CHAPTER 1

Digital Disciplines, Strategic Supremacy

On January 24, 1848, James W. Marshall, a carpenter from New Jersey, was helping to build a lumber mill on the American River near Sacramento when he noticed a twinkle in the water. It was the gold nugget that launched the Gold Rush, which, in turn, led to a population explosion and rapid statehood for California as fortune hunters and their suppliers—selling picks, shovels, food, libations, and more—descended on the territory from around the globe. The nonnative population of California grew from under 1,000 at the time of Marshall's discovery to over 100,000 by the end of the next year, thanks to the influx of Forty-Niners—mostly men who left their families behind to find riches. Even when the Gold Rush ended, much of the population remained, and so did a need for business associates, families, and friends to communicate with each other across the emerging nation.

To help meet this need, the Pony Express was launched on April 3, 1860. It could deliver letters and small packages between St. Joseph, Missouri, and Sacramento in only 10 days, a breakthrough for that era. The Pony Express accomplished this feat by using a cleverly engineered system of over 150 stations, hundreds of specially selected horses, lightweight riders, specially designed lightweight saddles, and clever "hacks" such as a horn to alert an upcoming station to ready the next horse. The stations were spaced about 10 miles apart, the distance a horse could go at top speed before tiring. In what was a forerunner to today's packet-switched networks such as the Internet, a lightweight pouch containing the mail was handed off from rider to rider, each rider exchanging horses several times before being replaced himself.

On October 24, 1861—a year and a half after the Pony Express began deliveries—the first transcontinental telegraph network was completed, and in less than 48 hours the Pony Express ceased operations. Thus was a miracle of *operational excellence* supplanted by early information technology (IT) and what might be called *information excellence*. It foreshadowed the critical need to exploit IT—or be trampled and left in the dust.

From Value Disciplines to Digital Disciplines

To help companies avoid a fate like that of the Pony Express, this book delineates four *digital disciplines*—information excellence, solution leadership, collective intimacy, and accelerated innovation—by which IT can galvanize strategy, drive customer value, maximize competitive differentiation, help attain market leadership, and create wealth. The current darlings of Silicon Valley, such as Uber, Nest, Netflix, and Apple, utilize one or more of these strategies, but so can companies in other verticals and with century-old legacies.

Information excellence, as signaled by the transcontinental telegraph, exploits information technology, sophisticated algorithms, and the synthesis of digital and physical worlds to drive better asset utilization, better physical operational excellence, and better business processes: processes that are faster, more cost effective, higher quality, more flexible, more sustainable, or otherwise create differentiated value. Assets can be optimized with information through techniques such as better operations planning to reduce idle time and through predictive maintenance to reduce unplanned downtime.

Uber is a good example of information excellence: It rethought transportation processes by using mobile devices and matching algorithms, and improved asset utilization by using on-demand drivers and their vehicles. Other companies use similar approaches: Airbnb for living spaces; Topcoder for developers. Other examples of information excellence include optimized operations for package delivery firms such as UPS and at ports such as the Hamburg Port Authority and integrated online-offline omni-channel experiences at retailers such as Burberry, featured in Chapter 7.

Solution leadership represents the evolution of standalone products and services to smart, cloud-enabled product-service systems and ecosystems, where firms focus on customer outcomes, one-time sales become ongoing relationships, and competitive advantage evolves from mere product features to ecosystems, communities, and future potential. Products such as cars, thermostats, and dishwashers are being connected to the cloud, but so are services. For example, healthcare services are becoming delivered in part by medical equipment such as connected pills, pacemakers, and CT (computed tomography) scanners.

The Nest Learning Thermostat is a smart device that connects across Wi-Fi to the cloud. From there, it can be remotely controlled by a smartphone, and perhaps someday through smart electric grid demand response and dynamic-pricing based algorithms. Other examples include jet engines from GE that tie to cloud-based analytics and wearables from Nike and its partners that link to cloud services and social networks. Nike's digital strategy is covered in Chapter 10.

