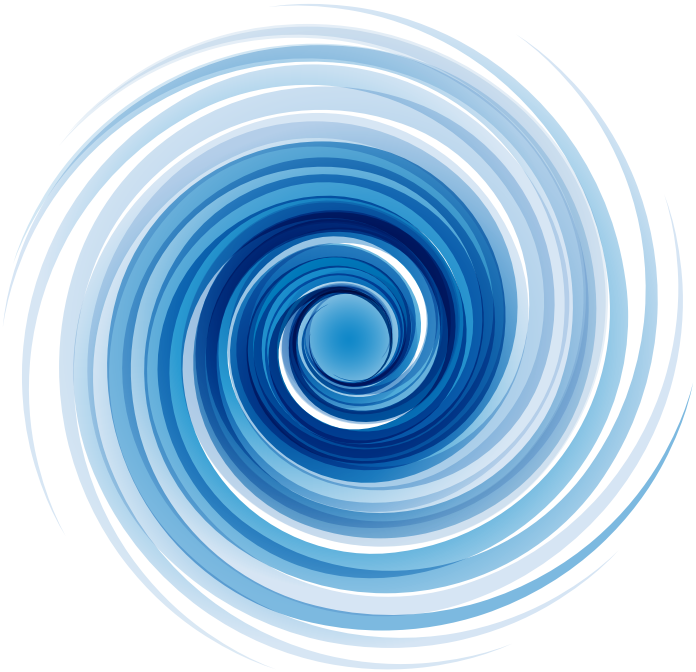
Digital Vortex

How Digital Disruption Is Redefining Industries



GLOBAL CENTER FOR DIGITAL BUSINESS TRANSFORMATION

An IMD and Cisco Initiative

June 2015

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Key Insights

- Digital disruption has the potential to overturn incumbents and reshape markets faster than perhaps any force in history.

- The Global Center for Digital Business Transformation (DBT Center), an IMD and Cisco initiative, is dedicated to original research and to creating opportunities for executives to innovate new business models for the digital age. To learn more about the current state of digital disruption and the outlook for industries, the Center surveyed 941 business leaders around the world in 12 industries.

- The results of our survey surfaced several troubling findings about the potential for disruption, and incumbents' readiness to adapt. Survey respondents 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.

- Despite these dire ramifications, digital disruption is not seen as worthy of board-level attention in about 45 percent of companies (on average across industries). In addition, 43 percent of companies either do not acknowledge the risk of digital disruption, or have not addressed it sufficiently. Nearly a third are taking a "wait and see" approach, in hopes of emulating successful competitors. Only 25 percent describe their approach to digital disruption as proactive—willing to disrupt themselves in order to compete.

- The impact of digital disruption can best be understood through the construct of a vortex. A vortex exerts a rotational force that draws everything that surrounds it into its 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.

- As industries move toward the center of the Digital Vortex, physical components that inhibit competitive advantage (such as manual, paper-based processes) are shed. Whatever can be digitized is digitized. The components of digital value can then be readily combined as disruptive business models. These models knit together different types of capabilities and deliver customer value in new ways. The most successful disruptors employ "combinatorial disruption," in which multiple sources of value—cost, experience, and platform—are fused to create disruptive new business models and exponential gains.

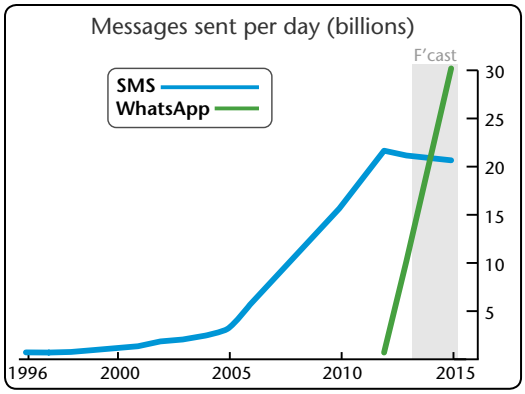
- We asked executives in each of the 12 industries we studied to estimate the likelihood of disruption based upon four variables: 1) investment in disruption, 2) timing of disruption, 3) means of disruption, and 4) impact of disruption. The industry that will experience the most digital disruption between now and 2020 is technology products and services. Pharmaceuticals, meanwhile, is likely to experience the least amount of digital disruption. However, all industries will see competitive upheavals as innovations become increasingly exponential.

- Based on their ranking and placement within the Digital Vortex, firms can evaluate the speed at which their industry will experience disruption. They then can choose to "disrupt themselves" or potentially be displaced by a new business model. This does not mean discarding what has made them successful or emulating in-vogue digital tactics. Rather, they must challenge the assumptions that have underpinned prior success, and stress-test the ways in which they deliver value to customers. It means changing the organization itself, including its operations, culture, revenue model, and more—in fundamental ways, and perpetually.

Introduction

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.

Figure 1
How One App Disrupted an Industry



Sources: Portio Research, a16z, The Economist, 2015

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 market[2] 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.

