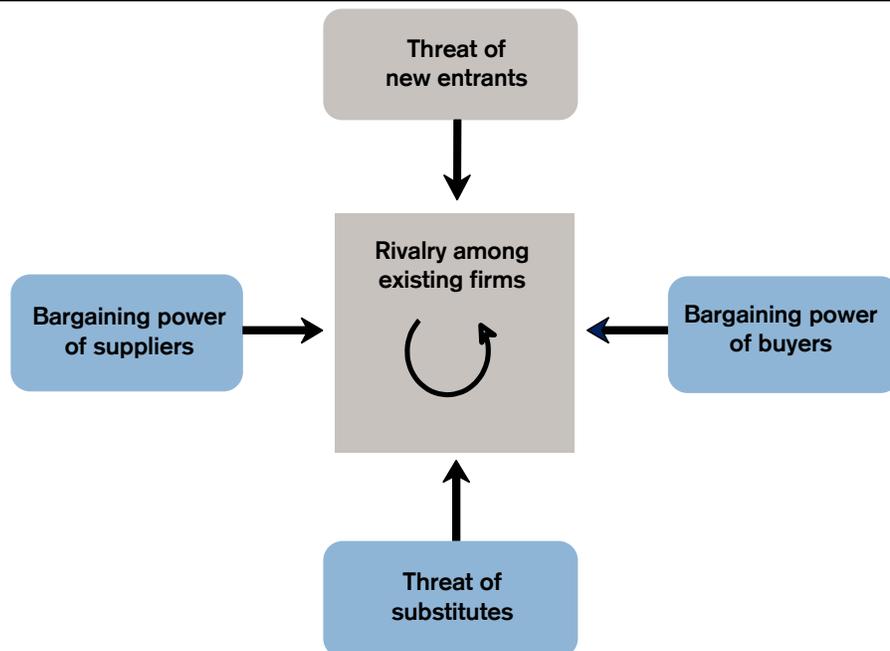
Industry Structure	Opportunities
Fragmented industry	Consolidation: - Discover new economies of scale - Alter ownership structure
Emerging industry	First-mover advantages: - Technological leadership - Preemption of strategically valuable assets - Creation of customer switching costs
Mature industry	Product 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 Structure—Five Forces Analysis

Michael Porter is well known for his five-forces framework (see Exhibit 12), which remains one of the best ways to assess an industry's underlying structure.²⁰ While some analysts employ the framework to declare an industry attractive or unattractive, Porter recommends using industry analysis to understand “the underpinnings of competition and the root causes of profitability.” Porter argues that the collective strength of the five forces determines an industry's potential for value creation. But the industry does not seal the fate of its members. An individual company can achieve superior profitability compared to the industry average by defending against the competitive forces and shaping them to its advantage.²¹

Exhibit 12: Michael Porter's Five Forces That Shape Industry Structure



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

While analysts commonly treat Porter's five forces with equal emphasis, we believe that the threat of entry and rivalry are so important that they warrant deeper consideration than the others. Further, our section on firm-specific analysis will put a finer point on some of the other forces. For now, here is a quick look at supplier power, buyer power, and substitution threat:²²

- **Supplier power** is the degree of leverage a supplier has with its customers in areas such as price, quality, and service. An industry that cannot pass on 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.

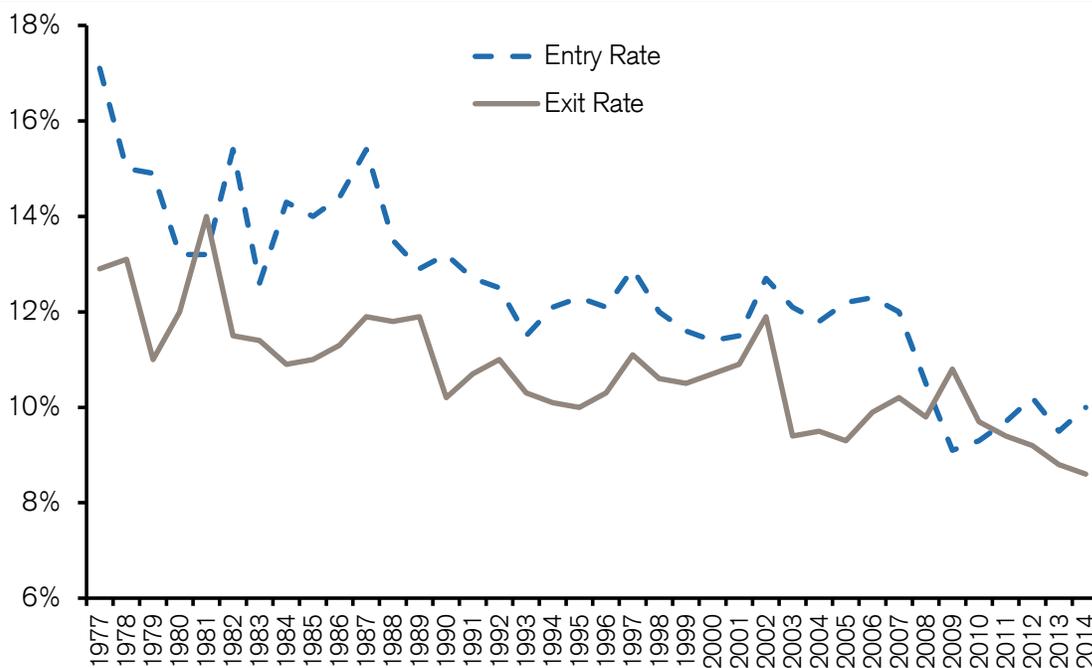
The threat of new entrants, or barriers to entry, is arguably the most important of Porter’s five forces. Before we delve into the factors that determine impediments to entry, it is worthwhile to review the empirical research on entry and exit.

Entry and Exit

Exhibit 13 shows the rate of entry and exit for U.S. establishments across all industries since 1977, using the U.S. Census’s Business Dynamics Statistics (BDS). Most studies on corporate demography use establishments as the unit of analysis because that is the way that the Census Bureau collects and reports the data. Establishments are the physical sites where corporations operate whereas firms are the aggregations of all the establishments a parent company owns. Most firms, and especially young ones, have only one establishment. Note that not all exits are failures. For example, some exits are planned or are the result of the sale of a viable business.²³

A useful way to think about entry and exit is to imagine an industry with 100 firms today. Based on the annual rates since 2000, an average of 11 new firms will enter the industry in each year and 10 will leave. This brings the total number of firms to 101. Because the rate of entry typically exceeds that of exit, the number of establishments in the U.S. has increased over time.

Exhibit 13: Rate of Entry and Exit for Establishments in the U.S., 1977-2014

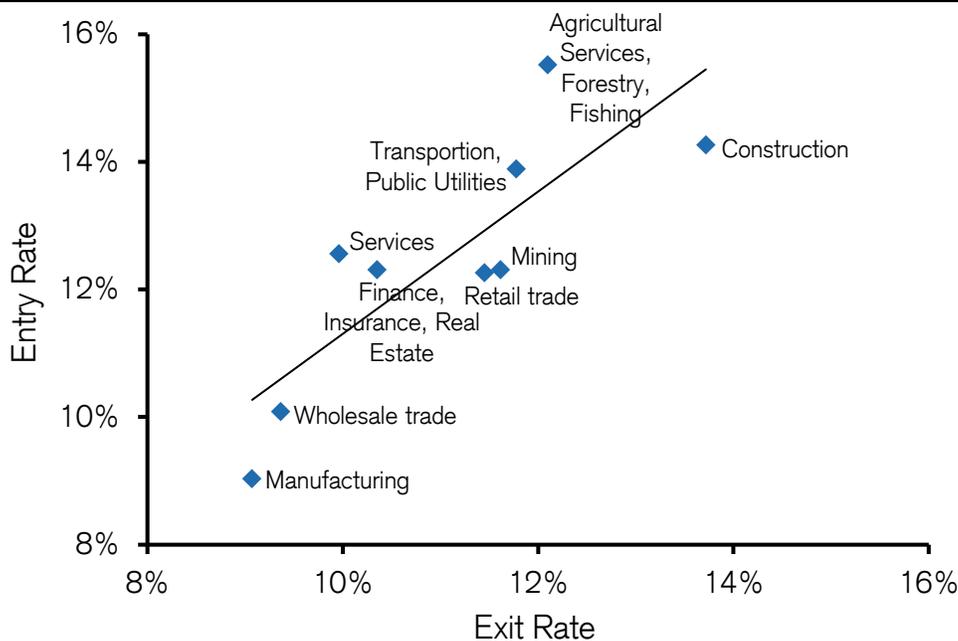


Source: U.S. Census Bureau, Center for Economic Studies, Business Dynamics Statistics; Credit Suisse.

It is also important to understand the history of entry and exit for the specific industry you are analyzing. These rates vary widely based on where the industry is in its life cycle and on the industry’s barriers to entry and exit. Research shows that the number of firms in new industries follows a consistent path.

The market is uncertain about the products it favors in the early stage of industry development, which encourages small and flexible firms to enter the industry and innovate. As the industry matures, the market selects the products it wants and demand stabilizes. The older firms benefit from economies of scale and entrenched advantages, causing a high rate of exit and a move toward a stable oligopoly.²⁴ Exhibit 14 shows the entry and exit rates for a variety of sectors, grouped according to Standard Industrial Classification (SIC) codes.

Exhibit 14: Annual Average Rate of Entry and Exit by Sector in the U.S., 1977-2014



Source: U.S. Census Bureau, Center for Economic Studies, Business Dynamics Statistics; Credit Suisse.

There is a strong correlation between the rate of entry and exit for each sector. For instance, manufacturing has low rates of entry and exit, while construction has very high rates, suggesting that the manufacturing sector possesses stronger barriers to entry and exit.

Perhaps the most widely cited study of entry and exit rates is that of Timothy Dunne, Mark Roberts, and Larry Samuelson (DRS). They examined more than 250,000 U.S. manufacturing firms over a 20-year span ended in the early 1980s.²⁵

A useful way to summarize the findings of DRS is to imagine a hypothetical industry in the year 2016 that has 100 firms with sales of \$1 million each. Should the patterns of entry and exit in U.S. industries during the period of their study apply to the future, the following will occur:²⁶

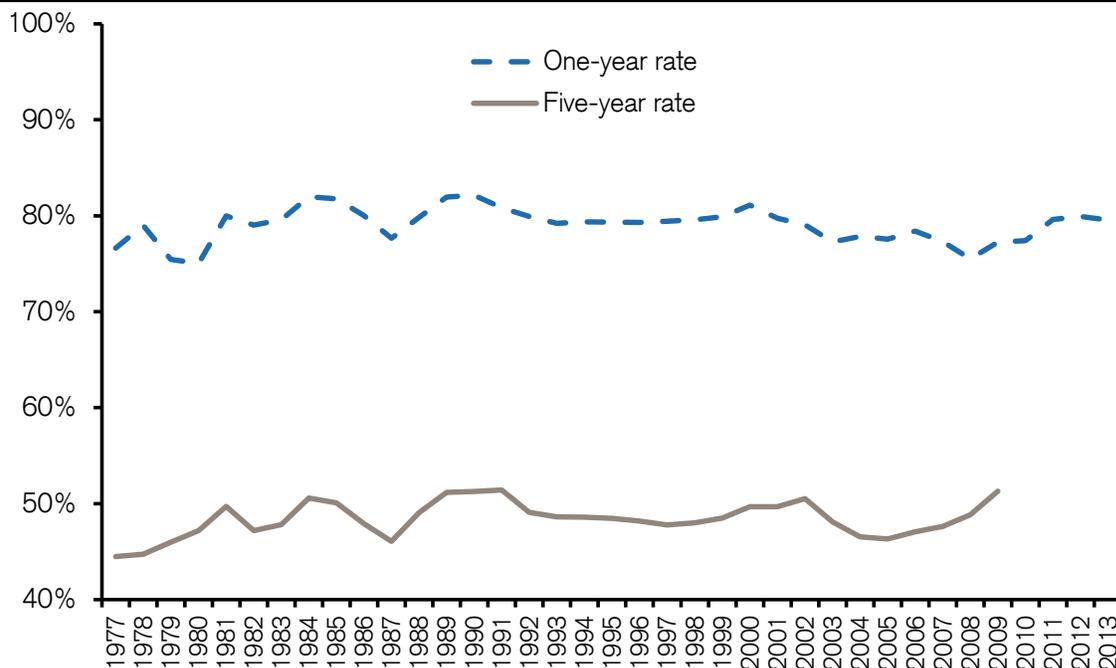
- **Entry and exit will be pervasive.** After five years, between 30 and 45 new firms will have entered the industry and will have combined annual sales of \$15-20 million. Half of these entrants will be diversified firms competing in other markets, and half will be new firms. During the same time, 30 to 40 firms with

aggregate sales of \$15-20 million will leave the industry. So the industry will experience a 30-45 percent turnover in firms, with the entering and exiting firms representing 15-20 percent 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 percent of total new entrants, tend to be roughly the same size as the incumbents.
- **Entry and exit rates vary substantially by industry.** Consistent with Exhibit 14, research by DRS shows that low barriers to entry and low barriers to exit tend to go together.
- **Most entrants do not survive ten years, but those that do thrive.** Of the 30 to 45 firms that enter between 2016 and 2021, roughly 80 percent will exit by 2026. But the survivors will more than double their relative size by 2026.