Collective intimacy is where independent anonymous transactions become intimate, long-term relationships thanks to "big data" analytics run on detailed customer characteristics and behavior. Relationships become win-win, and products and services become predictive, contextual, and personal.

Examples include upsell and cross-sell of products at etailers such as Amazon.com, improved retention and customer lifetime value at entertainment services such as Netflix, reviewed in Chapter 13, and improved health outcomes through personalized medicine leveraging repositories of genomic data such as at the Mayo Clinic.

Accelerated innovation enables companies to innovate products, processes, and relationships faster, cheaper, and better than their competition by complementing internal resources with ad hoc external ones, through open, external innovation, published big data sets, crowdfunding, open source, platforms and agile development, and crowdsourced challenges exploiting contest economics. Accelerated innovation may be viewed as a meta-discipline, since it can be applied to improve operations and information, products, services, and solutions and customer relationships.

Uber, Nest, and Apple are certainly innovators, but so are Netflix with its Prizes; Procter & Gamble, highlighted in Chapter 16, developing its next billion-dollar blockbuster brand through a combination of internal and external innovation; and GE with its Quests, featured in Chapter 17.

Most of these companies are doing something in each discipline, but GE is applying all four disciplines across its numerous businesses. Opower, a company that is also arguably pursuing all the disciplines, is an interesting case of a company whose strategy is based on applying gamification—leveraging behavioral economics and human cognitive biases—to the business of reducing energy consumption, and is overviewed in Chapter 19.

Immense wealth is being created through the strategic, disruptive application of information technologies in these ways, or lost through the failure to do so successfully: consider Netflix vs. Blockbuster, Wikipedia vs. *Encyclopedia Britannica*, Amazon.com vs. Borders, Yelp vs. Zagat, Facebook's WhatsApp vs. cellular service providers' text messaging services, Uber vs. taxis, or Google vs. any number of newspapers. Upstart startups have overtaken established brands, seemingly overnight. The digital disciplines offer a blueprint for new companies to disrupt current ways of doing business as well as for established firms to reinvent themselves via compelling, digitally enabled value propositions.

Digital disciplines are the latest incarnation of a popular strategy framework—called *value disciplines*—originally developed by Michael Treacy and Fred Wiersema 20 years ago in their seminal article for the *Harvard*

Business Review titled "Customer Intimacy and Other Value Disciplines"[1] and their bestselling book *The Discipline of Market Leaders*.[2] They proposed three value disciplines: *operational excellence* (i.e., better processes), *product leadership* (i.e., better products and services), and *customer intimacy* (i.e., better customer relationships).

Treacy and Wiersema argued that companies should ideally pursue one discipline, and that different companies can dominate different niches in the same industry by pursuing different value disciplines. Consider retailing: Wal-Mart offers convenience and low cost through operational excellence, including a global store footprint and optimized logistics; Tiffany offers product leadership by selling high quality objects of desire in elegant settings; Amazon's Zappos unit competes on customer service and relationships.

Treacy and Wiersema's insights are timeless, but the ascendance of information technologies—including the cloud, big data, social, mobile, and the Internet of Things—enables disruptive applications of the value disciplines approach which couldn't have been anticipated at the dawn of the Internet era, when the cloud was an atmospheric phenomenon, a social was a mixer, cell phones were bricks, and online meant dial-up.

Fortunately, the Treacy and Wiersema framework permits digital extension, evolution, and elaboration. As just one example, customer intimacy implied dedicated, onsite account teams in business markets and a personal touch in consumer markets: think avuncular corner butchers or personable sales clerks. In other words, customer intimacy required an organizational, people-based, cultural approach. Today, it is just as likely to entail applying sophisticated algorithms to customer transaction or other data to provide offers that maximize customer satisfaction, consumer and business customer outcomes, retention, and profitability through upsell/cross-sell and reduced churn. IT is increasingly, inexorably, inextricably intertwined with the creation and delivery of customer value. And we are just at the beginning of this digitally enabled journey.

