CHAPTER 1

THE NEXUS OF SCALE, SCOPE, SPEED

"MOST CARS DON'T improve over time. By contrast, Model S gets faster, smarter, and better as time passes... [It] actually improves while you sleep. When you wake up, added functionality, enhanced performance, and improved user experience make you feel like you are driving a new car. We want to improve cars in ways most people didn't imagine possible."[1]

If this sounds like science fiction, it's not. Tesla Motors has been pioneering electric vehicles and over-the-air software updates. Unlike Alphabet, Apple, Amazon, and Facebook, Tesla Motors may not yet have made the *Fortune* 500 list. But Tesla, like the other four, is part of a new breed of companies born in the digital era or shaped by digital shifts that are growing by enhancing their scale and scope of operations at speeds that we have not seen in business ever before. They have already started to exert their influence in your industry and are likely to do so even more in the coming decade.

THE THREE DIMENSIONS OF DIGITAL BUSINESS

In the industrial era, companies expanded their *scale* by increasing sales of their products, which resulted in a higher market share. And this scale expansion was linear based on the company's ability to access the physical, human, and financial capital necessary for growth. Think of Coca-Cola expanding globally and Walmart opening stores across the United States and around the world. Some companies expanded their *scope* by extending their existing product lines and introducing new related ones. Think about Procter & Gamble's steady expansion in household brands, organically and through acquiring other companies, from Ivory body soap to Pampers disposable diapers to Gillette razor blades. Such scope extensions were rather gradual, often requiring significant financial and human capital. This steady and progressive expansion in scale and scope was a successful business strategy.

Digital companies show patterns of scale expansion and scope extension at a *speed* that is wildly different from that of the industrial age. Instead of linear rates of change, digital companies are showing mastery over non-linear, exponential expansion in scale and scope. In doing so, they start to influence industries with new capabilities that take advantage of digital technologies. So you need to locate your business at the nexus of scale, scope, and speed. Here, numbers tell more compelling stories than words.

SCALE

In 1999, Google handled 1 billion search queries; by 2012, that number was 1.2 trillion in a single year and up to 2 trillion searches annually in 2014![2] The company was not in the smartphone business in 2008, but by the end of 2015, more than 1.5 billion devices were running Google-powered Android operating system (OS) software.[3] That's Google's non-linear, exponential scale with search and mobile. If you add YouTube, Google has more than 1 billion users (about one-third of the global online audience), and its watch time has grown 50 percent annually for each of the last three years.[4]

Uber, which had a small set of drivers in 2011, had more than 300,000 drivers by the end of 2015, doubling from 150,000 in 2014. On December 30, 2015, it recorded its 1 billionth ride,[5] and six months later it had reached the 2 billion ride mark.[6] By early 2016, it operated in more than four hundred cities in seventy countries. By comparison,

yellow taxis in New York City—considered a popular ride-hailing city—recorded about 175 million rides in 2014, according to the *Taxicab Fact Book*. The value of taxi medallions, the highly coveted licenses issued by the Taxi & Limousine Commission, which regulates who can drive a taxi in NYC, is declining.[7]

Perhaps more telling are the comparisons between traditional (what I call "incumbent") companies and their digital counterparts. For example, the long-standing Marriott Hotels had about 760,000 rooms available worldwide in 2015.[8] Airbnb, the online accommodation booking service that started in 2008, had 50,000 listings in 2011, grew tenfold to 550,000 listings in 2014, and increased roughly fourfold to 2 million in more than 190 countries by early 2016.[9]

In retail, Walmart reported 260 million customers in 2015.[10] Amazon, the largest online retailer and Walmart's main competitor, recorded 304 million active customers by the end of 2015, after just twenty years of existence.[11] And, in those same two decades, most of Amazon's e-commerce (dot-com) competitors have withered away or become smaller or niche players. Although several large retailers coexisted in the industrial age based on locational advantage and differentiated merchandise, digital-era retail seems to favor one or two large players alongside countless specialist niche players, a phenomenon that has come to be known as "the long tail."