Other studies have found similarly low chances of survival for new firms.²⁷ Research by Credit Suisse HOLT® shows that less than 50 percent of public firms survive beyond ten years. Our analysis of the BDS data also reveals low survival rates. Exhibit 15 shows one-year and five-year survival rates based on the birth year of the establishment. The rate today is similar to that of 1977. The latest figures show one-year survival rates of about 80 percent and five-year survival rates of roughly 50 percent.

Exhibit 15: Survival Rates for Establishments in the U.S. by Birth Year, 1977-2014



Source: U.S. Census Bureau, Center for Economic Studies, Business Dynamics Statistics; Credit Suisse.

What influences the decision of a challenger to enter in the first place? On a broad level, potential entrants weigh the expected reactions of the incumbents, the anticipated payoffs, and the magnitude of exit costs.²⁸ Researchers also find that challengers neglect the high base rates of business failure, leading to overconfidence and a rate of entry that appears higher than what is objectively warranted. We'll explore each of these factors.

Let's first look at the expectations of incumbent reaction to a potential new entry. Four specific factors predict the likely ferocity 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 related to how much money the company had invested in assets. More careful analysis revealed that it's not the quantity of assets that matters but how specific those assets are to the market. A firm that has assets that are valuable only in a specific market will fight vigorously in order to maintain its position.

A clear illustration is a railroad versus an airline route. Say a company builds a railroad track from New York to Chicago. It can use that asset for only one thing: to move a train back and forth between those two cities. As a result, that company will go to great lengths to protect its position.²⁹ Now consider an airline that flies from New York to Chicago. If that route proves uneconomic, the airline can reroute the plane to a more attractive destination.

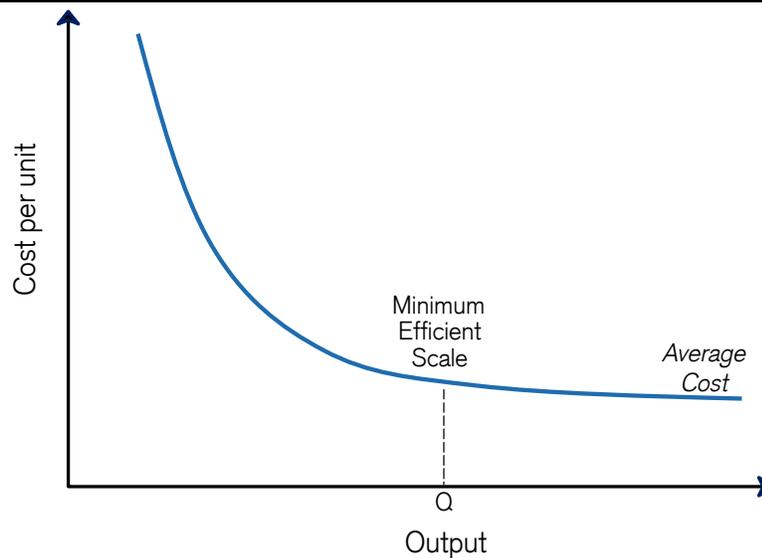
Asset specificity takes a number of forms, including site specificity, where a company locates assets next to a customer for efficiency; physical specificity, where a company tailors assets to a specific transaction; dedicated assets, where a company acquires assets to satisfy the needs of a particular buyer; and human specificity, where a company develops the skills, knowledge, or know-how of its employees.³⁰

The next factor is production scale. For many industries, unit costs decline as output rises. But this only occurs up to a point. This is especially relevant for industries with high fixed costs. A firm enjoys economies of scale when its unit costs decline with volume gains. At some point, however, unit costs stop declining with incremental output and companies get to constant returns to scale. The minimum efficient scale of production is the smallest amount of volume a company must produce in order to minimize its unit costs. (See Exhibit 16.)

The minimum efficient scale of production tells a potential entrant how much market share it must gain in order to price its goods competitively and make a profit. It also indicates the size of an entrant's upfront capital commitment. When the minimum efficient scale of production is high relative to the size of the total market, a potential entrant is looking at the daunting prospect of pricing its product below average cost for some time to get to scale. 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 it to charge a price premium versus the rest of the industry.

Minimum efficient scale is generally associated with manufacturing businesses, including automobile and semiconductor fabrication plants. For example, the cost for Intel to produce its first Xeon microprocessor was more than \$10 billion, including the fabrication plant and associated research and development. But once the chip was designed and the fab was up and running, the cost to produce incremental units dropped sharply.

The concept of minimum efficient scale also applies to knowledge businesses where a company creates content once at a very high cost and then replicates it for the market. The same cost curve exists for software as for hardware and it is even steeper in most cases.

Exhibit 16: 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 assessing incumbent reaction is excess capacity. The logic here is quite straightforward. Assuming that demand remains stable, an entrant that comes into an industry that has too much capacity increases the excess capacity of the incumbents. If the industry has economies of scale in production, the cost of idle capacity rises for the existing companies. As a result, the incumbents are motivated to maintain their market share. So the prospect of a new entrant will trigger a price drop. This prospect deters entry.

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

Another important shaper of barriers to entry is the magnitude of the entrant's anticipated payoff. An entrant cannot be sure that it will earn an attractive economic profit if the incumbent has an insurmountable advantage. Incumbent advantages come in the form of precommitment contracts, licenses and patents, learning curve benefits, and network effects.

The first incumbent advantage is precommitment contracts. Often, companies secure future business through long-term contracts. These contracts can be efficient in reducing search costs for both the supplier and the customer. A strong incumbent with a contract in place discourages entry.

Precommitment contracts take a number of forms. One is if an incumbent has favorable access to an essential raw material. An example of this occurred shortly following World War II. Alcoa, an aluminum producer, signed exclusive contracts with all of the producers of an essential material in aluminum production called high-grade bauxite. The inability to access bauxite on such favorable terms deterred potential entrants.

Another form of precommitment contract is a long-term deal with customers. In the mid-1980s, Monsanto (*NutraSweet*) and Holland Sweetener Company were two producers of the sweetener aspartame. After the patent on aspartame expired in Europe in 1987, Holland entered the market to compete against Monsanto. The competition drove down the price of aspartame 60 percent, and Holland lost money.

But Holland had its eye on the real prize, the U.S. market, where the patent was to expire in 1992. In a classic precommitment move, Monsanto signed long-term contracts to supply the largest buyers of aspartame, Coca-Cola and PepsiCo, and effectively shut Holland out of the United States. This suggests a crucial lesson for companies and investors: all buyers want to have multiple suppliers, but it doesn't mean that they will use multiple suppliers. Holland created a great deal of value for Coke and Pepsi but none for itself.³¹

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

Licenses and patents also shape a potential entrant's payoff for reasons that make common sense. 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 different from that of a license. The intent of a patent is to allow an innovator to earn 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 activities that are protected.

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 percent.³² A company can enjoy the benefits of the learning curve without capturing economies of scale, and vice versa. But generally the two go hand in hand.

Network effects are another important incumbent advantage that can weigh on an entrant's payoff. Network effects exist when the value of a good or service increases as more members use that good or service. As an example, Uber is attractive to passengers precisely because so many riders and drivers congregate on the platform. In a particular business, positive feedback often ensures that one network becomes dominant. For example, in the U.S. Uber has not only weathered competitive onslaught, it has also strengthened its position. Size, network structure, and connectivity contribute to network strength.³³

Good examples today are the online social networks, including Facebook and Instagram, which become more valuable to a user as more people join. We also see network effects in the smartphone market between the dominant operating systems and application developers. Because the vast majority of users own devices operating on Android or iOS, application developers are far more likely to build applications for them than for other operating systems. This creates a powerful ecosystem that is daunting for aspiring entrants.³⁴

The last point, consistent with DRS's analysis of entry and exit, is the link 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 determine the size of exit barriers. Low investment needs and non-specific assets are consistent with low barriers to entry.

Robert Smiley, a retired economist who specialized in competitive strategy, surveyed product managers about their strategies to deter entry.³⁵ While his analysis was limited to consumer products companies, the results are instructive nonetheless. (See Exhibit 17.) The first three strategies—learning curve, advertising, and R&D/patents—create high entry costs. The last three—reputation, limit pricing, and excess capacity—

influence judgments of post-entry payoffs. Virtually all managers reported using one or more of these strategies to deter entry.

Exhibit 17: 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	58
<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.

Behavioral factors also play a role in the decision to enter a business. A pair of economists, Colin Camerer and Dan Lovallo, designed an experiment to understand why subjects enter a game.³⁶ When the scientists informed the subjects that the payoffs were based on skill, the individuals overestimated their probability of success. As a result, they entered the game at a higher rate than those who were told that the payoffs were random. Most subjects who entered the game believed they would have positive profits despite the negative total profit among all entrants.

The researchers attributed the overconfidence of the entrants to "reference group neglect." The idea is that the entrants focused on what they perceived to be their unique skills while ignoring the abilities of their competitors and the high failure rate of new entries as reflected in the reference group. The failure to consider a proper reference class pervades many of the forecasts we make.³⁷ In the business world, reference class neglect shows up as unwarranted optimism for the length of time it takes to develop a new product, the chance that a merger succeeds, and the likelihood of an investment portfolio outperforming the market.³⁸

Competitive Rivalry

Rivalry among firms addresses how fiercely companies compete with one another along dimensions such as price, service, new product introductions, promotion, and advertising. In almost all industries, coordination in these areas improves the collective economic profit of the firms. For example, competitors increase their profits by coordinating their pricing. Of course, coordination must be tacit, not explicit.

There is a tension between coordinating and cheating in most industries. A firm that "cheats" by lowering the price on its product stands to earn disproportionate profits if the other firms do not react. We can think of rivalry as understanding, for each firm, the trade-offs 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 perceives itself to be a minor player and is more likely to think individualistically. Naturally, the flip side suggests that the existence of fewer firms leads to more opportunity for coordination. Research shows that most cases of price fixing that the government prosecutes involve industries with fewer firms than average.³⁹

A concentration ratio is a common way to measure the number and relative power of firms in an industry. The Herfindahl-Hirschman Index (HHI) is a popular method to estimate industry concentration. The HHI considers not only the number of firms but also the distribution of the sizes of firms. A dominant firm in an otherwise fragmented industry may be able to impose discipline on others. In industries with several firms of similar size, rivalry tends to be intense.