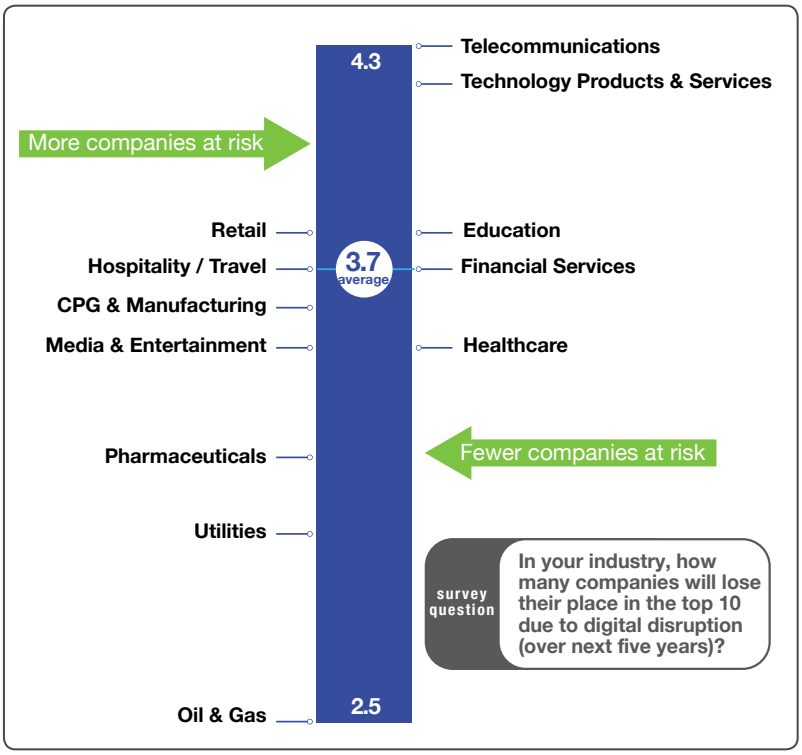
When confronted with the specter of such disruption, companies must understand the nature of the competitive change it represents, which technologies and business models will be most disruptive, and how they themselves can address the disruption. The Global Center for Digital Business Transformation, 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 Global Center for Digital Business Transformation

The Global Center for Digital Business Transformation (DBT Center) is an IMD and Cisco initiative that brings together innovation and learning to create disruptive business models for the digital era. The DBT Center is a global research hub at the forefront of digital business transformation, where executives engage to solve the challenges created by massive market transitions.

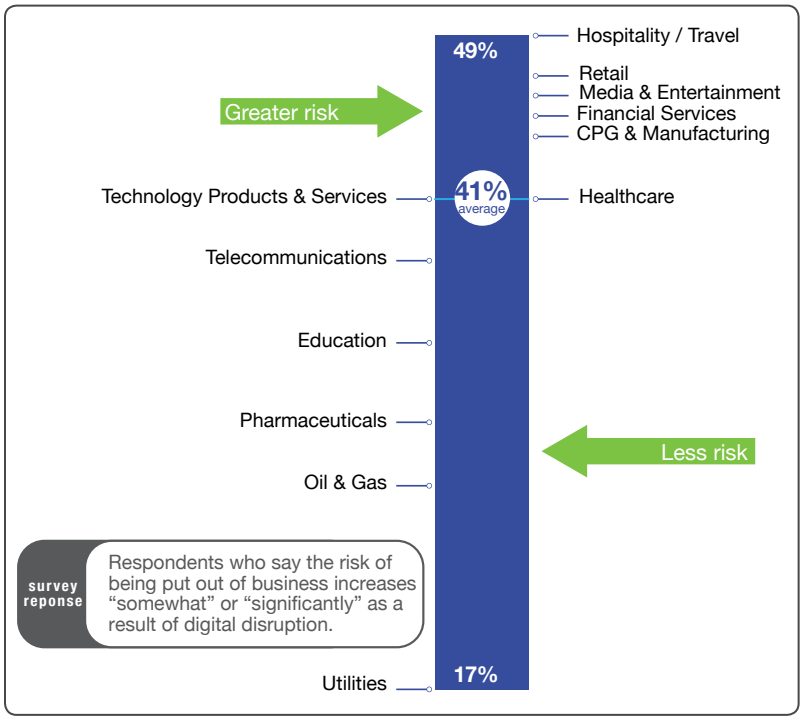
The DBT Center seeks out diverse viewpoints from a wide range of organizations—start-ups, incumbents, and disruptors—to bring new ideas, best practices, and disruptive thinking into the process. The collaboration combines Cisco's leadership in the Internet of Everything—the networked connection of people, process, data, and things—with IMD's expertise in applied research and developing global leaders, focusing on the organizational change required for digital transformation.

Figure 2
The Mighty Will Fall



Source: Global Center for Digital Business Transformation, 2015

Figure 3
Existential Crisis



Source: Global Center for Digital Business Transformation, 2015

Disruptive Dynamics

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 unicorns[6]—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.[]

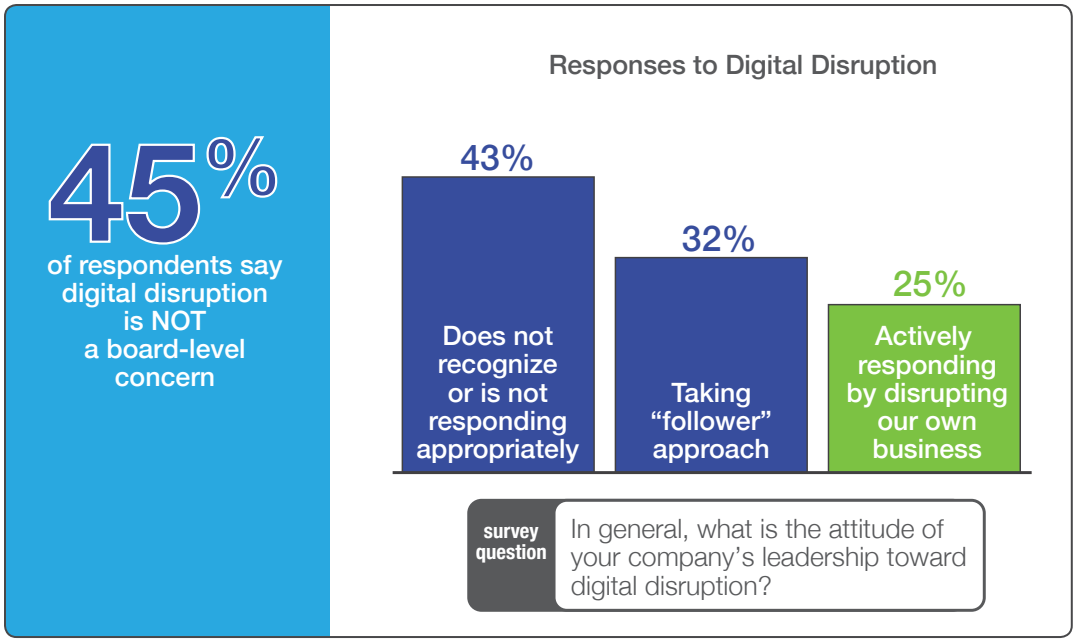
As disruptive as this is, the threat extends not only to displacement of big companies, but also to the very existence of entire industries. Executives in the industries we studied believe digital disruption has materially increased the risk of being put out of business altogether (see Figure 3).

