Digital business transformation is a journey to adopt and deploy digital technologies and business models to improve performance quantifiably. The first step of this journey is to grasp the need for change—an imperative driven by the inevitability of digital disruption. Digital disruption now has the potential to overturn incumbents and reshape markets faster than perhaps any force in history. Simply put, digital disruption is the effect of digital technologies and business models on a company’s current value proposition, and its resulting market position.

The difference between digital disruption and traditional competitive dynamics comes down to two main factors: the velocity of change and the high stakes involved. Digital disruptors innovate rapidly, and then use their innovations to gain market share and scale far faster than challengers still clinging to predominantly physical business models. One particularly striking case is that of WhatsApp, bought by Facebook in 2014 for a whopping $22 billion.1 WhatsApp’s overwhelming impact on the $100 billion global text messaging market2 delivers a powerful lesson in digital disruption (see Figure 1).

Digital disruptors are particularly dangerous because they grow enormous user bases seemingly overnight, and then are agile enough to convert those users into business models that threaten incumbents in multiple markets. In addition to free text messaging, WhatsApp now allows users to make free mobile voice calls.

However, Facebook is not only looking to disrupt the telecommunications industry. Having introduced person-to-person (P2P) payments via Facebook Messenger, the company is now poised to extend this service to WhatsApp’s 800 million users. WhatsApp is also testing a business model that would help Facebook challenge Google’s domination of the mobile advertising market by charging businesses for the right to contact its users directly. All this disruption comes from one innovative platform that has the seemingly simple function of allowing consumers to send messages to each other via smartphones for “free.”

In a way, WhatsApp’s success (or potential failure) in these ventures is beside the point.3 As ever, some strategies bear fruit, and others do not. But there is no question that the stakes are incredibly high—not only for Facebook’s potential revenue, but also for the many companies WhatsApp disrupts. WhatsApp and other over-the-top (OTT) services are projected to drain global telecommunications companies of $386 billion in revenue between 2012 and 2018 from the use of OTT mobile voice calling alone.4 Could most telecommunications service providers survive a decline like this in a core business?

Digital disruption is not just an issue for firms in high-technology sectors. As we will demonstrate in this report, the impact of digital disruption is being felt across industries. The relatively traditional high-end fashion sector, for example, has been disrupted by digitally savvy incumbents such as Burberry, as well as new entrants such as Net-A-Porter and Gilt. Similarly, the hospitality and travel business has been disrupted in many markets by upstarts like Airbnb, LiquidSpace, and trivago.

When confronted with the specter of such disruption, companies must understand the nature of the competitive change it represents, which technologies and business models will be most disruptive, and how they themselves can address the disruption. The Global Center for Digital Business Transformation, an IMD and Cisco initiative (see below), seeks to understand the state of digital disruption today and the outlook for industries. To this end, we surveyed 941 business leaders around the world in 12 industries (see appendix). Their responses, presented throughout this report, show that digital disruption has thrown many industries into flux, and that the magnitude of change is rapidly increasing.

The number of digital disruptors that have amassed millions of users—and billions of dollars in value—has grown tremendously over the past three years. In venture capital vernacular, a “unicorn” is a start-up that has a valuation of at least $1 billion. Unicorns received their name because they have been historically rare, although they are becoming more common as venture funding seeks disruptive companies with the potential to become the next Alibaba, the Chinese e-commerce portal that in 2014 raised $25 billion in capital—the largest IPO in history.5 According to CB Insights, there are now more than 100 unicorns6—nine with valuations over $10 billion, and two (Chinese smartphone maker Xiaomi, and Uber, an alternative to traditional taxis) at $40 billion-plus. Other examples include drone manufacturer DJI, employment benefits provider Zenefits, P2P lender Lufax, home design platform Houzz, Big Data firm Mu Sigma, and health insurer Oscar Health.

The results of our survey surfaced several troubling findings about the potential for disruption, and incumbents’ readiness to adapt. As Figure 2 illustrates, executives believe an average of roughly four of today’s top 10 incumbents (in terms of market share) in each industry will be displaced by digital disruption in the next five years.

As disruptive as this is, the threat extends not only to displacement of big companies, but also to the very existence of entire industries. Executives in the industries we studied believe digital disruption has materially increased the risk of being put out of business altogether (see Figure 3).