In the nineteenth and twentieth centuries, railroads and telegraph lowered the costs of transportation and communication, and the successful firms were the ones that built and maintained the organizational capabilities necessary to exploit economies of scale. They invested in the capital equipment necessary for high-volume production and local and global networks of marketing and distribution. And they formalized organizational structures and management systems that allowed them to invest to take advantage of economies of scale. In the words of historian Alfred Chandler, the modern industrial corporation of the twentieth century exploited economies of scale because of the "three-pronged investment in production, distribution, and management."[12]

When I talk about the linear growth of the twentieth century's leading companies, I like to use McDonald's as an example. You may remember the sign "Over [XX] Billion Served" that stood in front of each restaurant and was updated periodically. McDonald's reached the 1 million mark in 1955, the 1 billion mark in 1963, and the 100 billion mark on April 15, 1994.[13] I remember seeing the sign "Over 99 Billion Served" in 1994, and then the restaurant simply adjusted all of the signs to read "Billions and Billions Served" and left it at that. Why? Because McDonald's did not keep track of how many individuals consumed their hamburgers; they merely counted the number of hamburger patties shipped to all their locations.

That's the difference now. Digital-era businesses such as Uber, Airbnb, Netflix, and Google have amassed detailed data on their operations. Google's database of our search queries is now in the tens of trillions, and the same holds true for its mobile platform. Uber collects data on its 1 billion–plus rides and uses it to fine-tune its operations in ways that the taxi companies of yesterday could never hope to achieve. Netflix knows our preferences for movies in ways that cable and television companies never did or could: they simply were not designed to collect, process, analyze, and interpret such data. Airbnb knows where, when, and how long we stay in ways that the hotel chains do not and cannot. Amazon knows our buying habits in richer detail than Walmart ever has.

The bottom line is that if you are still operating on the assumption that scale means the number of products manufactured or sold (units)—and that selling more units relative to your direct competitors means a higher market share and therefore a lower per-unit cost and higher profitability—you may be at a scale disadvantage in the digital world.

SCOPE

How did Apple go from being one of many companies selling personal computers in 2001 to dominating the music and telecommunications industries by 2011? How did Google parlay its supremacy in search into

leading the mobile web (Android) and media web (YouTube) and into automobiles and health care within a single decade? How did Amazon go from being an e-commerce bookseller to being a towering giant on the cloud in just twenty years?

Since the end of the Second World War, many corporations have extended their core business into adjacent areas. For example, meat-packing firms took advantage of by-products in their production processes to make leather, soaps, and fertilizers. And Honda used its core engine technology to offer motorcycles, automobiles, lawn mowers, and aircraft engines. By the end of the twentieth century, General Electric (today's GE) was selling not only the home appliances for which it was known but also unrelated products and services such as aircraft engines, entertainment (as part owner of NBCUniversal), and financial services. At that time, most companies that diversified too far from their core markets, such as United Technologies, which was founded as an aircraft manufacturer, and ITT Corporation, which was originally a telecommunications company, were brutally punished by the stock market, and they returned to their core competencies and divested non-core businesses and processes.

Whereas companies traditionally expanded their scope incrementally and relatively methodically by testing and then extending their core competencies in new geographies or market segments or by gradually adding products and services to their core offering (as the auto companies did with financial services, insurance, telematics, and so on), digital-era companies rely on their core competency—data and analytics—to predict with a high degree of accuracy what their consumers want. With machine learning and artificial intelligence, Google, Uber, Netflix, Airbnb, and Amazon can take huge volumes of data and sift it, sort it, and analyze it to expand their scope with new products and markets—even in unrelated industries. And because they can track when, where, and how consumers are reacting—and adjust the offering quickly—they can mitigate risks and capitalize on successes to fuel exponential growth.

So again, the bottom line is that if you are still operating on the assumption that scope means extending your reach only within your own or adjacent industries—and with products or services related solely to your historical core competency—you may be at a scope disadvantage. And if you think that you are only vulnerable to competition from leaders in adjacent industries, you are looking too narrowly at the landscape.