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.

Figure 4
What, Me Worry?



Source: Global Center for Digital Business Transformation, 2015

A Digital Vortex

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:

1. A vortex pulls objects relentlessly toward its center. As objects approach the center of the vortex, their velocity increases exponentially.[7]
2. 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.
3. 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

Vulnerability Assessment

The DBT Center's ranking of industries by potential for digital disruption is based on quantitative analysis of market data and responses from 941 business leaders across 13 countries. The industries were scored and ranked based on the following indicators of potential for digital disruption:

Investment: The level of investment in companies that are focused on using digital technologies to disrupt.

Timing: The length of time until digital disruption is expected to have a meaningful impact in an industry, and the rate of change expected to occur.

Means: The barriers to entry that digital disruptors face in an industry, and the extent of digital business models they have at their disposal to surmount these barriers.

Impact: The extent of disruption, such as impact on the market share of—and the level of existential threat to—incumbents in an industry.

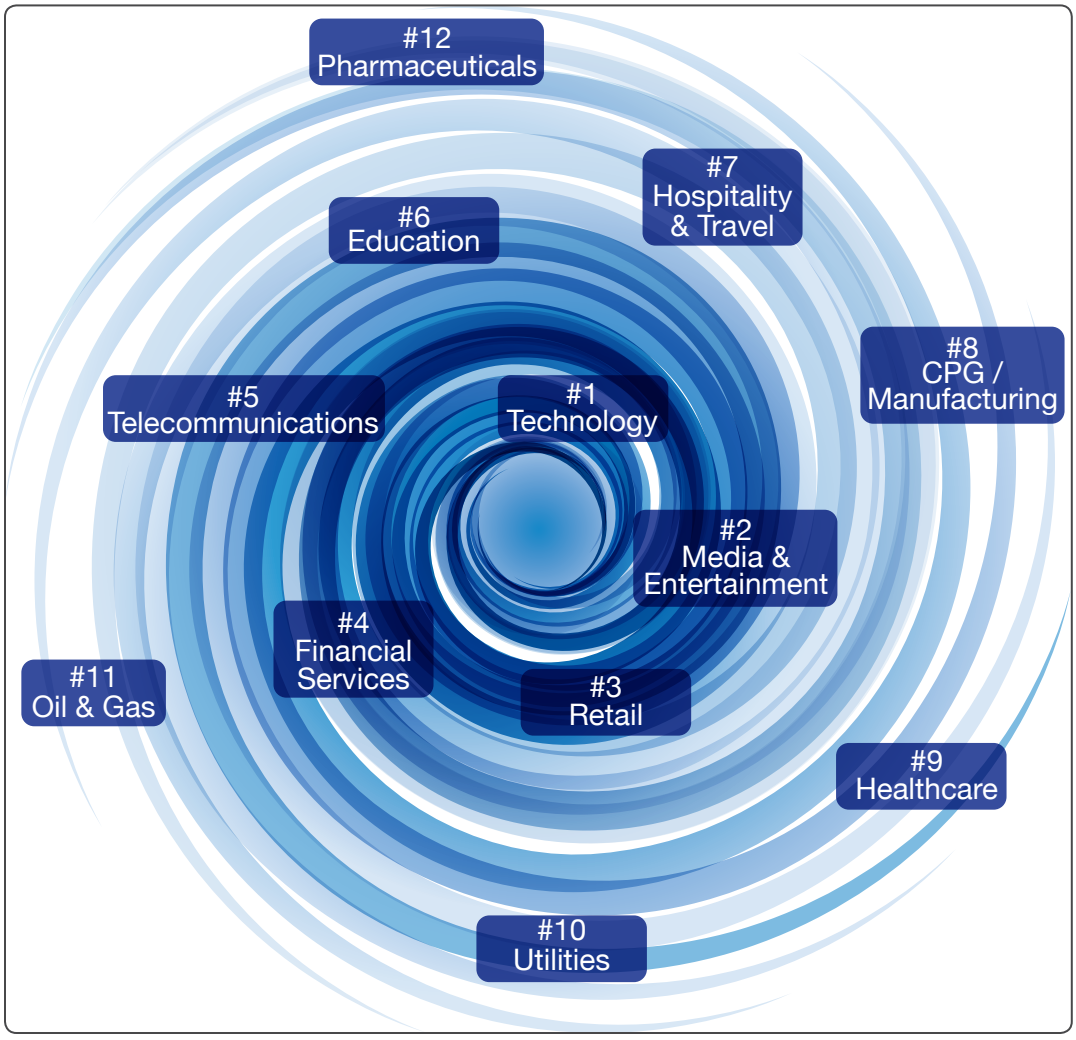
See Appendix for details.

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.

Figure 5
Digital Disruption by Industry



Source: Global Center for Digital Business Transformation, 2015

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

The Internet of Everything

The source of much of today's digital disruption is the Internet of Everything (IoE). IoE is the networked connection of people, process, data, and things, and Cisco projects these connections to surge from 15 billion today to some 50 billion by the end of the decade.With a total Value at Stake of $19 trillion from 2013 to 2022, IoE represents a profound market transition. Cisco defines Value at Stake as the potential bottom-line value that can be created, or that will migrate among companies and industries, based on their ability to harness IoE over the next decade.