Exhibit 18 shows the HHI for 20 industries. Many economists characterize readings in excess of 1,800 as industries with reduced rivalry. The index is equal to 10,000 times the sum of the squares of the market shares of the 50 largest firms in an industry. If there are fewer than 50 firms, the amount is summed for all firms in the industry. For instance, for an industry with four companies and market shares of 40 percent, 30 percent, 20 percent, and 10 percent, the index would be 3,000. (Take $10,000 \times [(.4)^2 + (.3)^2 + (.2)^2 + (.1)^2]$.)

Exhibit 18: Herfindahl-Hirschman Index for Selected Industries

Industry (Manufacturing)	Herfindahl-Hirschman Index
Breakfast cereal	2,333
Household appliances	1,576
Tires	1,377
Automobiles	1,178
Plastic bottles	934
Flour milling	772
Explosives	771
Book printing	623
Poultry processing	600
Stationery products	497
Iron foundries	454
Sporting and athletic goods	373
Animal food	369
Basic chemicals	362
Fabric mills	275
Motor vehicle bodies	207
Adhesives	182
Machinery	91
Computer and electronic products	72
Retail bakeries	12

Source: U.S. Census Bureau, *Concentration Ratios - 2012 Economic Census*.

If industry concentration is a reliable indicator of the degree of rivalry, you'd expect to see some link between concentration and profitability. Researchers have shown this to be the case. Two professors of finance, Kewei Hou and David Robinson, examined industries for the years 1963-2001 and found that concentrated industries earned above average profits and less concentrated industries earned below average profits.⁴⁰

Another influence of rivalry is firm homogeneity. Rivalry tends to be less intense in industries with companies that have similar goals, incentive programs, ownership structures, and corporate philosophies. But in many instances, competitors have very different objectives. For example, an industry may have companies that are public, privately held, or owned by private equity firms. These competitors may have disparate financial objectives, incentive structures, and time horizons. The strategies that companies within an industry pursue will reflect the heterogeneity of objectives.⁴¹

Asset specificity plays a role in rivalry. Specific assets encourage a company to stay in an industry even when conditions become trying because there is no alternative use for the assets. Assets include physical assets, such as railroad tracks, as well as intangible assets such as brands.

Demand variability shapes coordination costs and hence has an influence on rivalry. When demand variability is high, companies have a difficult time coordinating internally and have little opportunity to effectively coordinate 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. While companies use this capacity at the peak, the capacity is excessive at the trough and spurs even more intense competition at the bottom of the cycle. The conditions of variable demand and high fixed costs describe many commodity industries, which is why their rivalry is so bitter and consistent positive economic returns are so elusive.

Industry growth is a final consideration. 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 rise in rivalry often accompanies a decelerating industry growth rate.

Disruption and Disintegration

Most strategy frameworks focus primarily on figuring out which industries are attractive and which companies are well positioned. Clayton Christensen, a professor of management, developed a theory to explain why great companies fail and how companies succeed through innovation. Christensen wondered why it was common for companies with substantial resources and smart management teams to lose to companies with simpler, cheaper, and inferior products. His theory of disruptive innovation explains that process.⁴²

Christensen starts by distinguishing between sustaining and disruptive innovations. Sustaining innovations foster product improvement. They can be incremental, discontinuous, or even radical. But the main point is that a sustaining innovation operates 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.”⁴³

A disruptive innovation, by contrast, approaches the same market with a different value network. Consider book selling as an example. The evolution from mom-and-pop bookstores to superstores was a clear innovation, but the value network was the same. Amazon.com introduced a new value network when it started selling books online. It is common for disruptors to trade lower operating profit margins for high capital turnover in their bid to earn returns on invested capital in excess of the cost of capital.

Christensen distinguishes between the two types of disruptive innovation: low-end disruption and new-market disruption. A low-end disruptor offers a product that already exists. For instance, when Southwest Airlines entered the airline industry, it provided limited flights with no frills at a very low cost. Southwest couldn’t, and didn’t, compete with the large legacy carriers.

A new-market disruption, on the other hand, competes initially against “non-consumption.”⁴⁴ It appeals to customers who previously did not buy or use a product because of a shortage of funds or skills. A new-market disruptive product is cheap or simple enough to enable a new group to own and use it.

The transistor radio, introduced in the 1950s, is an example of a new-market disruption. Manufacturers such as Sony targeted teenagers, a group who wanted to listen to music on their own but who couldn’t afford

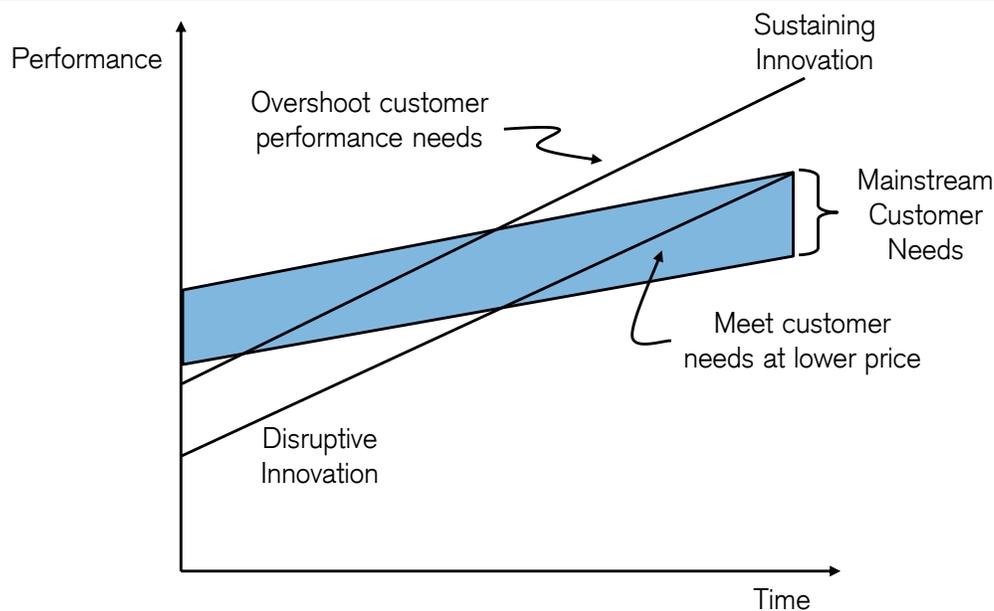
tabletop radios. Teenagers were so thrilled that they could listen to these pocket-sized radios away from their parents that they ignored the static and poor sound quality.⁴⁵

Disruptive innovations initially appeal to relatively few customers who value features such as low price, smaller size, or greater convenience. Christensen finds that these innovations generally underperform established products in the near term but are good enough for a segment of the market.

Exhibit 19 presents Christensen's model visually. The horizontal axis is time, and the vertical axis is product performance. The shaded area represents customer needs and takes the shape of a distribution that includes low-end, average, and high-end customers.

The upward-sloping line at the top is the performance trajectory of sustaining innovations. The parallel, upward-sloping line below it is the performance trajectory for a disruptive innovation.

Exhibit 19: Christensen's Model of Disruptive Innovation



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

One of the key insights of the model is that innovations often improve at a rate faster than the consumer demands. Established companies, through sustaining technologies, commonly provide customers with more than they need or more than they are ultimately willing to pay for. When innovation drives performance for a sustaining technology past the needs of mainstream customers, the product is “overshot.” Indications that a market is overshot include customers who are unwilling to pay for a product’s new features and who don’t use many of the available features.

When the performance of a sustaining innovation exceeds the high end of the consumer’s threshold, the basis of competition shifts from performance to speed-to-market and delivery flexibility. For instance, as the personal computer market became overshot in the 1990s, manufacturers focused on performance, such as Compaq, lost to manufacturers with more efficient delivery models, such as Dell.

The trajectory of product improvement allows disruptive innovations to emerge because even if they fail to meet the demands of mainstream users today they become competitive tomorrow. Further, disruptive innovations end up squeezing the established producers because the disruptors have lower cost structures.

Christensen likes to use the example of the mini-mills versus integrated mills in the steel industry. Mini-mills melt scrap steel, so they are a fraction of the size of the integrated mills that make steel in blast furnaces. Because the integrated mills controlled the whole process, they started with the substantial advantage of producing steel of high quality.

The mini-mills launched their simpler and cheaper model in the 1970s. Their inferior quality initially limited them to making rebar, the bars that reinforce concrete. This is the least expensive and least valuable market for steel. Indeed, the operating profit margins for integrated mills improved after they left the market for rebar to the mini-mills. As Christensen says, "It felt good to get in and good to get out."

But the good feeling didn't last long. Just as the theory predicts, the mini-mills rapidly improved their ability to make better steel and started to compete in markets that had more value. That process continued over time until the mini-mills shouldered into the high end of the market and destroyed the profitability of the integrated mills.

A crucial point of Christensen's work is that passing over disruptive innovations may appear completely rational for established companies. The reason is that disruptive products generally offer lower margins than established ones, 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 innovations.

Exhibit 20 summarizes Christensen's three categories of innovation, sustaining, low-end, and new-market, and considers the customers they serve, the technology they utilize to attract customers, the business models they employ, and the expected incumbent response to each. The incumbent response warrants specific attention. If a new competitor comes along with a sustaining innovation, incumbents are highly motivated to defend their turf. Christensen suggests it is very rare to see an incumbent lose this battle to a challenger.

For low-end disruptions, the motivation of incumbents is generally to flee. This is what the integrated mills did. In the short run, fleeing helps profit margins by encouraging the incumbent to focus on the most lucrative segment of the market. In the long run, it provides resources for the disruptor to build capabilities that allow it to penetrate the mainstream market on a cost-effective basis.

Incumbents are typically content to ignore new-market disruptions. The example of the transistor radio shows why. Because the portable radios did not encroach on the base of the established tabletop radio customers, the incumbent firms were motivated to disregard the new product.

Exhibit 20: Innovation Categories and Characteristics

	Sustaining Innovation	Low - End Disruption	New - Market Disruption
Customers	Undershot customer	Overshot customer at low end of existing market	Non-consumer or non-producer
Technology (product/service /process)	Improvement along primary basis of competition	Good enough performance at lower prices	Simpler, customizable; lets people "do it themselves"
Business Model	Extension of winning business model	Attractive returns at lower prices	Completely new model, different from core business
Competitor Response	Motivated to respond	Motivated to flee	Motivated to ignore

Source: Based on Clayton M. Christensen and Michael E. Raynor, *The Innovator's Solution* (Boston, MA: Harvard Business School Press, 2003), 51.

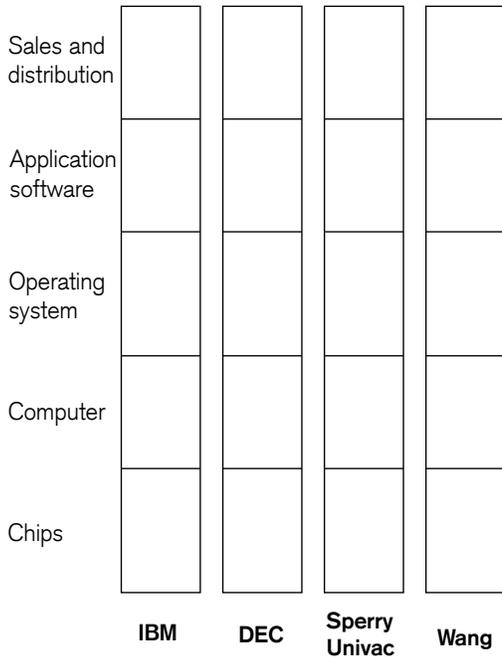
Christensen has also done insightful work on understanding and anticipating the circumstances under which an industry is likely to shift from vertical to horizontal integration.⁴⁶ This framework is relevant for assessing the virtue of outsourcing. While outsourcing has provided some companies with great benefits, including lower capital costs and faster time to market, it has also created difficulty for companies that tried to outsource under the wrong circumstances.