SPEED

You've almost certainly heard Facebook CEO Mark Zuckerberg's motto: "Move fast and break things... Unless you are breaking things, you are not moving fast enough."[14] And that's the idea of speed in the digital world. It's not about being reckless; it's about continuous improvement and iteration, a culture that Zuckerberg calls the Hacker Way, because "hackers believe that something can always be better, and that nothing is ever complete."[15] Using that same premise, Google develops products in the open, adds features daily or weekly, and closely observes how customers use them. This immediate feedback makes customers trusted co-developers. And Tesla maintains and upgrades its cars through over-the-air software updates,[16] which is just another form of speed as a key attribute of digital businesses.

In the industrial age, companies hastened to lock up physical assets such as land and machinery, as well as access to production and transportation. Traditionally, speed referred to the time it took a company to act (and react) to changes in the specific industry and relative to other competitors within that industry. Writing in the late 1980s, George Stalk at Boston Consulting Group argued that: "Companies that meet the needs of their customers faster than competitors grow faster and are more profitable than others in their industries. We argued that time could be the next decade's most powerful competitive weapon and management tool for US companies."[17] Viewed this way, your speed allowed you to reap first-mover advantage relative to others competing against you within the accepted industry definitions. In other words,

your ability to be faster in the market hinged on your organization's own clock speed in areas such as product design and development, manufacturing and supply chain synchronization, and so on. It also depended on your information technology department's ability to speed up the back-office processes—often operating on antiquated systems and legacy infrastructure—to support the development of new products. The slowest part of the interlinked processes defined your speed. As long as your competitors were in a similar state, this did not prove ruinous.

Now, the digital players are dictating the pace of customer service with new services that are enabled and delivered via the cloud and through apps on the mobile phone. You not only need to speed up the back-office processes to compete against your traditional competitors but you also need to calibrate the speed of your delivery to the benchmark set by companies born in the digital era. If you are still operating on the assumption that speed means being the first to move into a new market—rather than the fastest to capitalize on the opportunities—you may be at a speed disadvantage.

THE COMBINATORIAL ADVANTAGES OF SCALE-SCOPE-SPEED

In industrial-age companies, scale, scope, and speed acted independently. The scale decisions were handled within individual business units, which first sought to become efficient in production or distribution at the minimum viable scale before expanding based on the available resources, organic growth, and acquisitions. The scope decisions concerned corporate strategy and often involved mergers, acquisitions, and joint ventures, in addition to significantly realigning the resources of existing businesses. Speed often reflected speed to market (first mover versus fast follower) and defined a company as either slow or fast relative to other competitors within specific industries. As an incumbent in a traditional industry, you already know how to tap into the advantages of scale, scope, and speed within your industry. You may have developed an advantage in one or more of these dimensions compared to your traditional competitors.

As your industry digitizes, progressively in some cases and rapidly in others, you need to look at these three dimensions of your business as being interconnected. Scale and scope still define your company's strategic ambition and address the question: What set of businesses should we operate and at what scale? However, scale at speed creates not first-mover advantage but *fast-mover* advantage, which may currently be limited by your company's internal organizational processes and systems, if they cannot recognize and respond to the shifts as quickly as some of the newer companies. Changing scope at speed also reflects fast-mover advantage, where the advantage may lie not necessarily in launching products but in tapping into scarce critical resources such as unique interconnected data, patents, talents, or research and development projects, often executed with others.

How well you stack up against not only other incumbents, who themselves are transforming, but also against newer-age companies that are aiming to disrupt and transform your industry may well define your ability to compete and win in the digital realm. Those companies that take maximum advantage of scale, scope, and speed together are able to gain significant advantage in the digital business world. First, with data and analytics and connectivity, you can now extend your footprint beyond your core firm's boundaries and tap into extended ecosystems. Second, through sensors, software, and connectivity, you now have the capability to collect data, process information, and learn in ways that would have been difficult if not impossible in the industrial world.