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."

Combinatorial Disruption

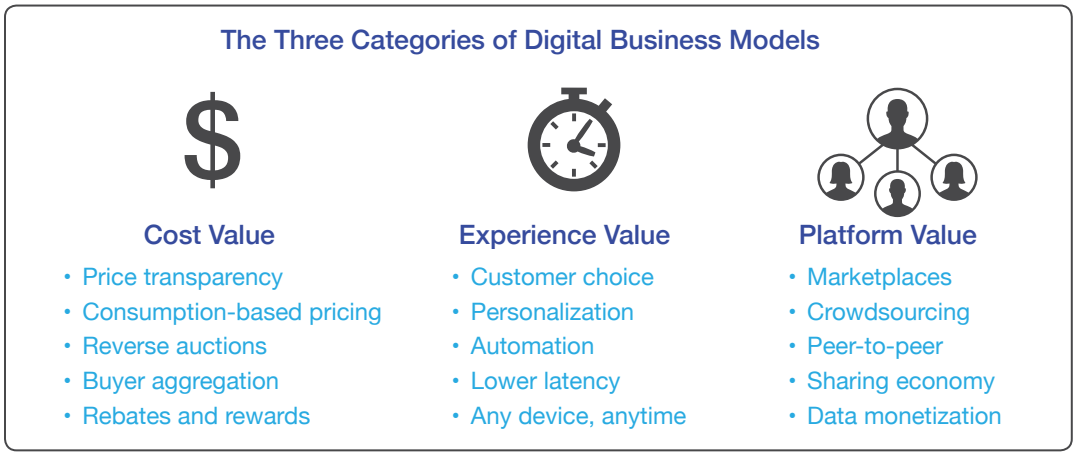
It is important to understand the inner workings of the Digital Vortex that give rise to digital disruption. To begin, we asked the 941 executives which technologies have the most disruptive potential for their industries in the next five years. The results are shown in Figure 6, a word cloud of verbatim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

Figure 6
What Does Digital Disruption Mean to You?

Source: Global Center for Digital Business Transformation, 2015; Image copyright Tagxedo.com

Figure 7
Business Models



Source: Global Center for Digital Business Transformation, 2015

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.

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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.

The Encumbered Incumbent?

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.[]

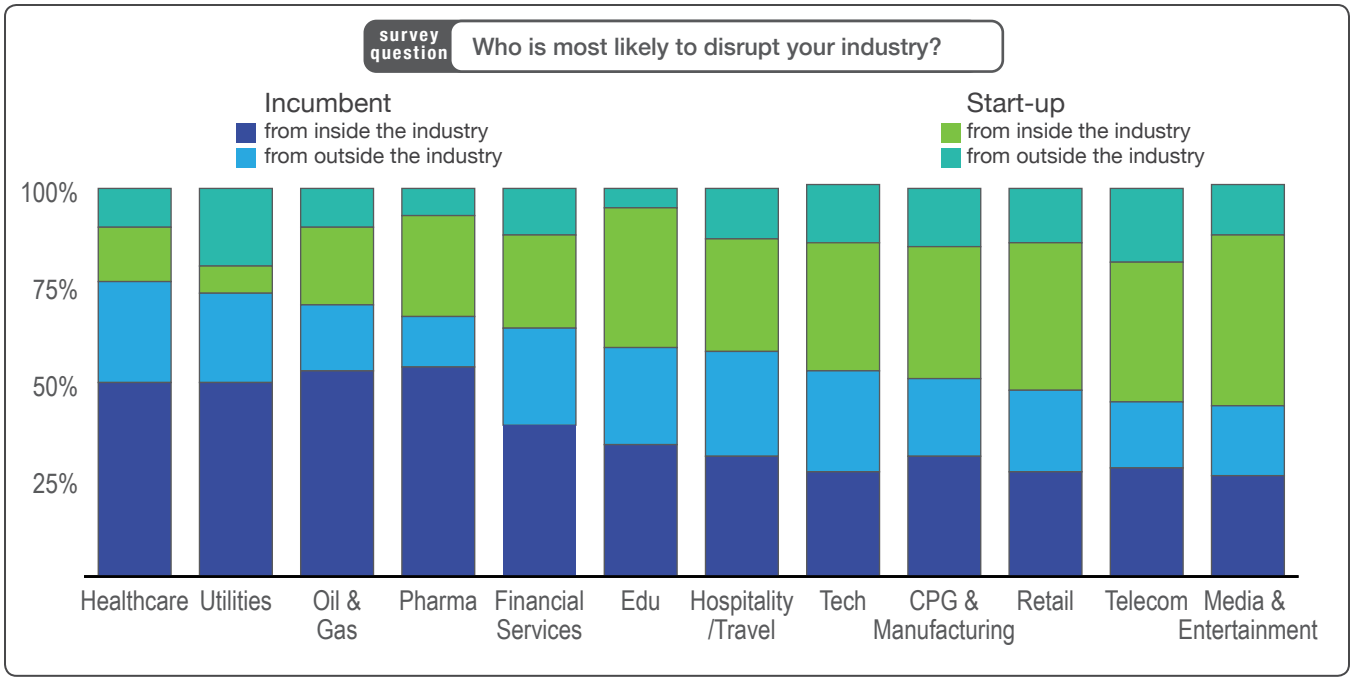
Campus Bullies

While a majority of education leaders point to incumbents as the primary source of disruption, 41 percent of education leaders also fear the rise of "ed-tech" start-ups. So-called massive open online courses (MOOCs), for example, such as Coursera and Udacity, are proving that online university-level education can thrive in a low-cost model by combining highly scalable expert knowledge with a community of learners, merging new sources of cost value, experience value, and platform value. Degreed's mission is to break the stranglehold universities have on issuing credentials. Pluralsight, the only education unicorn, has used a number of acquisitions to increase its capabilities while seeking to dominate the growing market for "hard" computer science and IT skills. Given the stratospheric costs of higher education in many countries, the value traditional institutions of higher learning provide is being questioned in important new ways. Scores of universities, including some of the world's most prestigious, are now compelled to offer competing services, at low or no cost.