Market leadership based on implementing these strategies can be measured in terms of traditional business metrics such as market share, revenue, profitability, labor productivity, and return on invested capital. One study[3] showed that a dollar invested in IT returned almost two, mostly through revenue growth rather than cost reduction. Moreover, this return was substantially higher than investments in R&D (research and development) or marketing, making it somewhat ironic that marketing budgets are currently[4] three times larger and growing twice as fast as IT budgets, although the CMO (chief marketing officer) is increasingly funding digital initiatives due to their strategic importance.

However, the benefits of the digital disciplines can also be measured in terms of environmental, community, and societal benefits. For example,

IT can reduce carbon footprints through substitution, such as when videoconferences replace physical travel; synchronization, as with electricity demand response; and reuse, as with collaborative consumption, sometimes called the *sharing economy*.

Or consider Ushahidi CrowdMap, a cloud-based application that has helped increase the transparency of Kenyan elections and the effectiveness of Haitian earthquake relief. The Arab Spring reached critical mass largely due to Twitter and Facebook. Basic mobile phones have increased the transparency and efficiency of fish markets in Kerala, India, increasing the availability of fish to consumers, and of incomes to fisherman.[5] While success for most businesses might be defined by profitability or market share, for a nonprofit or enlightened corporation it can (also) be measured through the achievement of social goals and alignment with values. Rather than—or in addition to—being profit-maximizing, author Dan Pink calls these organizations "purpose-maximizing."[6]

Information Excellence

Although implementation details of the four digital disciplines of necessity vary in their application across industry verticals and by firm, as generic competitive strategies, they are easy to understand.

Information excellence is not shorthand for data quality, but the employment of comprehensive real-time information, predictive analytics, dynamic optimization, and integrated virtual and physical operations to implement better business processes and to better use assets.

"Better" as perceived by customers in terms of quality and performance. "Better" in terms of financial metrics, such as returns on invested capital through better asset utilization. "Better" in seamlessly integrating the virtual and physical worlds of information and operations. "Better" in terms of activities, process design, and rightsizing assets—doing things right—and outcomes—doing the right things. "Better" as in faster, cheaper, more flexible, higher quality, more reliable, more convenient, easier to use, more available, or more sustainable. "Better" as in making better decisions; executing those decisions with higher likelihood of success; and doing it all faster than the competition. Business processes are not limited to internal back-office constructs, but extend to customers, customers' customers, and end-users, as well as to supply chain partners and other stakeholders.

Businesses can exploit information throughout virtually all processes. Which customers should be targeted with promotions? Which services are most profitable and should receive incremental marketing investments? Which direct mail layout results in the greatest response rate? Which

products will sell the most this season and thus should be inventoried to minimize stock-outs? Those are obvious kinds of questions that big data and predictive analytics can help answer. But it isn't just sales, marketing, or supply chain optimization. How about whose air conditioner should be lowered or shut off to avoid brown-outs? Which of the candidates is best for this job? How fast should this train go? Which potholes should be fixed first? Is this melanoma? The essence of information excellence is acquiring data, analyzing it, synthesizing information and insight, and then making decisions and optimizing virtual and physical processes, customer experiences, and relationships.

For example, UPS plans its routes via ORION (On-Road Integrated Optimization and Navigation), which implements state-of-the-art algorithms to minimize driving distance and fuel consumption while minimizing late deliveries.[7] If an average truck needs to make 120 stops, there are 6,689,502,913,449,135,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000 different possible sequences of stops, not including additional options to get from one stop to the next.[8] UPS has 55,000 such routes in the United States alone, and therefore 55,000 such calculations to perform. Every day. This type of problem is obviously not amenable to human solution, and to make things even more complex, ORION needs to balance out an optimal solution with a degree of delivery consistency. UPS expects to save several hundred million dollars annually when ORION is fully deployed.