Firms that are vertically integrated dominate when industries are developing because the costs of coordination are so high. Consider the computer industry in 1980. (See Exhibit 21.) Most computer companies were vertically integrated to ensure that their products would actually work.

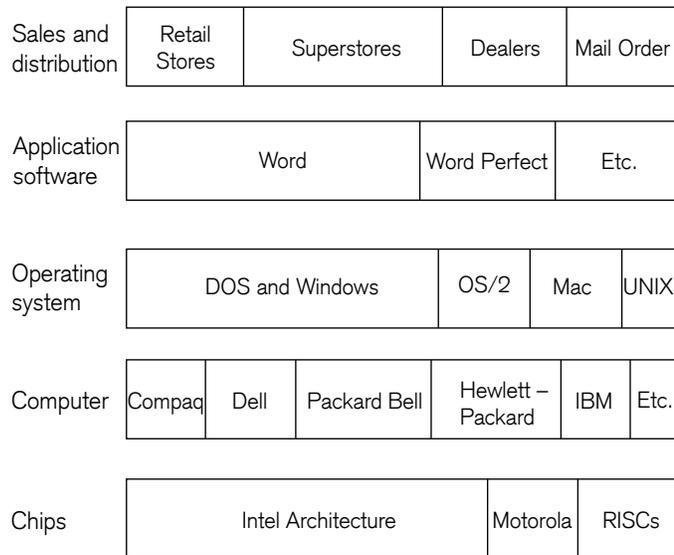
But as an industry develops, various components become modules. The process of modularization allows an industry to flip from vertical to horizontal. This happened in the computer industry by the mid-1990s. Modularization, which is not simple from an engineering standpoint, allows for standardization and the assembly of products off the shelf.

Exhibit 21: 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.

Boeing’s ordeal with the 787 Dreamliner is a cautionary tale about the perils of outsourcing too early.⁴⁷ Historically, Boeing used a process called “build-to-print,” where the company did all of the design for an aircraft in-house and sent suppliers very specific instructions. For the 787, Boeing decided to outsource the design and construction of various sections of the plane, with the goal of lowering costs and quickening assembly times.

The program was a mess. The first plane was supposed to arrive in 1,200 parts but showed up in 30,000 pieces. Boeing had to bring substantial parts of the design back in-house at a large cost of money and time. The company failed to realize that outsourcing doesn’t make sense for products that require complex integration of disparate subcomponents. The coordination costs are simply too high.

Industry analysis provides important background for understanding a company’s current or potential performance. Now we 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, its interaction with competitors, and how it deals with non-competitors.⁴⁸

Much of what companies discuss as strategy is not strategy at all. As Michael Porter emphasizes, strategy is different than aspirations, more than a particular action, and distinct from vision or values. Further, Porter differentiates between operational effectiveness and strategic positioning. Operational effectiveness describes how well a company does the same activity as others. Strategic positioning focuses on how a company's activities differ from those of its competitors. And where there are differences, there are trade-offs.⁴⁹

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 Harborne Stuart, professors of strategy, offer a very concrete and sound definition of how a firm adds value.⁵⁰ Their equation is simple:

Value created = willingness-to-pay – opportunity cost

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). Understanding what each of the terms means is fundamental to appreciating the equation.

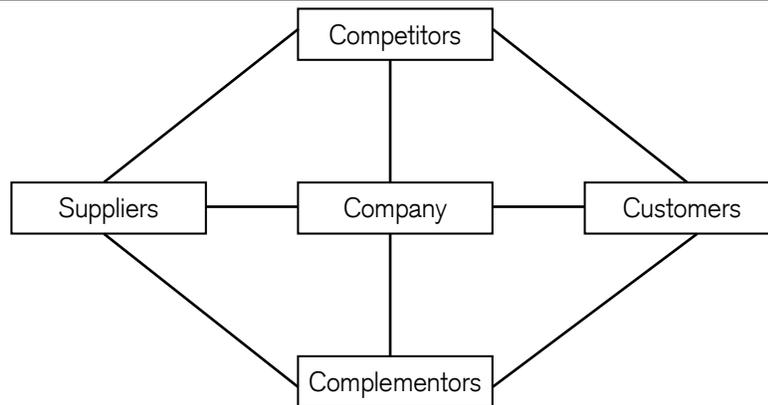
Let's start with willingness to pay. Imagine someone hands you a brand new tennis racket. Clearly, that is good. Now imagine that the same person starts withdrawing money from your bank account in small increments. The amount of money at which you are indifferent to having the racket or the cash is the definition of willingness to pay. If you can buy a product or service for less than your willingness to pay, you enjoy a consumer surplus.

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

Brandenburger and Stuart then go on to define four strategies to create more value: increase the willingness to pay of your customers; reduce the willingness to pay of the customers 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—cost leadership (production advantage) and differentiation (consumer advantage).

Brandenburger teamed up with his colleague Barry Nalebuff to create what they call a "value net."⁵¹ We present the value net slightly differently than the authors do, but the components and configuration are identical. (See Exhibit 22.) 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 more detail. 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 22: 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 analyses but adds an important element: strategy is not only about risk and downside but also about opportunity and upside. Research in industrial organization emphasizes non-cooperative game theory, a reasonable approach for well-established industries near product price equilibrium. But cooperative game theory recognizes that many industries are dynamic and offer opportunities to cooperate as well as to compete.

The Value Chain

Michael Porter also developed value chain analysis, a powerful tool for identifying a company’s sources of competitive advantage. The value chain is “the sequence of activities your company performs to design, produce, sell, deliver, and support its products.”⁵² (Exhibit 23 depicts a generic value chain.) Porter recommends focusing on discrete activities rather than broad functions such as marketing or logistics, which he considers too abstract. The objective is to assess each activity’s specific contribution to the company’s ability to capture and sustain competitive advantage, be it through higher prices or lower costs.

Exhibit 23: The Value Chain



Source: Joan Magretta, *Understanding Michael Porter: The Essential Guide to Competition and Strategy* (Boston, MA: Harvard Business Review Press, 2012).

Creating an effective value chain analysis involves the following steps:

- **Create a map of the industry’s value chain.** Show the sequence of activities that most of the companies in the industry perform, paying careful attention to the activities specific to the industry that create value.
- **Compare your company to the industry.** Examine your company’s configuration of activities and see how it compares to others in the industry. Look for points of difference that may reflect a competitive advantage or disadvantage. If a company’s value chain closely resembles that of its peers, then the companies are likely engaged in what Porter calls a “competition to be the best.” This is when rivals

pursue similar strategies across the same activities, and it often leads to price wars and destructive, zero-sum competition.⁵³

- **Identify the drivers of price or sources of differentiation.** To create superior value, a company should look for existing or potential ways to perform activities differently or to perform different activities. This can come anywhere along the value chain, starting with product design and ending with post-sales service.
- **Identify the drivers of cost.** Estimate as closely as possible the full costs associated with each activity. Look for existing or potential differences between the cost structure of the company and that of competitors. Pinpointing the specific drivers of a cost advantage or disadvantage can yield crucial insights. This allows a manager to rethink how, or why, a company performs a particular activity.

Sources of Added Value

There are three broad sources of added value: production advantages, consumer advantages, and external (e.g., government) factors. Note that there is substantial overlap between this analysis and the industry analysis, but here we focus on the firm.

Production Advantages

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 consider when determining whether a firm has a process advantage:

- **Indivisibility.** Economies of scale are particularly relevant for businesses with high fixed costs. One important determinant of fixed costs is indivisibility in the production process. Indivisibility means that a company cannot scale its production costs below a minimum level even if output is low. The baking business is 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 empty 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 instance, Procter & Gamble (P&G) reportedly spent eight years and hundreds of millions of dollars to develop Tide Pods, a unit-dose capsule form of laundry detergent. Much of the spending went toward a dedicated staff of technical professionals, testing on thousands of consumers, and hundreds of packaging and product sketches. The government granted P&G numerous patents on detergent chemistry, the pod's casing, and the manufacturing process. Bob McDonald, P&G's CEO at the time, demonstrated his confidence in the intellectual property when he said, "I don't imagine that this is going to be able to be copied in any way that it will become a threat."⁵⁴
- **Rate of change in process cost.** For some industries, production costs decline over time as a result of technological advances. For example, the process-related cost of building an e-commerce company today is less than in the past because you can purchase most of the necessary components off the shelf. But the cost in the future is likely to be lower than the cost today for the same reason. For industries with declining process costs, the incumbent has learning curve advantages, while the challenger has the

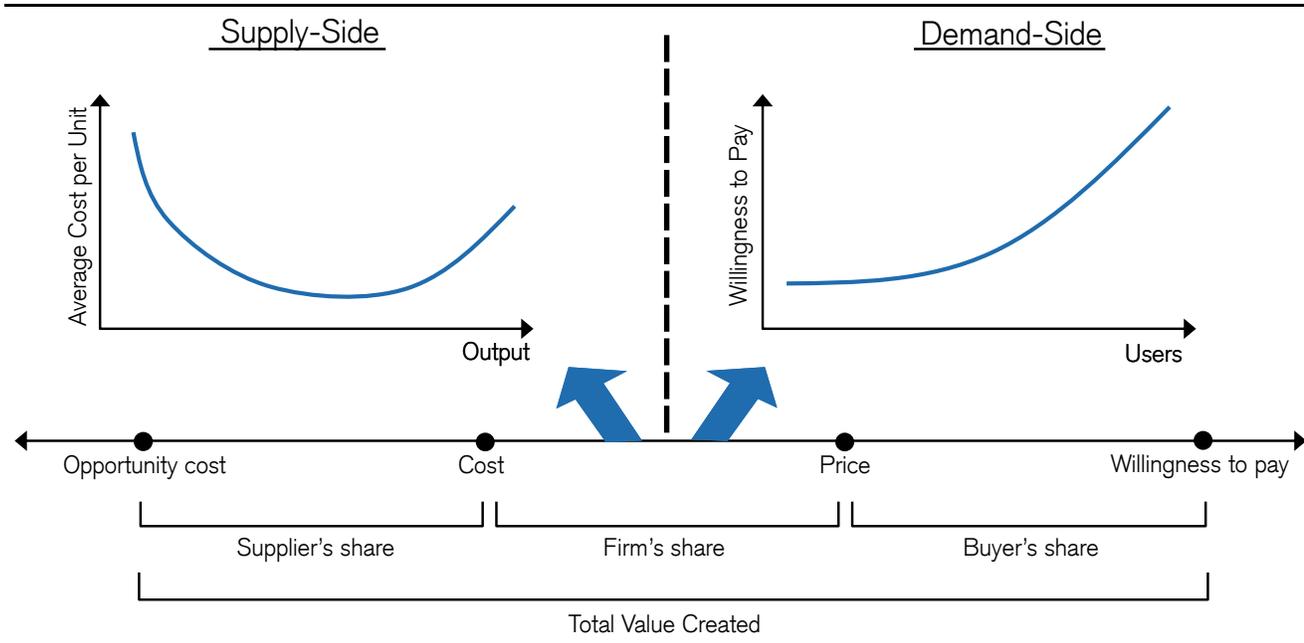
advantage of potentially lower future costs. So the analysis must focus on the trade-off between learning advantages and future cost advantages.