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

Figure 8
Inside Job vs. Break-in



Source: Global Center for Digital Business Transformation, 2015

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

Digital Disruption: The Good, the Bad, and the Ugly

What makes the Digital Vortex "spin"? In other words, why is this disruption occurring, and who is it for? The answer, on all counts, is that unmet needs in the market and in our societies can be addressed through digital means. While maximizing profits, delivering convenience, and furnishing users with new sources of amusement play a big role in attracting private equity and venture capital, these drivers are not the full reason we are experiencing an emergence of digital disruptors.

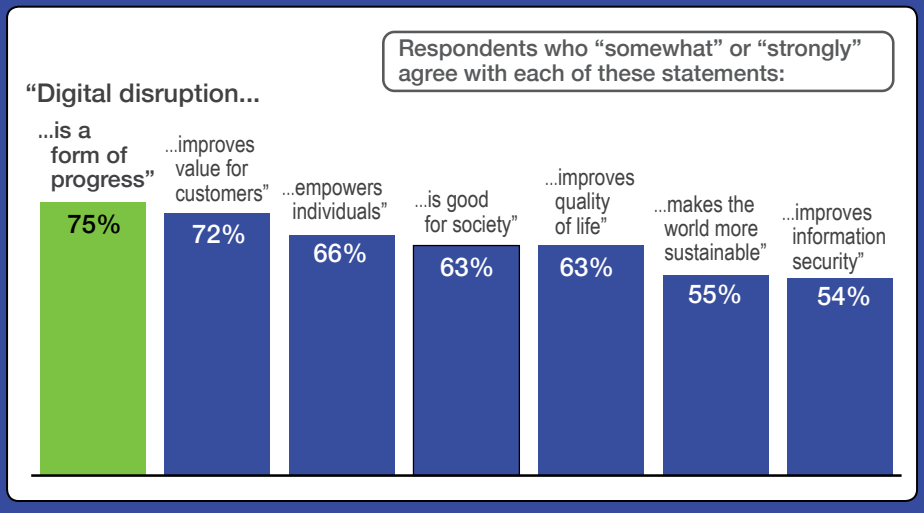
The dynamics are much more complex. Many of the forces driving this change are fundamental—for consumers, getting more value on less income; or for institutions, finding ways to make public goods like healthcare, energy, or education more affordable and effective. Human ingenuity and a pervasive desire to make life better are powering the Digital Vortex.

While clearly not without its downsides, digital has "delivered" thus far in many ways. Economists may debate the productivity gains associated with digital technology,[24] but this debate obscures the fact that customers (both individuals and businesses) are undeniably realizing enormous amounts of value—lower costs, better experiences, and new sources of connection (for learning, for selling or buying, and so forth). This is perhaps why executives in our survey believe that the effects of disruption are, by and large, positive (see Figure): 75 percent said digital disruption is a form of progress—that it is moving us in the right direction; nearly as many say the customer ultimately benefits; and two-thirds believe the individual is empowered—not merely as a consumer, but as a human being.

This is a paradox: While bad for some companies, and perhaps entire industries as they are now constituted, digital disruption may be good for the whole, in a utilitarian sense. This view on digital disruption among executives surveyed may simply be a contemporary vindication of economist Joseph Schumpeter's well-worn observation that capitalism is "creative destruction," in which the old economic order is perpetually cast off to make room for new sources of wealth creation.[25] It is also worth noting that respondents to our survey are executives in large and midsized private sector companies—not government officials, labor leaders, or the unemployed.

It would be naïve to assert that digital disruption does not result in some economic dislocations. Stalwarts of industry are being displaced, put out of business, or limp along, consigned to the dustbin of history. Entire professions are sideswiped by forces like automation, artificial intelligence, and disintermediation. The stature of countries on the global stage waxes and wanes as their fortunes correspond to digital change. It is up to governments, businesses, and civil society together to mitigate these negative impacts, and to support and empower those who are affected.

These dislocations must be considered from a balanced viewpoint, accounting for the unprecedented new sources of cost value, experience value, and platform value in the digital age. Pocketbook savings, convenience, more opportunities to learn and share ideas—these are just a few of the sources of value we are collectively realizing. When combined, these sources can yield outsized benefits. This likely explains why business leaders generally view digital disruption in a positive light, despite a recognition that their own firm may end up on the short end of the stick.



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 capabilities [] (see Figure 9):

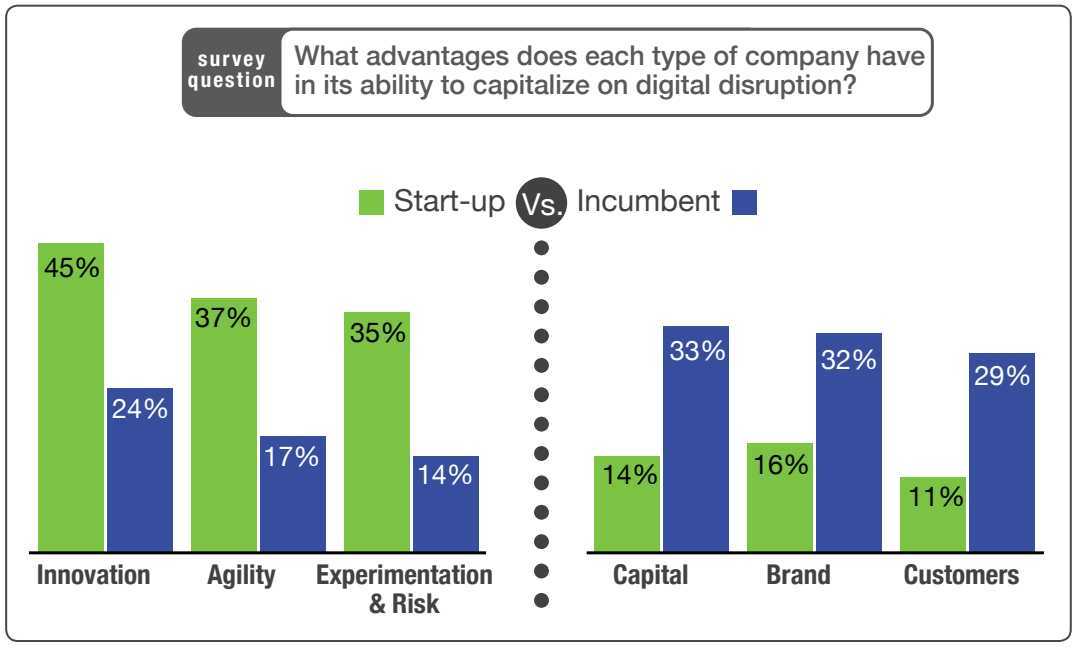
- Fast innovation
- Agility
- Culture of experimentation and risk-taking