Kroger's QueVision system uses infrared cameras to track shopper arrivals, feeding a proprietary algorithm that then predicts the number of cashiers needed, reducing average wait time eightfold. And Kroger isn't just focusing on its own processes; it's also aiding consumers with theirs: a mobile app will plot out optimal paths through the store based on grocery lists.[9]

Chapter 7 will delve into Burberry, which has leveraged information excellence to achieve dramatic growth in the luxury goods industry, by offering streamed fashion shows live at stores on the world's biggest digital signage, deploying mirrors in dressing rooms that magically display runway clips of the clothing items being tried on, and by arming store personnel with a customer's purchase history on an opt-in basis to ensure fashion consistency.

Solution Leadership

Solution leadership is a broad concept encompassing extensible, adaptable, smart digital products and services connected to cloud-based capabilities

and an expansive partner ecosystem including social networks, which all together offer a unique, differentiated "product-service system" that can grow exponentially—in terms of features, customer adoption, and revenues—via network effects.

The original Apple iPod was a better *product*, thanks to its innovative click wheel, elegant design, and features such as random shuffle. It was also a better *solution*, thanks to iTunes and access to a near-infinite library of songs. The Apple iPhone was a better *product*, thanks to its innovative touchscreen, elegant design, and ease of use. It was a better *solution*, thanks to the App Store and the third-party app developer community. Thanks to network effects, more customers mean more apps, and more apps mean more customers. More of both mean more money: the Apple App Store crossed the $10 billion per year revenue threshold in 2013,[10] and grew another 50 percent in 2014.[11]

Services are becoming smart, digital, and connected, too: Pandora, TiVo, Netflix, and Shazam are connected services, driven by the cloud. Amazon.com is a connected retail service. But it isn't just virtual services: Domino's pizzerias are connected; the water and electric and cable utility services have points of presence such as smart meters and set-top boxes that are connected; Staples in-store copiers are connected; Uber transportation services are connected; FedEx and UPS delivery services are connected; and so on.

Products and services aren't limited to handheld devices or web applications running on PCs. BMW Group has driven past treating cars as standalone products and now views them as smart, digitalized[12] solutions that tie to a global cloud of data centers, offering solutions ranging from entertainment to real-time traffic information, access to social networks such as Facebook and Twitter and services such as Pandora and Yelp. Nike has sprinted past the idea of athletic shoes as just products, and now sees them as integrated with cloud-based activity trackers, digital coaching services, and social networks such as Facebook. GE sells aircraft engines and wind turbines, but is flying high by tying them back to engineers and customers who are fed enormous amounts of data to maximize performance and improve designs. Chapter 10 will delve into Nike's approach to solution leadership through the Nike+ flexible partner ecosystem, and Chapter 17 will examine GE in more depth.

Collective Intimacy

Firms know that social media should be a part of their strategy. Today's successful businesses are exploiting social media to engage with millions or hundreds of millions of customers, enhancing personal relationships with those customers 140 characters at a time. But collective intimacy is much

more than that; at its heart it is about developing intimate, value-added relationships with every customer. Collective intimacy goes beyond mass personalization to develop a unique relationship with *each* engaged customer, based on insights derived from *all* customers using big data algorithms.

Only a few industry leaders are effectively integrating all the elements of a collective intimacy strategy—exploiting social media and communities together with customer relationship management, collection of data including not just stated preferences but also actual customer behavior, characteristics, and contexts, and using advanced algorithms to build virtually unassailable customer relationships that drive value for customers and the firm. Amazon.com is drowning its competitors, using a flood of information based on millions of customers and billions of purchases to recommend products using sophisticated algorithms. Better recommendations mean higher revenues through upsell/cross-sell, faster growth in customers, thanks to word of mouth and social selling, and higher profitability through reduced customer churn. The Mayo Clinic uses a voluminous repository of genomic, microbiomic, and epigenetic data across tens of thousands of patients to better prescribe personalized therapies for each patient. Chapter 13 will examine how Netflix uses advanced algorithms to pursue collective intimacy and thus provide better movie recommendations, increase customer satisfaction and loyalty, and maximize customer lifetime value.