- **Protection.** Look for patents, copyrights, trademarks, and operating rights that protect a firm's process. Research suggests that products with patent protection generate higher economic returns as a group than any single industry.⁵⁵
- **Resource uniqueness.** 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. Exhibit 24 illustrates the distinction between supply- and demand-side scale economies. A firm creates value if it has a positive spread between its sales and costs, including opportunity costs.⁵⁶ A firm can create more value by either reducing its costs or increasing the price it receives. Evidence suggests that differences in customer willingness to pay account for more of the profit variability among competitors than disparities in cost levels.⁵⁷

The well-known cost curve depicted in Exhibit 24 shows that, as a manufacturing company increases its output, its marginal and average unit costs decline up to a point. This is classic increasing returns to scale, as the company benefits from positive feedback on the supply side. It is all about lowering costs. However, positive feedback tends to dissipate for manufacturing companies because of bureaucracy, complexity, or input scarcity. This generally happens at a level well before dominance: market shares in the industrial world rarely top 50 percent. Positive feedback on the demand side comes primarily from network effects, a point we will develop further in our discussion of consumer advantages.

Exhibit 24: Supply- versus Demand-Side Driven Scale Economies



Source: Credit Suisse.

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

- **Distribution.** Start by determining whether the firm has local, regional, or national distribution scale. We would note that very few firms have national distribution scale. One good example is retailing. Wal-Mart built its business in the 1970s and 1980s through regional distribution advantages. Most retailers have only regional advantages and often fail to generate meaningful economic profits 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.⁵⁸

- **Purchasing.** Some firms can purchase raw materials at lower prices as the result of scale. For instance, Home Depot was able to add over 200 basis points to its gross margin in the late 1990s by lowering its cost of merchandising through product line reviews and increased procurement of imported products. 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, where the ideas from one research project transfer to other projects. For example, Pfizer sought a drug to treat hypertension, then thought it might treat angina, and then found an unusual side effect which led to the blockbuster drug, Viagra.⁵⁹ Companies with diverse research portfolios can often find applications for their ideas more effectively than companies with smaller research portfolios.
- **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, including advertisement preparation and negotiating with the broadcaster, are roughly the same for small and large companies, then large companies have an advantage in cost per potential consumer because they can spread their costs over a much larger base.

For example, say both McDonald's and Wendy's have equally effective national advertising campaigns in the United States. That McDonald's has almost three times as many stores as Wendy's does means that McDonald's advertising cost per store is lower.

Companies that enjoy economies of scale in their local geographic or product markets should also be aware of the impact of globalization on their industries. Analysis by McKinsey, a consulting firm, suggests that about one-third of all industries are global, one-third national, and one-third regional. (See Exhibit 25.) Their research also shows that industries are becoming increasingly global over time.

Exhibit 25: Various Industries and Their Stages of Globalization

	Industry	GLOBAL	Examples
~33% Globally defined	Physical commodities	1	Petroleum, mineral ores, timber
	Scale-driven business goods and services	2	Aircraft engines, construction equipment, semiconductors, airframes, shipping, refineries, machine tools, telecom equipment
	Manufactured commodities	3	Refined petroleum products, aluminum, specialty steel, bulk pharmaceuticals, pulp, specialty chemicals
	Labor skill/productivity-driven consumer goods	4	Consumer electronics, personal computers, cameras, automobiles, televisions
~33% Nationally defined	Brandable, largely regulated consumer goods	5	Beer, shoes, luxury goods, pharmaceuticals, movie production
	Professional business services	6	Investment banking, legal services, accounting services, consulting services
	Historically highly regulated (nationally) industries	7	Personal financial services, telecommunications service providers, electric power service providers
~33% Locally defined	High interaction cost consumer goods and services	8	Food, television production, retail distribution, funeral homes, small business services
	Locally regulated or high transportation cost goods and services	9	Construction materials, real property, education, household services, medical care
	Government services	10	Civil servants, national defense
		LOCAL	

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

Globalization ties to economies of scale in two important ways. First, companies enjoying economies of scale in their local markets often find it extremely challenging to replicate those advantages in new product or geographic markets. Even Wal-Mart has struggled overseas, where competitors dominant in those regions enjoy cost advantages in areas such as advertising and distribution. Any institutional advantages Wal-Mart has in terms of efficiency or use of technology are offset by the local economies of scale its competitors have earned.

Second, increasing globalization may undercut the advantages of economies of scale in some industries. This is tied to the idea that an industry leader can more easily maintain dominance in a market of restricted size. In a restricted market, an upstart needs to capture a significant amount of market share to reach economies of scale, a challenge given it must wrestle share from the leader itself. But as an industry undergoes globalization, economies of scale are actually easier to obtain for new competitors, as they no longer need to capture a significant share of a local market.⁶⁰

If you believe a firm has a production advantage, think carefully about why its costs are lower than those of its competitors. Firms with production advantages often have lower gross margins than companies with consumer advantages.

Consumer Advantages

Consumer advantage is the second broad source of added value. Firms with consumer advantages create value by delivering products with a spread between perceived consumer benefit and cost that is larger than that of its competitors. They do so primarily by outperforming competitors on the benefit side.

Here are some common features of companies with consumer advantages:

- **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. A product need not be unambiguously better than competing products; it just has to have features that some consumers find attractive. Soft drinks are an example. Competing with Coca-Cola is hard because many consumers habitually drink Coke and are fiercely attached to the product.⁶¹
- **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.
- **Switching costs and customer lock-in.** Customers must bear costs when they switch from one product 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).

An example of a product with high switching costs is an enterprise resource planning (ERP) system. In addition to the high initial cost for the license, a company implementing a new ERP system must also expend a significant amount of internal resources for things such as user training and IT support. Moreover, because a company must customize an ERP system to its business processes, it makes it even more costly to switch providers. Exhibit 26 provides a breakdown of various forms of lock-in and their associated switching costs.

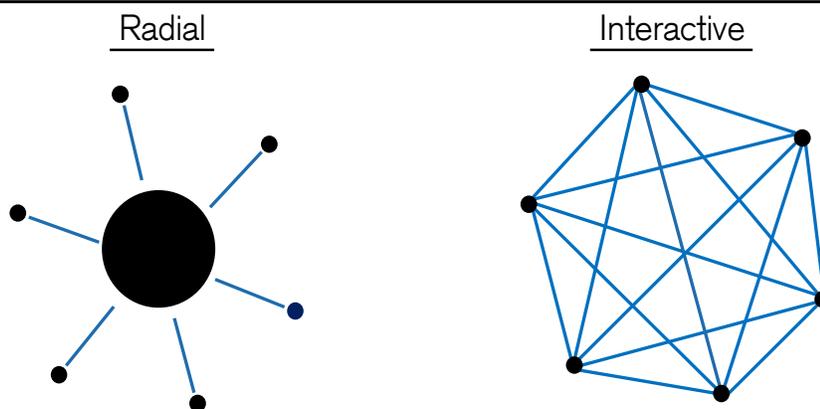
Exhibit 26: Types of Lock-In and Associated Switching Costs

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, MA: Harvard Business School Press, 1999), 117.

- Network effects.** Network effects can be an important source of consumer advantage, especially in businesses based on information. You can think of two types of networks. (See Exhibit 27.) The first is a hub-and-spoke network, where a hub feeds the nodes. Examples include most airlines and retailers. In these networks, network effects exist but are modest.

Exhibit 27: Network Effects Are Stronger for Interactive Networks than for Radial Networks



Source: Credit Suisse.

The second type is an interactive network, where the nodes are either physically (telephone wires) or virtually (the same software) connected to one another. Network effects tend to be significant for interactive networks because the good or service becomes more valuable as more people use it. For example, Visa and MasterCard have formidable advantages in the market for payment systems as a result of their strong network effects.

Positive feedback is critical in interactive networks. If more than one interactive network is competing for customers, the network that pulls ahead will benefit from positive feedback, leading to a winner-take-most

outcome. The dominant network benefits from having the most users and scale, and the switching costs for its customers rise as the network grows. The classic example of this *de facto* standard setting is Microsoft's personal computer operating system business.

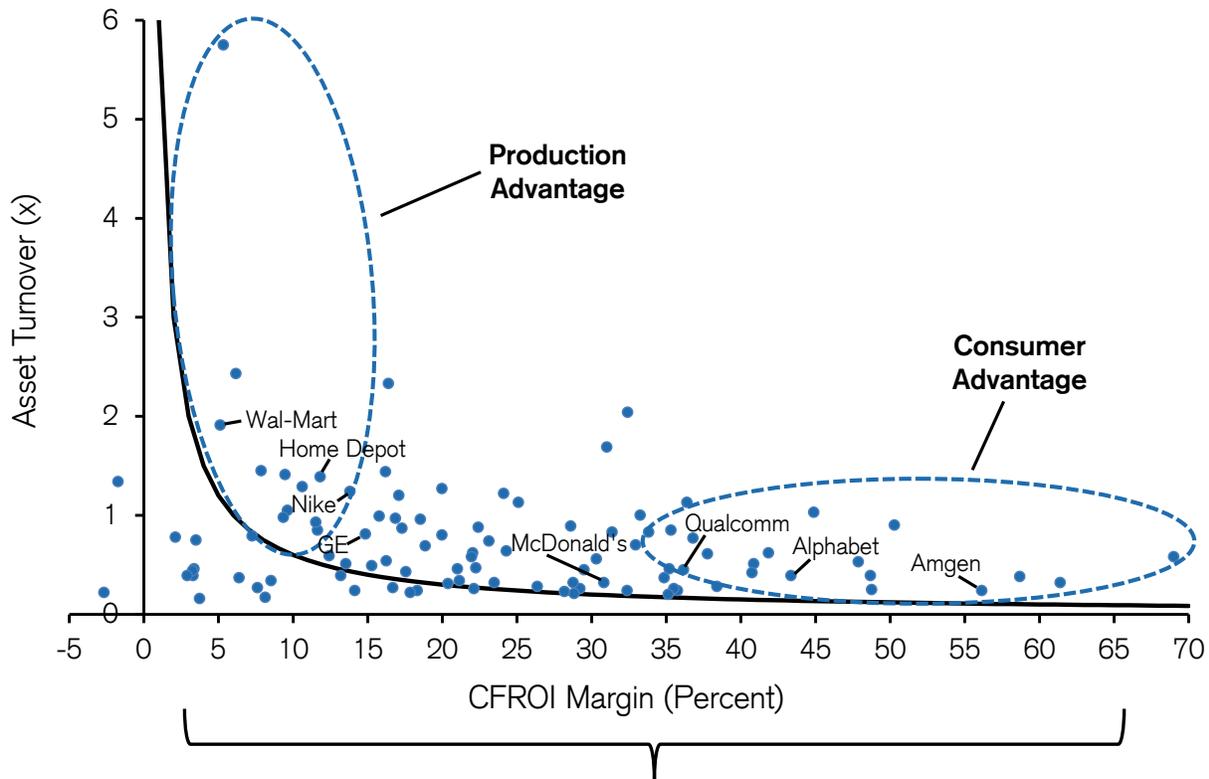
The pattern of cumulative users of an interactive network follows an S-curve, similar to the diffusion of other innovations. However, the S-curve tends to be steeper for interactive networks.⁶² Everett Rogers, a prominent sociologist, found that the plot of new adopters to a technology or network follows a normal distribution. Judging the source and longevity of a company's added value is central to understanding the likelihood of sustainable value creation. A number of companies, including AOL, MySpace, and Friendster, appeared to have built valuable networks only to see their value fizzle.

If you believe a firm has a consumer advantage, consider why the consumer's willingness to pay is high and likely to stay high. Consumer advantages generally appear in the form of high gross margins.

Exhibit 28 allows us to see which companies have production or consumer advantages by disaggregating the sources of economic return on investment. ($CFROI = CFROI \text{ Margin} \times \text{Asset Turnover}$.) The vertical axis is asset turnover. Companies with a production advantage generally have high asset turnover. The horizontal axis is profit margin. High margins are consistent with a consumer advantage. The isocurve shows all the points that equal a six percent CFROI. Using data from Credit Suisse HOLT, the exhibit plots the profit margins and asset turnover for the largest 100 non-financial companies in the world, by market capitalization, for the latest fiscal year. All companies that fall above or to the right of the isocurve earn CFROIs in excess of six percent.