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

Figure 9
Fortune Favors the Bold (and Innovative)



Source: Global Center for Digital Business Transformation, 2015

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

The center of the Digital Vortex symbolizes a "new normal" characterized by rapid and constant change as industries become increasingly digital.

$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 1995[13] and now boasts about 25 million[14] active online banking users and 14.1 million[15] 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.

It's the Value, Not the Value Chain

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

Sowing the Seeds of Disruption

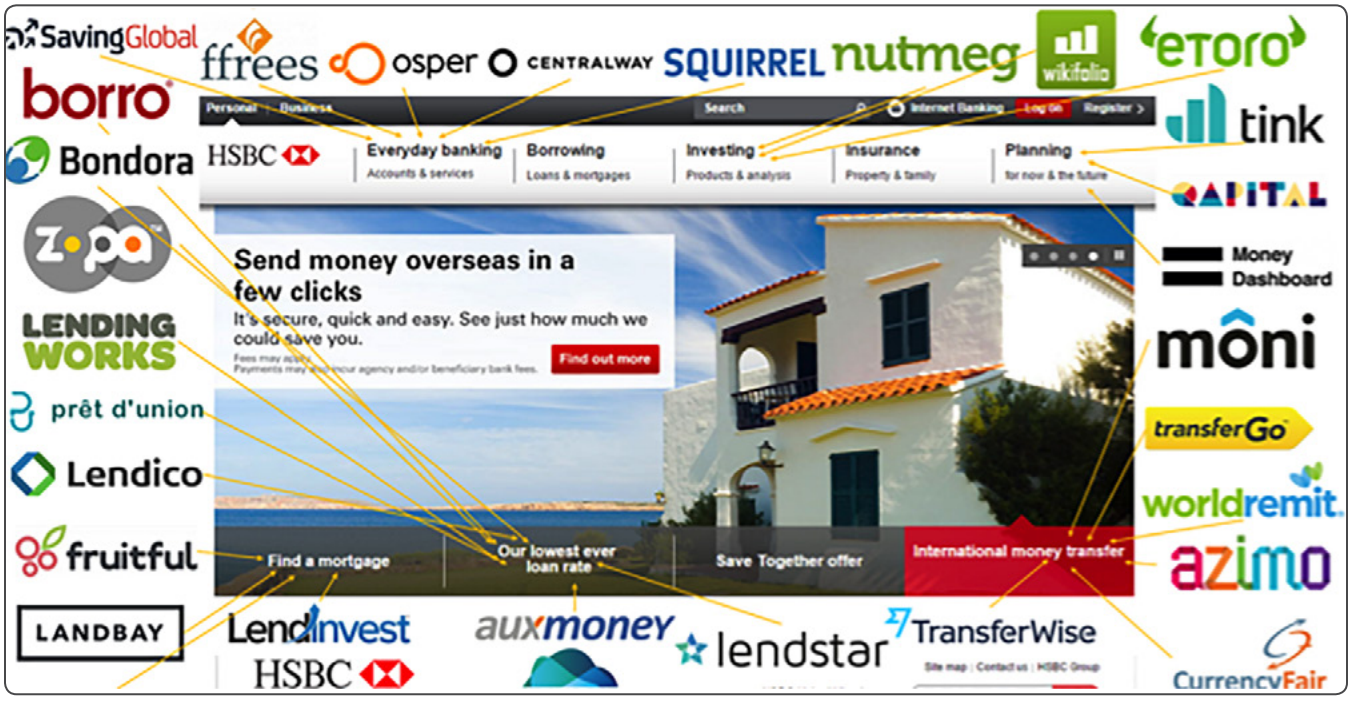
Fruitful is a crowd-funded financial services start-up looking to disrupt savings deposits as well as commercial mortgages. It allows savers to deposit funds and get a guaranteed 6 percent interest rate, with no "lock in" period. Fruitful takes deposits and lends them to businesses that need mortgages. It vets the creditworthiness of borrowers (reducing the risk for the saver) and divides the money automatically among multiple mortgages, making it seamless for both the saver and Fruitful when deposits are withdrawn. Fruitful gives depositors a high rate of interest, while offering those who need business mortgages a fast and "frictionless" alternative to lengthy, paper-based bank processes. While banks are inhibited by regulations and high capital requirements, "fintechs" find it easier to offer attractive alternatives to their customers.

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."