The ecosystem advantage

Whereas scale advantage arose in the industrial world from assets that a single firm controlled and the units that it produced, in the digital world, scale advantage comes from being part of an ecosystem that includes key partners that play complementary roles. Ford and GM's

scale depends on the number of cars produced by them, but Uber's scale is defined by the number of cars it has in its network on a global basis as well as locally in every one of the four hundred–plus cities in which it operates. Whereas Nokia's scale depended on the number of feature phones it manufactured and sold globally, Google's scale advantage, as the architect of the Android mobile operating system, depends on the number of devices produced by its hardware partners in the ecosystem and the number of software apps written by the developers for its operating system. In the industrial age, scale is the result of what a firm does by itself using the assets that it controls and the units it produces. In the digital world, scale is the result of what it may produce by itself *plus* what it can achieve with its partners in the ecosystem. *Tap into the scale advantage conferred by your ecosystems.*

Just like scale, scope advantage in the digital world comes through being part of an ecosystem. You may wonder what's the contrast here between industrial and digital: in industrial, the relationship between a company's core area and its adjacencies had to be pretty close for customers to accept the link; in digital, data as a core area is infinitely malleable so that companies that collect data can more easily apply it across a wide range of platforms, as in mobile platforms. With their core mobile software—Apple's iOS and Google's Android—digital giants can logically extend their scope with different apps. Payment apps, such as Apple Pay and Android Pay, supported by merchants and global retail banks create an ecosystem that allows Apple and Google's parent company, Alphabet, to move into the seemingly unrelated area of retail finance. But they do so for different reasons—Apple to enhance the use of its phone and watch but explicitly not using the information on such transactions, and Google to better target its advertisements by using that information. *Use the scope advantage of your ecosystems.*

In contrast to the industrial world, where a single company could gain an advantage by being the first one into a new market, in the digital world, everyone in an ecosystem has to move at more or less the same speed. Since not all the competencies lie inside your firms, you have to rely on the ecosystems. It's like being on a relay team: one super-fast runner is not going to win the race for the group, though one super-slow runner, like one super-slow company, could lose the game for the entire ecosystem. In other words, your critical skills and capabilities might increase your chances of joining an ecosystem, but your ability to stay up to speed (or even enhance the speed) could well be the deciding factor. Sony PlayStation has succeeded over the past decade because it has mobilized its game development partners with the pace of successive console developments. *Structure your relationships to profit from the speed advantage of your ecosystem.*

Throughout this book, we will explore in more detail how you connect to different ecosystems to gain such advantages to craft your winning strategies.

The learning advantage

An important characteristic of scale-scope-speed is learning from products and services in use and adapting their characteristics to the specific needs of individuals. So how do we think about collecting data? Whereas companies in the industrial world collected data about a few attributes, mostly focused on operational efficiency, and analyzed this coarse, aggregated data over time, digital companies are constantly recording data with detailed attributes and analyzing it using new tools to discern patterns of preference and fine-tune their strategies. To determine how many burgers it sold, McDonald's counted the total number of hamburger patties shipped to its locations. In contrast, Starbucks uses its apps and loyalty programs to understand not only how much coffee it sells but when and where its customers buy their coffee, how they prefer it, how much they spend per transaction, and so on.

Products behave differently under various conditions, and no amount of testing in the lab is enough to understand the particular behavior in actual conditions of use—whether they are tractors on the field or aircraft engines in flight or cars on the road or washing machines in the home. Now, companies monitor their products in so many different locations (even remotely) at scale and in near real time that they have more opportunities than ever before to learn about

them, modify them, and even correct mistakes before the impact is felt too widely. *Learn from products in use at scale to glean early warning signals.*