The panel at the bottom of Exhibit 28 shows how companies can take different paths to the same economic return. For instance, Nike and Alphabet have CFROIs of 17 percent. But Nike has a relatively low margin and high asset turnover, whereas Alphabet has a high margin and low turnover.

Exhibit 28: Sources of Economic Return for the Largest 100 Firms in the World



CFROI (%)	Production Advantage			Consumer Advantage		
	Company	Margin (%)	Turns (x)	Company	Margin (%)	Turns (x)
17	Nike	14	1.2	Alphabet	43	0.4
16	Home Depot	12	1.4	Qualcomm	36	0.4
13	General Electric	15	0.8	Amgen	56	0.2
11	Walgreen Boots Alliance	8	1.5	Roche Holding	38	0.3
10	Wal-Mart	5	1.9	McDonald's	31	0.3
9	Daimler	9	1.0	Pfizer	36	0.3
7	Samsung	14	0.5	Union Pacific	35	0.2

Source: Credit Suisse HOLT.

Note: Data for latest fiscal year as of 10/25/16.

Government

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, Basel III on financial services, the Affordable Care Act on health care, and tariffs on the solar energy industry.⁶³

Firm Interaction—Competition and Cooperation

How firms interact with one another plays an important role in shaping sustainable value creation.⁶⁴ Here we not only consider how companies interact with their competitors but also how companies 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 companies rather than viewing competition solely from their own point of view.

The prisoner's dilemma is the classic example of two-person interaction in game theory.⁶⁵ We can consider the prisoner's dilemma in a business context by looking at a simple case of capacity addition. Say two competitors, A and B, are deciding whether to add capacity. If competitor A adds capacity and B doesn't, A gets an outsized payoff. (See the bottom left corner of Exhibit 29.) Likewise, if B adds capacity and A doesn't, B gets the large payoff (top right corner). If neither expands, the total payoff for A and B is the highest (top left corner). But if both add capacity, the total payoff is the lowest (bottom right corner).

If a company plays this game once, the optimal strategy is to add capacity. Consider the problem from the point of view of company A. The expected payoff from adding capacity is higher than the expected value of not expanding. The same logic applies from B's standpoint. So adding capacity gets the competitors to the Nash equilibrium, the point where no competitor can gain by changing its strategy unilaterally.

Exhibit 29: Capacity Addition 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 40 25 40	A B 30 30 30

Source: Credit Suisse.

You might assume that companies always evaluate the potential reactions of their competitors. But that is frequently not the case. During a roundtable discussion in the mid-1990s, for instance, the chief financial officer of International Paper revealed that his company considered basic economic conditions when weighing the decision to build a new paper facility. But he conceded the absence of a game theoretic approach: "What we never seem to factor in, however, is the response of our competitors. Who else is going to build a plant or machine at the same time?"⁶⁶

Pankaj Ghemawat, a professor of strategy, provides a more sophisticated example based on the actual pricing study of a major pharmaceutical company.⁶⁷ The situation is that a challenger is readying to launch a

substitute for one of the incumbent's most profitable products. The incumbent's task is to determine the pricing strategy that maximizes the value of its established product.

Exhibit 30 shows the payoffs for the incumbent (I) and challenger (C) given various assumptions. For example, with no price change for the incumbent and very low pricing by the challenger, the model suggests a payoff of 350 for the incumbent and 190 for the challenger (upper left corner). This analysis allowed the incumbent's management to view the situation from the challenger's point of view versus considering only what it hoped the challenger would do.

Exhibit 30: The Payoff Matrix in the Face of a Challenger Product Launch

Incumbent (I) Price	Challenger (C) Price			
	Very Low	Low	Moderate	High
No price change	I 350 / C 190	I 507 / C 168	I 585 / C 129	I 624 / C 116
C has large price advantage	I 418 / C 163	I 507 / C 168		
C has small price advantage	I 454 / C 155	I 511 / C 138	I 636 / C 126	
I neutralizes C's advantage	I 428 / C 50	I 504 / C 124	I 585 / C 129	I 669 / C 128

Source: Adapted from Pankaj Ghemawat, *Strategy and the Business Landscape-3rd Ed.* (Upper Saddle River, NJ: Prentice-Hall, Inc., 2009), 71.

In our simple cases of capacity additions and product launches, we treated competitor interaction as if it were a one-time event. In reality, companies interact with one another all the time. So the next level of analysis considers repeated games.

Robert Axelrod, a political scientist, ran a tournament to see which strategy was most successful in an iterated prisoner's dilemma. Instead of playing just once, the competitors played 200 rounds of the game with payoffs similar to that in Exhibit 29.⁶⁸ The winning strategy 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.

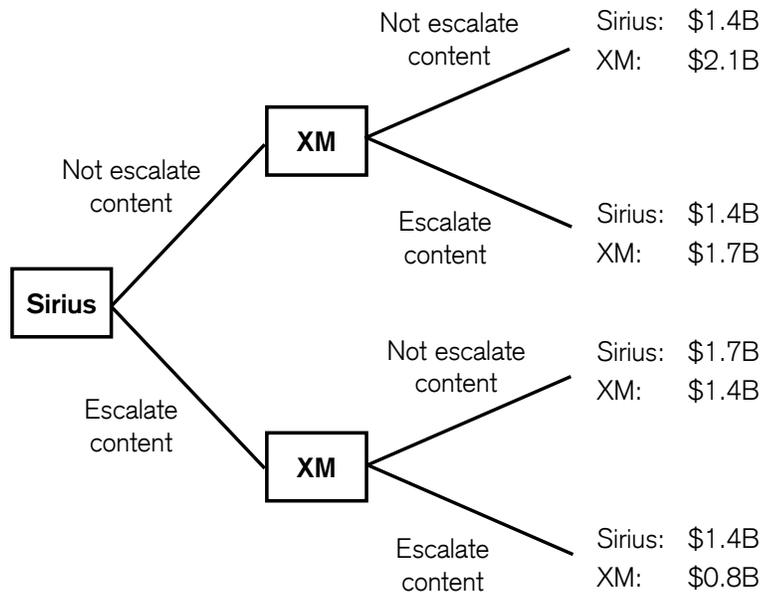
Game theory is particularly useful in considering pricing strategies and capacity additions.⁶⁹ A thorough review of a firm's pricing actions and capacity additions and reductions can provide important insight into rivalry and rationality. You can do similar analysis at the industry level. Institutional memory, especially for cyclical businesses, appears too short to distinguish between a one-time and an iterated prisoner's dilemma game.

Companies and analysts can go beyond a payoff matrix that considers only one-time interaction and build a tree based on sequential actions. The approach here is similar to strategy in chess: look forward and reason backward.⁷⁰

Exhibit 31 is an example of a game tree that Pankaj Ghemawat developed to reflect the payoffs from various decisions in the early days of the satellite radio industry when two companies, Sirius Satellite Radio and XM

Satellite Radio, went head-to-head.⁷¹ Sirius’s choice was between escalating its investment by acquiring its own content and following the traditional radio model of licensing content. In either case, XM could have responded by choosing to escalate its own content investment. The payoffs at the end of the tree show the economic consequences of the various scenarios. In reality, such analysis is difficult because the range of alternatives is large. But game trees provide insight into competitive interaction and hence the prospects for sustainable value creation.

Exhibit 31: Mapping Sequential Moves in Content Acquisition for Satellite Radio Companies



Source: Pankaj Ghemawat, Strategy and the Business Landscape-3rd Ed. (Upper Saddle River, NJ: Prentice-Hall, Inc., 2009), 74-77.

Another good example of game theory is the month-long turmoil in the interbank loan market during the fall of 2008. John Stinespring and Brian Kench, professors of economics, describe the decisions that banks faced when the bankruptcy of Lehman Brothers sent a jolt of fear through the financial system. One result was that banks became reluctant to lend overnight to one another. This institutional lending and borrowing is essential to the liquidity of the financial system.⁷²

Stinespring and Kench frame the decision in the throes of the crisis as a game of Loan or No Loan for two banks, A and B. (See Exhibit 32.) The payoffs in the table are the expected profits for each bank. (A’s profits are shown on the left, and B’s are on the right.) If both banks choose “Loan,” liquidity is preserved in the system, and both banks secure an expected profit of \$10. If both banks choose “No Loan,” interbank lending decreases, liquidity dries up, and both banks incur an expected loss of \$10.

Exhibit 32: Prisoner’s Dilemma in Interbank Loan Market

		Bank B	
		No Loan	Loan
Bank A	No Loan	-10, -10	15, -15
	Loan	-15, 15	10, 10

Source: John Robert Stinespring and Brian T. Kench, “Explaining the Interbank Loan Crisis of 2008: A Teaching Note,” February 1, 2009. See: <http://ssrn.com/abstract=1305392>.

The best result for the system is for both banks to Loan. Nevertheless, when we follow the logic of the payoff matrix, we see that A is unlikely to choose Loan when it considers what B might do. (The same logic applies for B.) If A thinks B will choose No Loan, A will select No Loan (-10 versus -15). If A thinks that B will choose Loan, A's best response is still No Loan (+15 versus +10). It's a classic prisoner's dilemma, where the optimal strategy in a single interaction is the least attractive in repeated interactions.

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 based on conflict. Sometimes companies outside the purview of a firm's competitive set can heavily influence its value creation prospects.

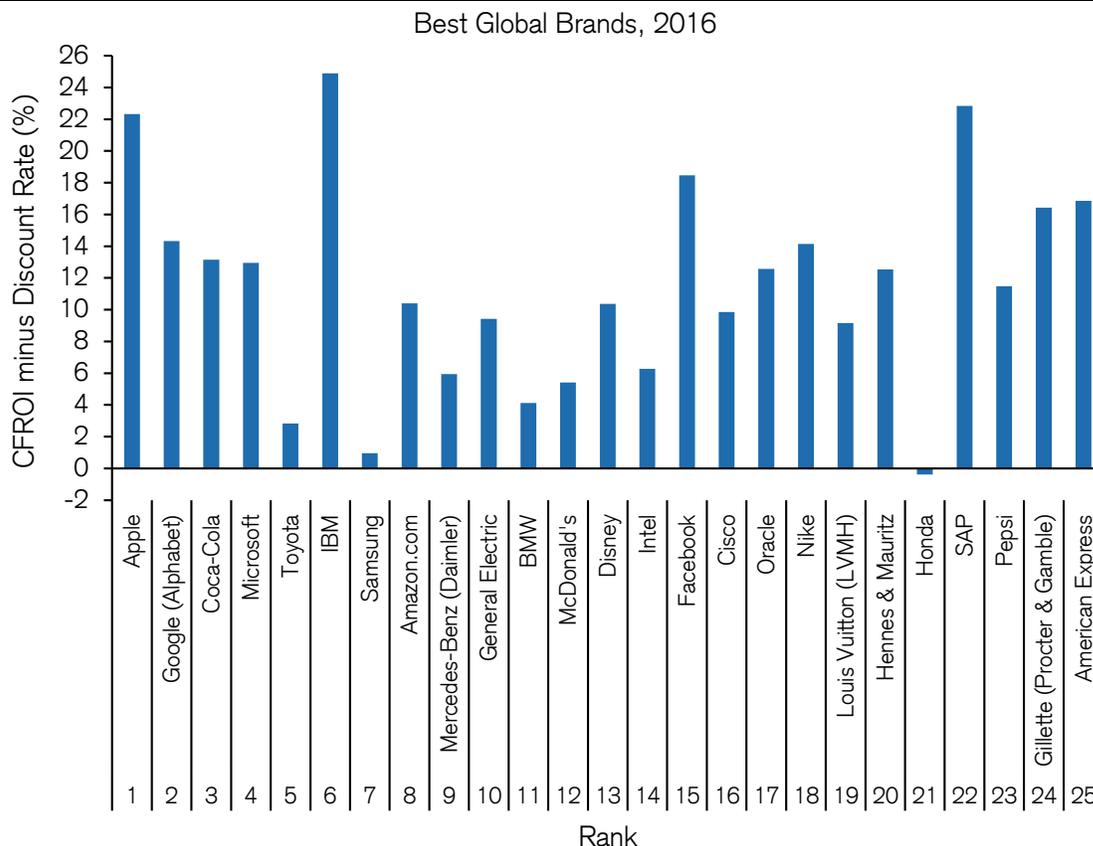
Consider the example electric car manufacturers and the makers of charging stations. A consumer is more likely to purchase an electric vehicle when the number and quality of options for charging increases. And charging stations are more valuable if there are more electric vehicles on the road. Complementors make the added value pie bigger. Competitors fight over a fixed pie.