Perhaps most disquieting, despite these potentially dire ramifications, digital disruption is not seen as worthy of board-level attention in about 45 percent of companies (on average across industries; see Figure 4). This indifference extends even to industries such as hospitality/travel and telecommunications, which have been rocked by disruption for over a decade.

This lack of attention in the executive ranks is matched by inadequate strategies for coping with digital disruption. Forty-three percent of companies either do not acknowledge the risk of digital disruption, or have not addressed it sufficiently (again, see Figure 4). Nearly a third are taking a “wait and see” approach, in hopes of emulating successful competitors. The velocity and high stakes of digital disruption, however, may make it unlikely that even 32 percent of companies will succeed in taking a “fast follower” approach. Only 25 percent describe their approach to digital disruption as proactive—willing to disrupt themselves in order to compete.

Given the chaos and complexity of digital disruption, it can be difficult to discern patterns or “laws of nature” in this rapidly evolving competitive landscape—or a prescription for what to do. Yet, a fundamental understanding of how digital disruption works is vital if companies are to devise effective strategies to exploit it (or counter it).

The construct of a vortex helps to conceptualize the way digital disruption impacts firms and industries. A vortex exerts a rotational force that draws everything that surrounds it into its center. There are many examples of vortices in nature, such as when fluids or gases are stirred. These include whirlpools, the wake of an aircraft, and so forth. While vortices are very complex, they have three main features that are relevant to digital disruption:

A vortex pulls objects relentlessly toward its center. As objects approach the center of the vortex, their velocity increases exponentially.7

Within the basic rule of movement toward the center, vortices are highly chaotic. An object can be on the periphery of a vortex one moment, and then drawn directly into the center the next. Objects do not travel a uniform or predictable path from the outside to the center.

Objects within a vortex may break apart and recombine as they collide with one another and converge toward the center.

The Digital Vortex is the inevitable movement of industries toward a “digital center” in which business models, offerings, and value chains are digitized to the maximum extent possible. Physical and digital sources are separated by the force of the vortex, creating “components” that can be readily combined to create new disruptions, and blurring the lines between industries.

We initially began to conceive of digital disruption as a vortex when we used our survey data to determine which industries were at greatest risk of digital disruption within the next five years. We asked executives in each of the 12 industries we studied to estimate the likelihood of disruption based upon four variables (see sidebar). Their responses were translated into a ranking that shows the extent of digital disruption by industry.

An industry’s ranking (and its position in the Digital Vortex) represents the extent of potential competitive disruption within five years as a result of digital technologies and business models. Industries poised for greatest disruption are those in which the most digitization is taking place; those on the periphery of the Digital Vortex are less vulnerable to disruption and may enjoy greater relative insularity. However, all industries—including those that have been more stable in recent years—will see competitive upheavals as innovations become increasingly exponential.

As we can see in Figure 5, the industry that will experience the most digital disruption between now and 2020 is technology products and services—a sector that is unique because it supplies the technological foundations of all disruptions. Its proximity to the center reflects the extent of digital disruption occurring. Pharmaceuticals, meanwhile, is likely to experience the least amount of digital disruption.

The center of the Digital Vortex symbolizes a “new normal” characterized by rapid and constant change as industries become increasingly digital. An industry’s position relative to the center of the Digital Vortex reflects the state of competition a firm in that industry will face, rather than its own digital capabilities per se. The center of the vortex does not represent an end state in which markets stabilize around new competitive leadership for an extended period of time. Finally, in no way does the center imply “going down the drain.”

It is important to understand the inner workings of the Digital Vortex that give rise to digital disruption. To begin, we asked the 941 executives which technologies have the most disruptive potential for their industries in the next five years. The results are shown in Figure 6, a word cloud of verbatim responses they shared.

These technologies are not emerging in isolation from one another. In fact, digital enablers such as these are converging to create an environment of connectedness, linking people, processes, data, and things in new ways—what Cisco and others refer to as the “Internet of Everything” (see sidebar). This connectedness, in turn, supports the creation of new digital business models that can be highly disruptive for incumbents.8 Moore’s Law, open source software, and the advent of cloud computing provide access to applications, platforms, and skills that enable firms of all sizes, from all geographies, to compete against multinational enterprises.