Accelerated Innovation

Digital innovation is in many ways easier than physical: It can be easier to build and experiment with software than to build a full-size prototype. In either case, though, accelerated innovation uses the Internet, open innovation mechanisms such as contests, crowdsourcing, innovation networks, and idea markets, and cloud-based experimentation and platform as a service to dramatically accelerate the invention, commercialization, and adoption of improvements to processes, products, services, and solutions, and customer relationships. Netflix famously improved its *Cinematch* movie recommendation algorithm over 10 percent via an open contest, engaging scores of researchers around the world for the same cost as hiring a handful of them, and paying only upon attainment of a quantifiable improvement.[13]

Netflix then performed an encore with the Netflix OSS (Open Source Software) Cloud Prize, which used a somewhat different approach. There were multiple categories, rather than one objective. The goals were qualitative rather than quantitative. The results were dedicated to the improvement of cloud technology generally, with all entries treated as open source. Cloud computing technologies help Netflix but making them broadly available

doesn't hurt Netflix's core differentiators, so an open-source approach garnered more entrants and better results.

Amazon Web Services has created challenges won by cities such as London, New York, and Asheville in implementing cloud technologies for better government; Goldcorp has run seismic analysis challenges on gold mine data to turn bankruptcy into, well, gold; Procter & Gamble complements its formidable internal R&D capability with crowdsourced and external open innovation to create new billion-dollar brands, as we'll see in Chapter 16; and GE has run them for improved airline and hospital operations, as we'll see in Chapter 17.

Exponential Value Creation

IT is an exponentially accelerating whirlwind that is feeding on itself. "Things" such as sensors, devices, equipment, vehicles, and buildings are creating an avalanche of big data, which is uploaded over networks to the immense computing resources of the cloud, which is running sophisticated algorithms to process and interpret it, linking to social networks, and driving real-time and predictive decisions implemented by people and things.

Estimates of the number of things that will be connected in the next few years range from tens of billions to trillions.[14] These estimates may seem far-fetched, but there are already billions of cell phones and smartphones in use. eReaders and tablets and PCs and smartphones and wearables and smartwatches and Wi-Fi cameras and light bulbs and toasters and refrigerators and video security cameras and digital photo frames and planes and trucks and traffic lights and who knows what else will connect to each other and the cloud over wireless (and occasionally, wired) networks. Even pills are becoming connected: the FDA-approved Proteus Pill already incorporates a wireless sensor the size of a grain of sand that signals—from inside the digestive system—when the pill has been taken.[15]

These devices, in turn, will generate massive and increasing amounts of data: purchase transactions, video streams, status updates, tracking data, oil pressure, turbine speed, and ambient temperature, on top of documents, slideshows, spreadsheets, songs, and photographs.

Data will increase in frequency and resolution. Netflix used to have a few data points for each movie: number of days out and possibly a rating. Now it knows the number of times you've watched it; on what device; at what time; where; and which scenes you've skipped or replayed. The stream used to be standard definition, then became high definition, now is becoming 4K, and eventually will be 8K, 3D, and holographic. Or consider this: reading utility meters every 15 minutes rather than monthly leads to 3,000 times

more data. This means not just more data, but the ability to deduce when you are running the dishwasher or the air conditioning. The doctor used to know your gender, height, weight, temperature, and blood pressure. Then, your cholesterol and triglycerides. Now she can access your electrocardiogram or electroencephalogram on a continuous basis, not to mention your entire genome, which is about 700 megabytes.[16]

Multiply all these trends together: more devices, each generating more data, more often, and you are multiplying exponentials.