Brands

When queried about sustainable competitive advantage, many executives and investors cite the importance of brands. The question is whether brands, in and of themselves, are a source of advantage.

Interbrand, a brand consultant, publishes annually its list of the most valuable brands in the world.⁷³ If brands are clearly linked to value creation, you should see a one-to-one relationship between brand strength and economic returns. This is not the case empirically. Of the companies that own the top ten most valuable brands, two barely earned their cost of capital in the latest fiscal year, and there is a weak correlation between brand ranking and economic return. (See Exhibit 33.) So a brand is clearly not sufficient to ensure that a company earns economic profits, much less sustainable economic profits.

Exhibit 33: Brand Popularity Does Not Translate into Value Creation



Source: Interbrand, Credit Suisse HOLT; Note: Returns data for financial companies represented by cash flow return on equity minus cost of equity. Note: Data for latest fiscal year as of 10/25/16.

One way to think about brands is to consider what job a consumer is “hiring” a product or service to do.⁷⁴ Companies tend to structure their target markets by product category or by customer characteristics. But consumers do not buy something just because the average consumer in their demographic is supposed to like it. Instead, they find they need something to get done and they hire a product to do the job. A company can differentiate itself and build a more enduring brand if it truly understands the job customers want done and develops its products or services accordingly. A brand, then, represents a product or service that is effective at getting a job done.

From an economic standpoint, the best way to approach brands is to consider the amount of value added. A brand that represents a business benefiting from network effects or that confers horizontal differentiation may increase a customer's willingness to pay. Google, for instance, benefits from the company's network effects and adds value to the constituents in its ecosystem. The willingness to pay for a brand is high if you are in the habit of using it, have an emotional connection to it, trust it, or believe that it confers social status.

It is less common for brands to add value by reducing supplier opportunity cost. A fledgling supplier may try to land a prestigious company, even at a discounted price, as part of its effort to establish credibility. To the degree that a 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.

Management Skill and Luck

Managerial skill entails creating a strategy and executing it effectively. But while better strategies will lead to more successes over time, a good process provides no guarantee of a good outcome. In the highly complex environment in which companies compete, randomness, or luck, also greatly influences outcomes.⁷⁵

Customers, competitors, and technological change all contribute to uncertainty in decisions. This suggests that outsiders should evaluate management teams and the strategies they devise based on the processes they employ rather than the outcomes they achieve.⁷⁶

There are numerous books that purport to guide management toward success. Most of the research in these books follows a common method: find successful businesses, identify the common practices of those businesses, and recommend that the manager imitate them.

Perhaps the best known book of this genre is *Good to Great* by Jim Collins. He analyzed thousands of companies and selected 11 that experienced an improvement from good to great results. He then identified the common attributes he believed caused those companies to improve and recommended that other companies embrace those attributes.⁷⁷ Among the traits were leadership, people, focus, and discipline. While Collins certainly has good intentions, the trouble is that causality is not clear in these examples. Because performance always depends on both skill and luck, a given strategy will succeed only part of the time.

Jerker Denrell, a professor of behavioral science, discusses two crucial ideas for anyone who is serious about assessing strategy. The first is the undersampling of failure. By sampling only past winners, studies of business success fail to answer a critical question: How many of the companies that adopted a particular strategy actually succeeded?⁷⁸

Let's say two companies, A and B, pursue the same strategy and that A succeeds while B fails. A's financial performance will look great, while B will die, dropping out of the sample. If we only draw our observations from the outcome rather than the strategy, we will only see company A. And because we generally associate success with skill, we will assume that company A's favorable outcome was the result of skillful strategy. Naturally, by considering company B's results as well, we have a better sense of the virtue of the strategy. To counter this effect, Denrell recommends evaluating all of the companies that pursue a particular strategy so as to see both successes and failures.

Denrell's second idea is that it may be difficult to learn from superior performance.⁷⁹ The notion is that superior corporate performance is frequently the result of a cumulative process that benefitted from luck. Said differently, if you were to rewind the tape of time and play it again, the same companies would not succeed every time. Since some high-performing companies succeed by dint of luck, there is very little to learn from them. Indeed, companies with good financial performance that compete in industries where cumulative processes are less pronounced may provide better lessons into the sources of success.

Frustrated by a dearth of rigorous studies on business success, Michael Raynor and Mumtaz Ahmed, consultants at Deloitte, teamed up with Andrew Henderson, a professor of management, to do a statistical study to determine which companies achieved levels of superior performance for a sufficient time to confidently rule out luck. The researchers studied more than 25,000 U.S. publicly traded companies from 1966 to 2010 and used quantile regression to rank them according to their relative performance on return on assets (ROA). (Bryant Matthews, who manages HOLT Model Development, replicated their process and found very similar results.)

This analysis, which controlled for extraneous factors such as survivor bias, company size, and financial leverage, allowed them to understand the empirical parameters of past corporate performance. They then weeded out the instances of high performance that were due to randomness in order to find truly great companies. The bad news is that a large percentage of above average corporate performance is attributable to luck. The good news is that some companies truly are exceptional performers. Their analysis yielded a sample of 344 such companies.⁸⁰

Raynor and Ahmed used their model to see whether the firms hailed as exemplary performers in popular books on business success were likely simply the beneficiaries of luck. The authors examined 699 companies featured in 19 popular books on high performance and tested them to see how many were truly great. Of the companies that they were able to categorize, just 12 percent met their criteria.⁸¹

In an earlier paper they wrote, "Our results show that it is easy to be fooled by randomness, and we suspect that a number of the firms that are identified as sustained superior performers based on 5-year or 10-year windows may be random walkers rather than the possessors of exceptional resources."⁸²

Once the researchers identified their sample of truly skillful companies, they did what other authors of the "success study" genre do: they studied the strategies of those superior companies for common patterns that might prove useful to business executives trying to replicate such sustained success.

They divided the skillful companies into two groups according to the performance threshold they crossed often enough to rule out luck: Miracle Workers (top 10 percent of ROA), which consisted of 174 companies, and Long Runners (top 20-40 percent of ROA), which consisted of 170 companies. They labeled the final group Average Joes.

By identifying a sample of truly superior companies, the authors were able to study the behaviors that appeared to be behind their performance advantages. They couldn't find any commonalities when they looked at specific actions but made a breakthrough when they examined the general manner in which these companies thought. The manner was highly consistent and fit with a generic differentiation strategy. Raynor and Ahmed argue that, when considering business decisions, the skillful companies acted as if they followed two essential rules:

1. **Better before cheaper:** compete on differentiators other than price.
2. **Revenue before cost:** prioritize increasing revenue over reducing costs.

Based on this analysis, they suggest two steps for managers. The first is to gain a clear sense of a company's competitive position and profit formula. Following this step, a company should understand clearly the composition of its returns (return on assets = return on sales x total asset turnover) and its relative competitive position. Companies often compare their current financial performance to the past rather than to that of competitors. Business is a game of relative, not absolute, performance.

The second step is to make resource allocation decisions consistent with the rules. So when faced with a choice between offering a product or service with a low price and minimal standards versus a higher price and superior benefits, such as a strong brand or greater convenience, executives should opt for the latter. Or a company should prefer a merger that realizes the opportunity to expand versus one that simply achieves economies of scale.

Regression Toward the Mean

There is regression toward the mean any time the correlation between two assessments of the same measure over time is less than 1.0. The rate of regression is a function of the correlation coefficient. A correlation coefficient of 1.0 indicates that the next result is exactly predictable from the last, and a correlation of zero shows that the outcome is random. Activities with high correlations are based more on skill, and those with low correlations are based more on luck.

The second column of Exhibit 34 shows the year-to-year correlations for CFROI for 25 industries. The data are intuitive. Industries selling consumer packaged goods are less subject to rapid regression than industries with exposure to commodities, financials, or technology. What's valuable is that the exhibit provides a quantitative means to think about the rate of regression.

The third column of the exhibit shows the average CFROI for each industry. This is essentially the CFROI to which an individual company's results regress.

The combination of a qualitative framework in the report and the quantitative results below provides an investor or executive with a robust framework to assess sustainable value creation.

Exhibit 34: Rate of Regression and Toward What Mean CFROIs Regress for 25 Industries

Sector	How <i>Much</i> Regression?	Toward <i>What</i> Mean?
	One-Year Correlation Coefficient	Long-Term Average CFROI (%)
Food, Beverage, & Tobacco	0.95	8.6
Household & Personal Products	0.95	12.3
Food & Staples Retailing	0.93	8.2
Consumer Services	0.92	8.0
Commercial & Professional Services	0.91	11.1
Capital Goods	0.89	6.7
Health Care Equipment & Services	0.89	11.7
Pharmaceuticals, Biotechnology, & Life Sciences	0.89	8.1
Media	0.88	9.9
Transportation	0.87	5.2
Consumer Durables & Apparel	0.87	8.5
Retailing	0.87	8.7
Regulated Utilities	0.86	3.2
Software & Services	0.85	12.3
Automobiles & Components	0.83	5.2
Telecommunication Services	0.83	6.1
Technology Hardware & Equipment	0.82	6.8
Utilities	0.82	4.1
Insurance	0.81	8.5
Energy	0.78	5.7
Materials	0.78	4.9
Semiconductors & Semiconductor Equipment	0.77	6.6
Real Estate	0.77	4.6
Banks	0.76	9.3
Diversified Financials	0.73	9.0

Source: Bryant Matthews and David A. Holland, "HOLT Industry Profitability Handbook," Credit Suisse HOLT Market Commentary, October 4, 2016.

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 of the prospects for value creation is a critical facet of this analysis. But value creation by itself does not lead to superior stock price performance if the market fully anticipates that value creation.

The expectations investing process has three parts:⁸³

1. **Estimate price-implied expectations.** We first read the expectations embedded in a stock with a long-term discounted cash flow model (DCF). 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 needs 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.

Warren Buffett on Economic Moats

- What we refer to as a “moat” is what other people might call competitive advantage . . . It’s something that differentiates the company from its nearest competitors – either in service or low cost or taste or some other perceived virtue that the product possesses in the mind of the consumer versus the next best alternative . . . There are various kinds of moats. All economic moats are either widening or narrowing – even though you can’t see it.

Outstanding Investor Digest, June 30, 1993

- Look for the durability of the franchise. The most important thing to me is figuring out how big a moat there is around the business. What I love, of course, is a big castle and a big moat with piranhas and crocodiles.

Linda Grant, “Striking Out at Wall Street,” *U.S. News & World Report*, June 12, 1994

- The key to investing is not assessing how much an industry is going to affect society, or how much it will grow, but rather determining the competitive advantage of any given company and, above all, the durability of that advantage. The products or services that have wide, sustainable moats around them are the ones that deliver rewards to investors.