Digital business models can be grouped into three categories: cost value, experience value, and platform value (see Figure 7). As industries move toward the center of the Digital Vortex, physical components (to the extent that they inhibit competitive advantage) are shed. Whatever can be digitized is digitized. The components of digital value can then be readily combined as disruptive business models that knit together different types of capabilities and deliver customer value in new ways. The most successful disruptors of recent years—Amazon, Apple, Facebook, Google, Netflix, and others—employ what we refer to as “combinatorial disruption,” in which multiple sources of value—cost, experience, and platform—are fused to create disruptive new business models and exponential gains.

The term “combinatorial innovation” is most often associated with Hal Varian, chief economist at Google and emeritus professor at the University of California, Berkeley. In his work, Varian develops this idea by citing examples of how technology standardization and convergence throughout history have supported the combination and recombination of technologies, which in turn produces new inventions.9 Combinatorial disruption builds on this principle—the decomposition of value sources into constituent digital parts that are then recombined—enabling the invention of not only the next generation of technologies, but also different types of breakthroughs in the form of new business models. This in turn gives rise to digital disruption, competitive change, and the need for incumbents, in particular, to transform.

Our survey asked when—if ever—executives expected digital disruption to impact their industry. The average time to disruption (meaning a “substantial change” in market share among incumbents) was 3.1 years, a dramatic escalation in the rate of competitive change versus historical levels.

Incumbents now face the “innovator’s dilemma.” As Clayton Christensen of Harvard Business School has observed, “The reason why it is so difficult for existing firms to capitalize on disruptive innovations is that their processes and their business model that make them good at the existing business actually make them bad at competing for the disruption.”10 Incumbents do have cards to play, despite being constrained by, among other things, a predilection for doing things the way they have always been done, shareholder expectations, and unwieldy cost structures, as we’ll see later.

A majority of executives in all 12 of the industries surveyed believe that “insiders” will be the most likely disruptors, meaning both incumbents and start-ups from their own industry (see Figure 8). Executives from several industries with long histories of producing innovative start-ups—media and entertainment, telecommunications, and retail—believe that start-ups will continue to drive disruption. Interestingly, in several industries, including pharmaceuticals, healthcare, and utilities, incumbents were seen as the most likely source of digital disruption. If this is so, it would serve as a corrective to much of the hype surrounding unicorns, and give credence to the notion of a dot-com-style, venture-backed bubble that is artificially propelling disruptive players. This does not mean that companies from other industries do not constitute a threat. As we shall see, they can use “combinatorial disruption” to strike incumbents seemingly out of nowhere. Whether disruption comes from within or outside an industry, the momentum toward the center of the Digital Vortex will continue.

According to the executives we surveyed, start-ups have a clear set of advantages as they attempt to grow their businesses and unseat incumbents. Although leaders such as Elon Musk are rightly praised for their vision, executives in our survey believe that the real advantage of smaller digital players comes not from a grand plan, but from the following capa-bilities (see Figure 9):

Fast innovation

Agility

Culture of experimentation and risk-taking

Clearly, the ability to develop new innovations, and to change quickly as conditions dictate, is a critical advantage—indeed bigger in general than any specific innovations that start-ups bring to market.

In contrast, the incumbent advantages executives cited come directly from having an established market position:

Access to capital

Strong brand

Large customer base

To be sure, large companies can issue new shares, access corporate debt at historically low rates, or leverage their substantial cash flows in the face of competitive turmoil. Many incumbents have also spent decades promoting and burnishing their brands, many of which are themselves worth billions (according to Interbrand, Apple’s is valued at $119 billion).11 And, of course, incumbents by definition have large customer bases.

But many of these incumbent advantages hinge on scale, which is becoming an increasingly fleeting and commoditized asset. Take, for example, Wells Fargo, the second-largest bank by deposits in the United States.12 Wells Fargo first offered online banking services in 199513 and now boasts about 25 million14 active online banking users and 14.1 million15 mobile banking users. Compared to Wells Fargo’s painstaking efforts, MyFitnessPal, a mobile app used with wearable devices (such as Fitbit) for diet and exercise tracking, has amassed more than 80 million users.16 Under Armour, an innovative fitness apparel maker, acquired MyFitnessPal as part of a digital strategy that could include sensor-based clothing in the future that will track movement and biorhythms.17