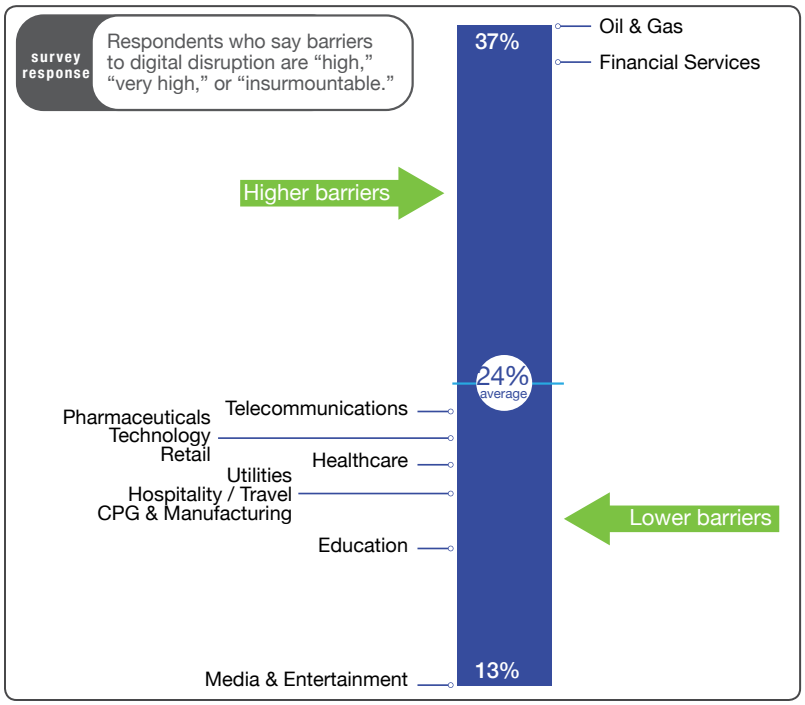
We also see this dynamic in the way "fintech" startups are disrupting banks by unbundling their products and services—seizing a share of their most profitable business, while avoiding the barriers to entry that come with being a full-service bank (see Figure 10). These start-ups use a combination of 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).

Figure 10
Digitizing, Not Duplicating



Source: CB Insights, 2015[22]

Figure 11
Safety Not Guaranteed



Source: Global Center for Digital Business Transformation, 2015

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.

The Road Ahead

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 43 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.

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.

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:

Leadership Checklist for Digital Business Transformation

- 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 "over-the-top" players—possess these capabilities?
- If the landscape shifts dramatically due to digital disruption, how quickly can we adapt?
- Are our people, processes, and technology[29] 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.

Acknowledgements

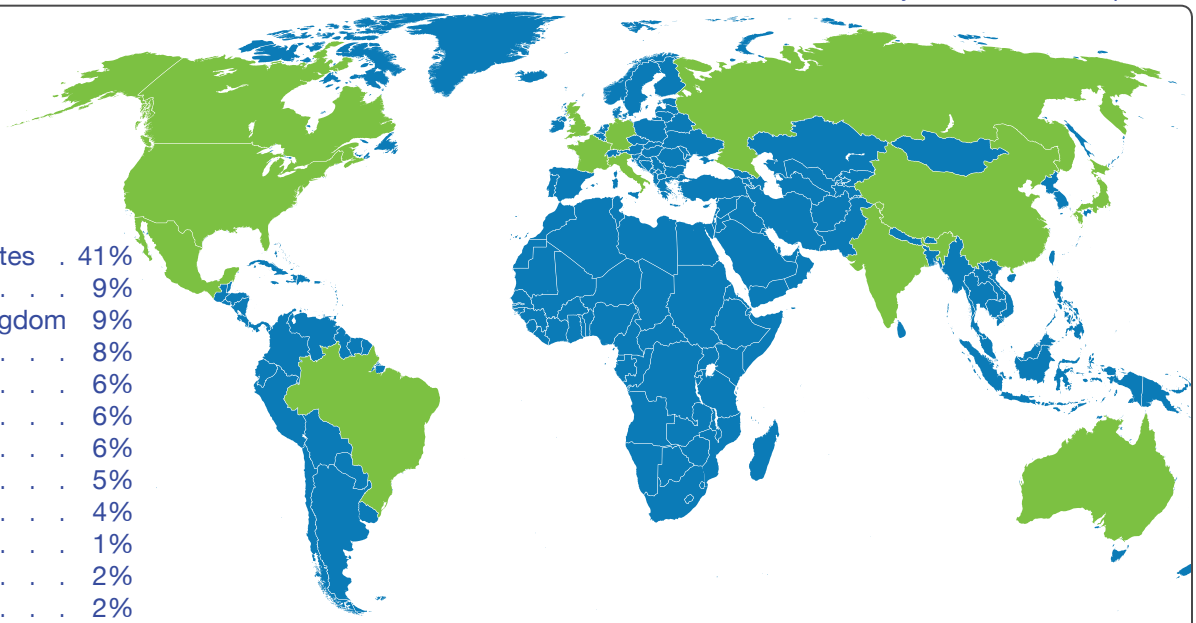
The authors gratefully acknowledge the important contributions of the following people to the development of this report: Caroline Ahlquist, Lauren Buckalew, Andrea Duffy, Remy El Assir, Scott Fields, Cheri Goodman, Carmen Lewis, Thierry Maupile, Martin McPhee, Bob Moriarty, Kathy O'Connell, Edzard Overbeek, Michael Riegel, Rick Ripplinger, Anish Saurabh, Hiten Sethi, Nishant Sharma, Gaurav Singh, Rachael Thomas, Ben Varghese, and Virgil Vidal.

Appendix: Digital Vortex Methodology

Survey Detail

During April 2015, the DBT Center conducted a blind online survey of 941 business leaders globally to understand the state of digital disruption. The characteristics of the survey respondents and their organizations are described below.