Warren Buffett and Carol Loomis, “Mr. Buffett on the Stock Market,” *Fortune*, November 22, 1999

- We think of every business as an economic castle. And castles are subject to marauders. And in capitalism, with *any* castle . . . you have to expect . . . that millions of people out there . . . are thinking about ways to take your castle away.

Then the question is, “What kind of moat do you have around that castle that protects it?”

Outstanding Investor Digest, December 18, 2000

- When our long-term competitive position improves . . . we describe the phenomenon as “widening the moat.” And doing that is essential if we are to have the kind of business we want a decade or two from now. We always, of course, hope to earn more money in the short-term. But when short-term and long-term conflict, widening the moat must take precedence.

Berkshire Hathaway Letter to Shareholders, 2005

- A truly great business must have an enduring “moat” that protects excellent returns on invested capital. The dynamics of capitalism guarantee that competitors will repeatedly assault any business “castle” that is earning high returns . . . Our criterion of “enduring” causes us to rule out companies in industries prone to rapid and continuous change. Though capitalism’s “creative destruction” is highly beneficial for society, it precludes investment certainty. A moat that must be continuously rebuilt will eventually be no moat at all . . . Additionally, this criterion eliminates the business whose success depends on having a great manager.

Berkshire Hathaway Letter to Shareholders, 2007

Appendix A: Checklist for Assessing Value Creation

Overview

- In what stage of the competitive life cycle is the company?
- Is the company currently earning a return above its cost of capital?
- Are returns on invested capital increasing, decreasing, or stable? Why?
- What is the trend in the company's investment spending, including mergers and acquisitions?

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 do pricing trends look like?
- What class does the industry fall into—fragmented, emerging, mature, declining, international, network, or hypercompetitive?

The First Three of the Five Forces

- How much leverage do suppliers have?
- Can companies pass price increases from their suppliers on to their 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 rates of entry and exit in the industry?
- How will the incumbents react to the threat of new entrants?
- What is the reputation of incumbents?
- How specific are the assets?
- What is the minimum efficient production scale?
- Does the industry have excess capacity?
- 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 costly licenses or patents?
- Are there benefits from the learning curve?

Rivalry

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

Disruption and Disintegration

- Is the industry vulnerable to disruptive innovation?
- Do new innovations foster product improvements?
- Is the innovation 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 analysis of the value chain reveal what activities a company does differently than its rivals?
- 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 (subsidies, tariffs, quotas, and competitive or environmental regulations)?

Firm Interaction—Competition and Coordination

- Does the industry include complementors?
- Is the value of the pie growing because of companies that are not competitors? Or, are new companies taking share from a pie with fixed value?

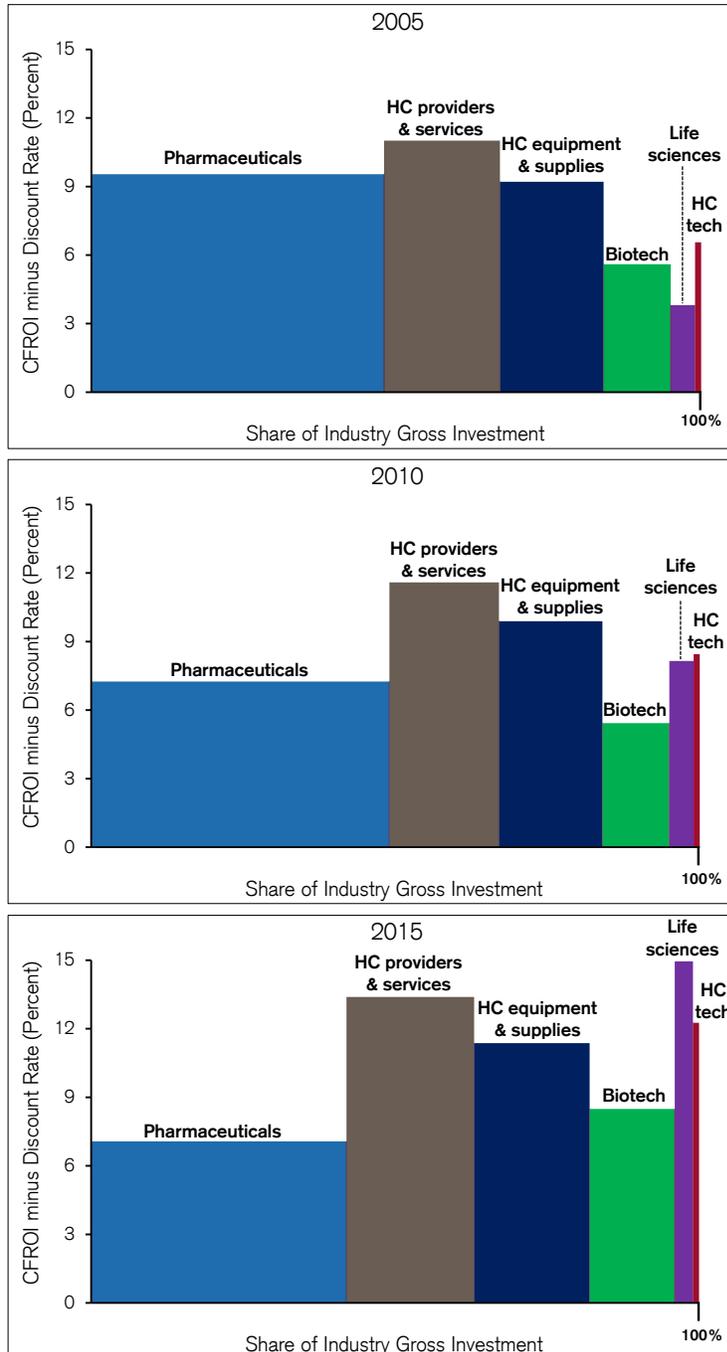
Brands

- Do customers want to "hire" the brand for the job to be done?
- 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: Profit Pool Analysis for Health Care

Our profit pool example in the body of this report showed one of the most value-destructive industries (airlines). Here, we conduct a similar exercise for the U.S. health care sector, which has consistently created value, as well as pharmaceuticals, the sector's largest constituent industry. We begin by using Credit Suisse HOLT data to examine the returns across various activities in the health care value chain. (See Exhibit 35.)

Exhibit 35: U.S. Health Care Sector Profit Pools by Activity, 2005-2015



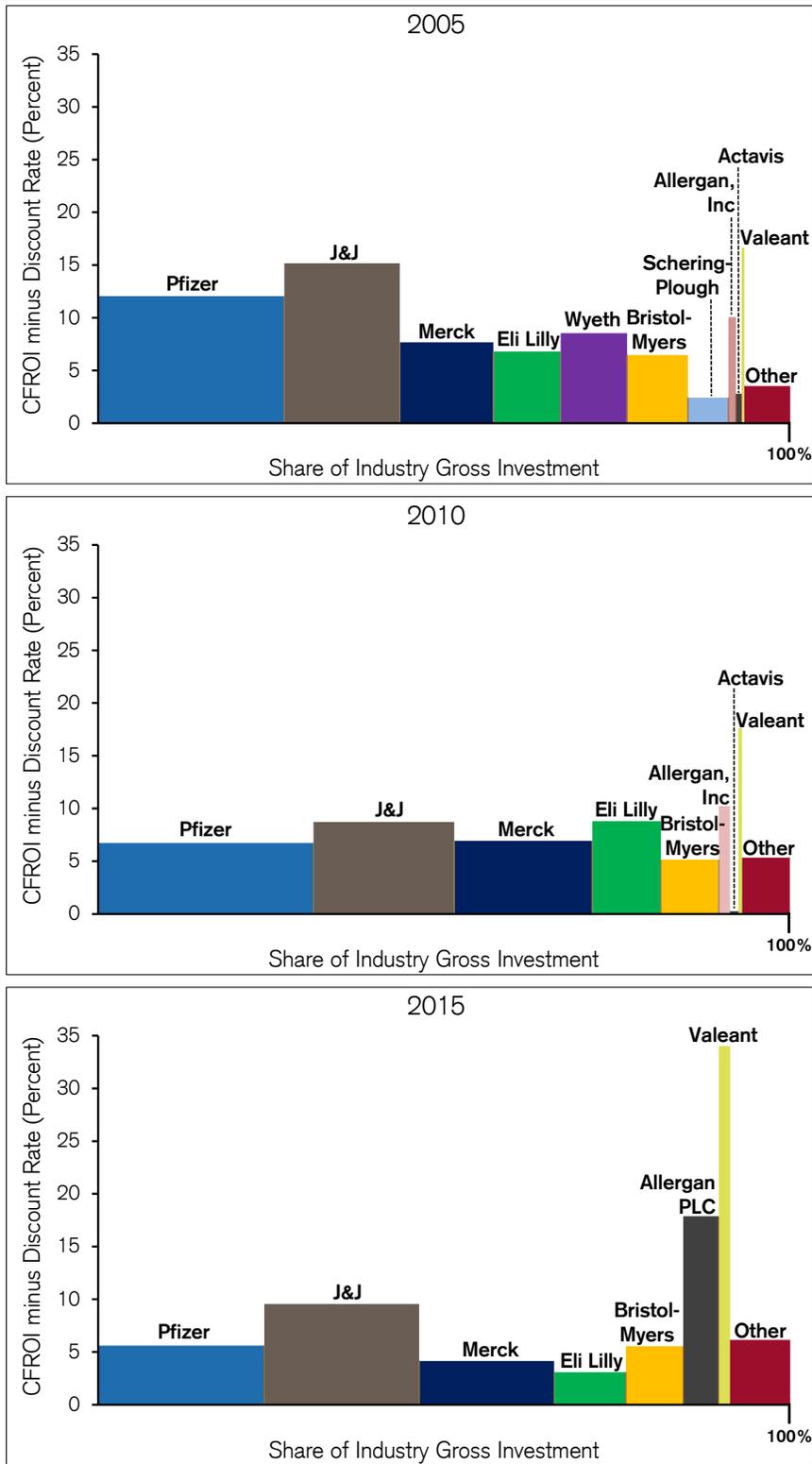
Source: Credit Suisse HOLT.

We see from the horizontal axis that each activity's share of the industry's total investment has shifted slightly over the past decade, with pharmaceuticals shrinking and health care equipment & supplies and biotech growing. The vertical axis tells a similar story, with economic returns falling for pharmaceuticals and rising for biotech, indicating that biotech is capturing a much greater share of the value pie within the overall sector.

We can demonstrate this with some simple calculations. By summing the area of each of the blocks, we find that the total value pie for the sector was roughly \$100 billion in 2005, \$120 billion in 2010, and \$190 billion in 2015. The pharmaceutical industry saw its share of that pie fall from roughly one-half in 2005 to about one-third in 2015, while the biotechnology industry rose from about one-tenth to one-quarter.

We can zoom in on the U.S. pharmaceuticals industry. (See Exhibit 36). 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. At a group level, it is clear that the pharmaceuticals industry has consistently earned above its cost of capital. However, those returns have fallen over the last decade due in part to a dearth of blockbuster drugs and increased generic competition following some key patent expirations.⁸⁴

Exhibit 36: U.S. Pharmaceuticals Industry Profit Pools by Company, 2005-2015



Source: Credit Suisse HOLT.
 Note: J&J = Johnson & Johnson.

Another thing that stands out is the consolidation and declining returns at the top of the industry. The largest three firms increased their overall share of the industry substantially, due largely to merger activity. But over that time, their economic returns fell more sharply than did the returns of the smaller firms in the industry.

We can also determine the total size of the profit pool by measuring and summing the value of each block. The total economic profit of the industry rose from roughly \$50 billion in 2005 to \$53 billion in 2010, and rose to \$60 billion in 2015. The top three firms represented 61 percent of the industry's total economic value in 2015, down from 72 percent in 2005.

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