This is driving a global increase in data traffic. Wired data is growing by well into the double digits annually, but mobile data is growing at 60 percent per year.[17] Mobility is growing for many reasons, such as convenience and speed. The ability to do something *now* ties into our innate need for instant gratification, which surfaces in behavioral anomalies such as *hyperbolic discounting*, where immediate results are perceived as being of significantly higher value than those requiring a wait. And, time compression is important for businesses as well, whether to create differentiated customer value or to reduce supply chain costs such as inventory carrying costs. Consequently, the mere act of making a function available on a mobile device can be a market hit: CUNA Mutual developed a smartphone app allowing car buyers to get a loan while at the dealership—generating a billion dollars in loans in only two years.[18] Put differently, mobile *by itself* can support operational and information excellence, not to mention when used in conjunction with other technologies.

In turn, there is a need to store and process that data, helping accelerate the growth of cloud computing. Amazon Web Services, at the time of this writing the largest cloud provider, already stores trillions of "objects"—documents, photos, databases, movies, etc.—in its S3 Simple Storage Service.[19] Companies such as Amazon, Google, and Microsoft *each* are estimated to have hundreds of thousands, if not over a million servers.[20]

Underpinning it all is our innate, inescapable human need to be connected and to care about others and what they think. As UCLA professor Matt Lieberman, cofounder of a field of study called *social cognitive neuroscience*, puts it, "We are wired to be social."[21] Originating as a mammalian need for mothers and their infants to stay connected, he argues, this orientation drove language, growth in the neocortex, and ultimately *homo sapiens*' immense abilities in problem-solving, pattern detection, and collaboration. And social media is not broadcasting or marketing in a traditional sense. It is all about two-way interaction, connection, relationships, and engagement.

Social media increases the value of all four digital disciplines. It enhances collective intimacy, by strengthening bonds between company and customer. It accelerates innovation, by enabling collaboration, providing early customer and partner input into needs and wants, and supporting co-creation of solutions. Connection to social networks is often an essential part of today's leading

solutions; even cars—and sharks—now connect to Facebook or Twitter. It impacts multiple touchpoints in driving information excellence, including product awareness, purchasing, delivery, use, billing, and return processes. In the old days, consumer purchasing decisions would be based on history with the vendor and word of mouth. Today, those decisions are based on vendor relationships and social selling, often created and maintained by social media, and referral marketing—that is, word of mouth, which has become word of Twitter, Foursquare, Instagram, Facebook, TripAdvisor, or Yelp.

The Leadership Agenda

The digital disciplines are not merely a matter for IT managers to squeeze in between discussions of approved mobile devices and upgrades to the email system, but a board-level agenda item. In fact, according to a recent McKinsey survey,[22] a majority of executives believe that the most important technology issue for the board to address is a strategic discussion regarding the impact of technology on the company's industry. Even the venerable *Wall Street Journal* just retitled its *Marketplace* section—after 27 years—to *Business & Tech*, explaining that " … it's likely that your company's next CEO is currently a CIO … "[23] If she isn't now, she will be soon: the most popular class at venerable liberal arts icon Harvard College is now "Introduction to Computer Science," handily surpassing "Principles of Economics."[24]

Unfortunately, only a quarter of CIOs self-report as true *chief* information *officers*. This minority focuses on driving innovation, aligning with the business units, and developing business strategy. A substantial fraction of the rest of CIOs are more like computing implementation organizers; managers, rather than leaders. Their focus is on IT operations improvement, systems deployment initiatives, and cost control.[25] The good news for all these CIOs and the companies that employ them is that the four digital disciplines can turn managers into leaders, cost-cutters into revenue-generators, and also-ran companies into market leaders.