Snapchat, a unicorn in the mobile video messaging space, is rumored to have upwards of 200 million active monthly users,18 a group roughly the size of the total population of Brazil, the fifth most populous country on earth. In May 2015, Snapchat raised $537 million in capital, valuing the company in excess of $16 billion.19

These examples demonstrate that the first lines of defense—access to capital and large customers bases—that insulated incumbents from upstarts of the past can be surmounted with growing ease. This is because, to use terms from the organizational theorist Geoffrey Moore, the “late majority” has now “crossed the chasm” and exhibits digital behaviors—such as a comfort level with smart mobile devices and apps—that were the preserve of innovators and early adopters only a couple of years ago. As we have seen with WhatsApp, a large customer base is now a sufficient condition for creating disruptive business models that can cross another kind of chasm—the one that once defined one industry from another, and is now narrowing.

As noted, the trajectory of an object circling in a vortex is highly unpredictable—it can be close to the periphery one moment, and drawn directly into the center the next. Executives in industries on the outer edges of the Digital Vortex today, such as utilities, may be tempted to take comfort in the idea that their sector is among those judged to be least prone to disruption. While true, this notion should be considered in juxtaposition with the cautionary tale of another industry: the taxi business. Five years ago, who appeared less vulnerable to digital disruption than taxi companies? Nonetheless, today their value is under siege. They have been rapidly and forcefully pulled into the digital center, obliged to compete with digital competitors such as Uber and Lyft that blend cost value, experience value, and platform value in a potent business model.

Let’s take a closer look at the utilities industry, recalling that our analysis ranked the sector No. 10 out of 12, and on a relative basis among the least susceptible to disruption. Utilities require major capital investment to generate and distribute electricity. However, the value utilities ultimately provide to their customers is power. We’ve already seen significant disruption in the area of renewable energy generation. For its part, Germany gets 26 percent of its electricity from renewable resources (22 percent from solar power).20 The fluctuations and logistical challenges inherent in producing energy from solar, in addition to the flexibility required to integrate power from user-generated solar panels, requires a “smart” grid—that is to say, an enabling digital technology.

Tesla has emerged as a household name and a veritable poster child for industry disruption. Until recently, the primary industry Tesla disrupted was the automotive sector. The company’s ability to upgrade the capabilities of electric vehicles via software downloads makes its cars more valuable to their owners over time.

In May 2015, however, Tesla unveiled inexpensive batteries for the home and business markets that can store energy generated by solar panels and pull power from the energy grid during cheaper off-peak hours.21 The technology that has made Tesla such a formidable competitive threat to automakers—its batteries and software—is highly transferable to power generation and storage. Examples of “combinatorial disruptions,” such as those presented by Tesla, and their applicability to multiple industries and business models, should strike fear in the hearts of incumbents: a single innovation or platform can be used to redefine markets that seemingly have little in common. For this reason, it can be difficult for executives to know who their most fearsome opponents will be, and from which industry they will emerge. Executives who feel insulated from attack by outsiders may fall victim to their own lack of imagination. In fact, combinatorial disruption such as that being driven by Tesla may one day extend to other industries such as oil and gas, financial services, and consumer goods.

Digitization of products, services, and business processes allows disruptive players to deliver the same value a traditional competitor provides— and even augment it—without having to reproduce the conventional value chain. In fact, that is the objective of digital disruption: to provide superior value to the end customer—either a consumer or another business—while avoiding the capital investments, regulatory requirements, and other impediments of “encumbered incumbents.”

We also see this dynamic in the way “fintech” startups are disrupting banks by unbundling their products and services—seizing a share of their most profitable business, while avoiding the barriers to entry that come with being a full-service bank (see Figure 10). These start-ups use a combination of technologies and business models, including analytics and automation, to digitize their offerings. These new offerings can disrupt more than one profitable business at a time, while fulfilling unmet needs in the market (see “Sowing the Seeds of Disruption,” previous page).

The perceived protection we detected among executives largely depends upon the built-in defenses they feel their industries possess. Twenty-five percent of executives believe there are “high” barriers to digital disruption in their industries, with oil and gas (37 percent) and financial services (36 percent) at the top of the list. These barriers include capital costs, regulatory roadblocks, and complexity of business processes. Most disruptive players, however, have little interest in competing on these terms (see Figure 11).