Companies in the industrial era expanded their scope by branching out to related products or markets, and they made these decisions based on pre-established patterns followed by others and based on analyzing data from market research and other coarse data. In the digital age, companies can actually predict areas of inefficiency by using analytic software and expand into seemingly unrelated areas. For example, GE, after borrowing from the playbooks of Apple, Google, Microsoft, and others, is now on a new mission to use software, apps, and data plus analytics in four industries: buildings, power, industrial transportation, and health care. The company's Predix platform with analytics as the foundation allows it to predict areas of major inefficiencies within and across diverse industries and solve them better than anyone else, including their own customers.[18] Furthermore, we can now not only collect data on our own products but we can also see how products from different companies operate together to solve customer problems. For example, in a health care setting, firms can monitor how their device or medication interacts with other treatments across a wide spectrum of different patients. Bearing in mind proper safeguards for privacy and security, all the companies contributing products (and services) can learn from the data and tailor their products to individual patients, specific treatment plans, and/or any number of other variables. Similarly, companies such as Amazon, Google, and Facebook have access to troves of customer data that could be mined for learning advantage. *Learn from customers that use complementary products to proactively improve key features.*

Industrial-age companies spent a lot of time before starting experiments to make sure that the goals were well specified and the mandates well established. Digital-age companies start projects on the backs of passionate people who try, hack, fail or succeed, learn, and adapt. They "fail fast" and "pivot,"[19] which simply means they learn fast with data, adapt their prototypes, and reflect on customer feedback. They pivot along different dimensions, such as customer segments, channels, revenue streams, partnerships, and value propositions. Since every interaction is an opportunity to collect data about the products and systems in use, they move fast to embrace new ideas not because they are slavish but just to learn at a deeper level. The ultimate advantage at the nexus of scale-scope-speed, then, is reflected in learning through experimentation and taking advantage of the greater scale and scope of your ecosystems. For example, Netflix used machine learning, analytics, and A/B testing—comparing two different versions of an offering—to create its personalized video recommendations.[20] Doing so at speed—understanding the validity of how your assumptions operate and iterating fast based on the results—allows you to refine your working hypothesis in key areas. Or as Eric Ries, an expert on lean startups preaches, validate your learning scientifically "by running experiments... to test each element of the vision," and "build-measure-learn" to accelerate your feedback loop.[21] *Learn from experimentation through data and analytics.*

MASTERING YOUR EXPONENTIAL TRAJECTORY

Learning from ecosystems is continuous. As ecosystems help you scale further; you gain more opportunities to learn. As ecosystems help you expand the scope of your business footprint, so too do your learning opportunities expand. And as you extend your scale and scope at a faster speed, you increase your learning opportunities further. So, scale, scope, and speed are mutually reinforcing. What emerges at the nexus of scale-scope-speed is a new focus on a *non-linear, exponential trajectory*, and your ability to master these shifts as your industry digitizes and evolve exponentially is an important new strategic requirement.

To understand this non-linearity, let's look at an example. Ray Kurzweil, author and resident futurist at Alphabet, believes in a "law of accelerating returns"[22] arising from the exponential increase in the power and functionality of personal computers and smartphones. He traces the ever-quickening evolution from "the mechanical calculating devices used in the 1890 US Census, to Turing's relay-based machine that cracked the Nazi enigma code [in 1937], to the vacuum

tube computer that predicted Eisenhower's [presidential] win in 1952, to the transistor-based machines used in the first space launches [in the 1960s], to the integrated-circuit-based personal computer [in the 1980s]" over the last 110 years. Looking ahead, this exponential increase in the functionality of computing power will extend to other areas such as devices connected to the Internet of Things, wearable computing devices embedded into clothing and footwear, health care devices, drones, 3D printers, robots, and automobiles. As the number of such powerful network-enabled devices increases to 50 billion or more over the next decade,[23] managing the exponential shifts in digital business will become the top priority. Non-linearity in technical features and performance improvements may be obvious to the technologists on your team, but your job is to recognize and respond to the opportunities and threats in this new business landscape of cross-industry ecosystems and extended social and professional networks. The Digital Matrix, which we will look at next, is designed to help you do just that.