Some have argued that "IT Doesn't Matter,"[26] because IT has become ubiquitous. Therefore, the thinking goes, it is accessible to all, and therefore can't be strategic, because everyone can employ it. But how could IT not matter when much of the greatest revenue growth and wealth creation globally has been through IT and IT-enabled companies: Alibaba, Amazon, Apple, Baidu, Facebook, Google, Instagram, Tencent, and Tesla? Sure, some IT doesn't matter: conference room reservation systems and expense reporting apps are probably not the key to competitive dominance.

But Mark Andreessen, one of the most successful venture capitalists,[27] serial entrepreneur and creator of Mosaic, the first usable browser, has

declared that "software is eating the world."[28] He points out that newly hatched software companies are beating the incumbents: Amazon in books; Netflix in movie rentals; Apple (iTunes), Spotify and Pandora in music; Zynga (at that time) in entertainment; Shutterfly in photos; Google in direct marketing; Skype in telecom; LinkedIn in recruiting; Square and PayPal in payments.

Andreessen keenly observes, "Software is also eating much of the value chain of industries that are widely viewed as primarily existing in the real world." He points out, "In today's cars, software runs the engines, controls safety features, entertains passengers, guides drivers to destinations and connects each car to mobile, satellite, and GPS networks." And, he continues, software is critical in retail/distribution, logistics, oil and gas, agriculture, financial services, and so forth.

Mary Meeker, Internet guru and a partner at Silicon Valley's legendary venture capital firm Kleiner Perkins Caufield & Byers, calls this effect "re-imagination." In other words, longstanding industries are being rethought from the ground up. Of course, this also means that legacy players are in danger of being re-imagined into oblivion. The details of her annual Internet Trends report change each year, but the underlying message[29] doesn't: exponential growth of connectivity due to mobile and fixed broadband; exponential growth of data; previously unheard of adoption rates for new devices such as tablets and smartphones; new-age monetization through mechanisms such as mobile advertising.

Because of the effects of software and reimagination, digital strategies are now core to virtually any business and corporate initiative. This is one reason that Laura McClellan, an analyst with Gartner, the prestigious global technology research firm, predicted[30] that by 2017, the chief marketing officer will spend more on IT than the chief information officer. Although her conclusions have been fodder for debate,[31] they may not be much of a surprise to CIOs; after all, a substantial fraction of enterprise IT projects are already funded or approved by business units.[32]

A related force is the *consumerization* of IT, as employees desire the latest devices with the coolest features and the greatest flexibility at work that they already have at home. Long gone are the days when enterprises were the first to have expensive functionality such as mainframes and green-screen terminals or data communications gear, which eventually trickled down to consumers. Now enterprises eventually deploy what consumers already have.

And, the bars for usability and user experience have been raised by rich, elegant interfaces incorporated into today's leading consumer devices. It's not just usability, but engagement. The same tricks that make games so addictive are being applied to business applications as well.[33] Elements such as points, scorecards, badges, leaderboards, challenges, puzzles, reputation rankings,

and progress feedback via levels and maps hit us in primal brain systems, as research in psychology, behavioral economics, and neuroscience has shown. By building these elements into products, processes, relationships, and applications—called *gamification*—companies can benefit through greater adoption and engagement, as we'll see in Chapter 18. We'll also take a look at Opower in Chapter 19, a company that is applying gamification to electricity consumption.

Information Technology in Context

All that notwithstanding, let us admit that IT isn't the only factor in competitive strategy. I purchase my groceries at Shop-Rite, not because its cash registers have patented, proprietary algorithms running on an advanced computing architecture but because it is the closest grocery store to me and its avocados seem to stay fresh a couple of days longer than those from the competition. So, let's clarify the context in which IT and thus digital disciplines matter.

At a high level, CEOs have a broad variety of tactics at their disposal. Going public, going private. Divestitures, mergers, and acquisitions. Global expansion, local focus. Cost-cutting, leasebacks, hedging, reverse takeovers, tax inversions, downsizing, and rightsizing. Stock sales, stock buybacks. Financial engineering, debt restructuring, organizational restructuring. Hiring, firing, training, compensation, and retention. Out-tasking, outsourcing, offshoring, onshoring, reshoring, insourcing.