Respondent Company, by Location of Headquarters



United States	41%
China	9%
United Kingdom	9%
India	8%
Brazil	6%
Canada	6%
Italy	6%
Germany	5%
France	4%
Japan	1%
Mexico	2%
Russia	2%
Australia	1%

Respondent Company, by Industry

CPG (Consumer Packaged Goods) & Manufacturing	23%
Financial Services	18%
Retail	12%
Technology Products/Services	10%
Healthcare	6%
Telecommunications	6%
Education	5%
Hospitality & Travel	5%
Pharmaceuticals	5%
Media & Entertainment	4%
Oil & Gas	3%
Utilities	3%

Respondent Company, by Annual Revenue

Less than $50 mil	4%
$50 mil < $100 mil	9%
$100 mil < $500 mil	20%
$500 mil < $1 bil	20%
$1 bil < $5 bil	22%
$5 bil < $10 bil	11%
$10 bil or more	14%

Respondent Roles and Functions

Company Executive (e.g., CEO, CIO)	33%
Senior Vice President, VP	29%
Director	38%
Information Technology (IT)	24%
General Management	19%
Finance	16%
Manufacture, Supply, Logistics	7%
Sales	6%
Marketing	5%
Customer Service	4%
Human Resources	4%
Legal, Risk Mngt, Compliance	4%
Research & Development	4%
Other	4%
Procurement	2%

Industry Ranking Methodology

The DBT Center industry ranking methodology is based on a combination of third-party and survey data. In order to assess the relative potential for digital disruption by industry, the following methodology was employed.

Step 1: Identify Indicators of Digital Disruption Potential

The analysis of digital disruption potential by industry began with the identification of key indicators of the potential for digital disruption described in the table below.

Indicators of Potential for Digital Disruption	
Investment	The level of investment in companies that are focused on using digital technologies to disrupt industries. This is an indicator of where investors are placing their bets and where they see the most opportunity for digital disruption to drive economic value.
Timing	The length of time until digital disruption has a meaningful impact on an industry and the rate of change that digital disruption will drive in the industry.
Means	The level of barriers to entry that digital disruptors face in an industry, and the means of disruption (such as the number of disruptive business models) they can use to surmount these barriers.
Impact	The extent of disruption (such as impact on market share of incumbents) and the level of existential threat that digital disruptors represent to an industry.

The DBT Center believes these are meaningful indicators of the relative potential for digital disruption by industry because they address the following questions:

- Where are investors and the market placing their bets?
- How many companies are working to disrupt industries using digital technologies?
- When, and at what rate, is digital disruption likely to occur in an industry?
- With which business models are digital disruptors likely to attack industries, and what are their chances of success?
- What level of disruption are these digital disruptors likely to drive within an industry?

Step 2: Quantify Indicators of Digital Disruption Potential

After defining indicators of the potential for digital disruption, the next step was to identify the specific metrics used to quantify these indicators. Based on examination of dozens of potential metrics, we selected those listed below. Because these metrics were from different sources and in different units, they were translated to standardized z-scores. For indicators with more than one input metric, the z-scores for the metrics were averaged. The final step was to calculate a cumulative z-score for each indicator of disruption potential.

Metrics Used to Quantify Potential for Digital Disruption by Industry

Metric	Indicator	Definition	Source
Venture capital in digital disruption	Investment	The number of venture-backed private companies valued at $1 billion or more by industry as of April 2015.	The Wall Street Journal, April 2015
Number of years to digital disruption	Timing	The mean number of expected years until an industry experiences an impact from digital disruption as predicted by industry executives.	DBT Center survey, April 2015
Extent of exponential rate of digital disruption	Timing	The percentage of industry executives that expect digital disruption in their industry over the next five years to be exponential (i.e., an increasingly rapid rate of change).	DBT Center survey, April 2015
Number of likely digital disruption models	Means	Out of five distinct disruptive digital business models tested in the survey, the mean number that executives believe are likely to have a disruptive impact on their industry within the next five years.	DBT Center survey, April 2015
Barriers to entry for digital disruptors	Means	The percentage of executives from each industry who believe barriers to entry for digital disruptors are nonexistent, very low, or low.	DBT Center survey, April 2015
Displacement of top market incumbents	Impact	The mean number of top 10 incumbents by market share that executives expect to be displaced by digital disruptors within the next five years.	DBT Center survey, April 2015
Risk of being put out of business	Impact	The percentage of respondents by industry that believe there will be a somewhat or significantly increased risk of being put out of business over the next five years due to digital disruption.	DBT Center survey, April 2015

Step 3: Calculate Industry Ranking for Digital Disruption Potential

For each industry, the cumulative z-scores for each indicator were summed to arrive at a cumulative z-score by industry. These scores were then used to arrive at the industry ranking, shown here:

Industries Ranked by Potential for Digital Disruption	
Technology Products & Services	#1
Media & Entertainment	#2
Retail	#3
Financial Services	#4
Telecommunications	#5
Education	#6
Hospitality & Travel	#7
CPG & Manufacturing	#8
Healthcare	#9
Utilities	#10
Oil & Gas	#11
Pharmaceuticals	#12

Step 4: Analyze Patterns

The scores calculated in Step 3 are illuminating beyond the level of individual industries. The order and groupings of industries highlight some key patterns about how digital disruption is likely to occur both within and across industries. The DBT Center used the scoring and underlying data to inform both the in-depth analysis of the patterns of digital disruption across industries and the Digital Vortex analysis that are the focus of this report.

About IMD:

IMD is the top-ranked business school, recognized as the expert in developing global leaders through high-impact executive education. The school is 100% focused on real-world executive development; offers Swiss excellence with a global perspective; and has a flexible, customized, and effective approach.

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To learn more, visit imd.org/dbtcenter or contact the Global Center for Digital Business Transformation at dbtcenter@imd.org.

Notes

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28. *Stall Points*, Matthew S. Olson and Derek van Bever, Yale University Press, 2008.
29. Cisco has invested significantly in understanding the technology strategies foundational to enabling business agility. We refer to this as Fast IT. With the creation of the Global Center for Digital Business Transformation, IMD and Cisco now aim to identify complementary strategies for the people and process change that will unlock still more IoE value.