The perception of relative immunity is partly fueled by the knowledge that, to date, fewer disruptive competitors have made inroads into industries like oil and gas. Industries such as technology products and services (cloud computing), retail (e-commerce), and media and entertainment (peer-to-peer file sharing) have all been through multiple waves of digital disruption since the inception of the Internet. However, business models with the potential to disrupt the energy sector, for example, are only in their infancy, or dependent upon early-stage technologies.

Digital disruption is impacting most sectors of the economy and many facets of our lives. With the Internet of Everything, we see the convergence of multiple technology transitions (cloud, mobile, social, Big Data), each having an exponential aspect to it. What happens when one exponential force collides with another? Is there a doubling of their effects? Or an order of magnitude increase? Do they change direction? Or become something completely new? As the level of digitization increases in the vortex, industries are unbundling and recombining—so much so that the notion of “industries” may become extinct. Competing on the basis of membership in a club of companies that identify themselves as “banks” or “utilities” may seem quaint in the decades ahead. Which industry is Apple in? Which industry is Tesla in? As they move toward the center of the Digital Vortex, industries come into frequent collisions with one another, decoupling sources of value, and then merging and creating new competitive forms.

The 44 percent of executives in our study who dismiss digital disruption or question the need to transform would do well to ask themselves, “Why will we be spared such a change? When does security become complacency?” Exponential change looks remarkably like linear change until it reaches what futurist Ray Kurzweil calls the “knee of the curve”— by which time it is too late to prepare.26

Disruptive innovators are digitizing ever more granular pieces of the value chain, in virtually all industries. As a result, value is atomizing, and many of the traditional profit pools upon which market incumbents depend have sprung leaks.27 Our research reveals that a significant number—as much as 40 percent—of incumbents may be left wounded, perhaps mortally, by digital disruption in the next five years. Business leaders also believe that a large percentage of incumbents will win. Those that can harness digital technologies and business models will prevail.

However, our survey highlighted factors that bring into question incumbents’ readiness to battle their new digital rivals. What is sometimes referred to as “premature abandonment of the core”28 (meaning when successful companies unwisely chase growth in new markets, thereby undermining their principal sources of revenue and profit) has been the road to ruin for many market leaders. Many mature organizations still have considerable value they can and should extract from digitizing operations and key internal processes. With corporate profits at record highs, moreover, defensive strategies for incumbents actually may seem perfectly appropriate, and often are.

However, the competitive dynamics associated with the Digital Vortex— unpredictability, turbulence, rapid acceleration, recombination—place a premium on greater foresight, experimentation, and fast execution, particularly as an industry moves toward the center. While moving toward the center of the Digital Vortex is neither good nor bad inherently, it is inevitable (i.e., digitization is certain to increase, yielding new disruptions). Many companies will benefit enormously from digitization of value sources, while others will not. In this environment, winners will be organizations agile enough to innovate rapidly and unbridle their capacity to create cost value, experience value, or platform value for their customers. The real question for organizations considering the need for change is how to make the required transformation.

“Disrupting yourself” does not mean discarding what has made you successful or mimicking in-vogue digital tactics. Rather, it involves challenging the assumptions that have underpinned that success, and stress-testing the ways in which you deliver value to customers. It means changing the organization itself, including its operations, culture, revenue model, and more—in fundamental ways, and perpetually. This is digital business transformation.

As executives navigate their firms through the Digital Vortex, the following areas have been identified as crucial areas of self-assessment:

Which capabilities are required to increase cost value, experience value, or platform value for customers?

How can we combine capabilities to magnify the value our customers receive?

To what degree do we possess these capabilities today?

To what degree do competitors—both traditional foes and “overthe-top” players—possess these capabilities?

If the landscape shifts dramatically due to digital disruption, how quickly can we adapt?

Are our people, processes, and technology29 agile enough?

How do we increase the agility of our organization to ensure we can fend off (or capitalize on) new disruptions?

The remit of the Global Center for Digital Business Transformation is to help companies address these questions head-on. Our Digital Vortex research into the challenges and opportunities posed by digital disruption has been a necessary first step—to codify the nature of competitive change—in what will be a five-year journey for IMD, Cisco, and an ecosystem of other organizations that will be our partners. We hope you will join us as we crack the code on organizational and business model change for the digital era.