Although these tactics may be helpful, they are not the essence of growth. Even a company that grows through acquisition has to acquire companies that are or can be successful. Companies need to look to innovations in business models, distribution, customer relationships, design, branding, endorsements, certifications, regulatory policies, positioning.

And, technology, of course.

But even if we restrict ourselves to technology, there are many technologies, not just IT. Nanotechnology is inventing new materials such as carbon nanotubes with unprecedented strength-to-weight ratios. Biotech is creating breakthroughs in everything from pest-resistant plants to new medical treatments. Chemistry breakthroughs are enabling new battery technologies and the manufacture of plastic literally from thin air.[34]

Even within IT, for every elegantly crafted application, there are many applications that are convoluted, unusable, late, overbudget, insecure, intrusive, or don't scale. Applications that ask you to press "3" for this and "#" for that or that offer cryptic Zen koans such as "Error: Unspecified Error." We'll address these issues and gotchas in Chapter 20.

Finally, let us admit that technology itself—information or otherwise—does not directly correlate with profitability at the industry level.

On the one hand, for example, one of the highest-technology industries is surely airlines. Computationally complex operational processes for global scheduling of crews and flights; modern jet airliners made of carbon composite frames and titanium alloy turbine blades; state-of-the-art dynamic pricing systems. These are complex amalgams of physics, aerodynamics, control systems, entertainment systems, navigational systems, information technology, and who knows what else. Yet, as strategy guru Michael Porter points out,[35] airlines are among the *least* profitable of all industries. Porter's Five Forces model—rivalry among competitors, threat of new entrants, threat of substitutes, bargaining power of customers, and bargaining power of suppliers—explains why.

On the other hand, the soft drink industry, which, after all, is just selling sweetened water—a century-old "technology," if one could call it that—is among the most profitable industries.

However, the point is not that higher information technology investments automatically lead to higher profitability. The point is that within a given industry and its profitability envelope, technology in general, and information technology in particular, *can* enhance performance and profitability relative to competitors. It can also enable new means of creating customer value, create barriers to entry, and reduce the appeal of substitutes.

We live in an era of immense technological change, thanks to the confluence of key technologies such as connected things, cloud computing, and social networks. While traditional elements of competition, such as brand and distribution channels, are still important, information technologies can be ignored only at the risk of ending up like Blockbuster and Borders, overtaken by new, digitally savvy entrants such as Netflix and Amazon.com. Ignore IT and risk irrelevance or death; exploit it and survive or thrive. This is true across verticals: healthcare, manufacturing, consumer packaged goods, aerospace, pharmaceuticals, and so forth.

Regardless of the vertical that your company is in, whether it's old or new, legacy or startup, SMB (small/medium business), Fortune 500, government, university, or garage shop, B2B (business to business), B2C (business to consumer), G2C (government to citizen), P2P (peer to peer), or X2X (anything to anything), understanding and applying one or more of these disciplines is likely to be vital for survival and growth. You don't need to be a hip Web 2.0 company to exploit these insights; many of the examples in this book come from century-old manufacturers who are transforming their processes, products, relationships, and innovation.

While there is no silver bullet, the same patterns—the digital disciplines—keep repeating across winners in these industries, and while they don't offer a simple recipe for success, they do provide a benchmark template

to customize and adapt in the context of your own firm's strategy. In short, the digital disciplines are where digital technology meets value disciplines—the foundation of today's and tomorrow's strategies—and could be just what you need to help your company attain market leadership.

Notes

1. Michael Treacy and Fred Wiersema, "Customer Intimacy and Other Value Disciplines," *Harvard Business Review*, (January–February 1993): 84–93.
2. Michael Treacy and Fred Wiersema, *The Discipline of Market Leaders* (Reading, MA: Addison-Wesley, 1995).
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