Top 10 Strategic Predictions for 2015 and Beyond: Digital Business Is Driving 'Big Change'

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Digitalization and the digital business are catalysts of change that are affecting the human-machine relationship and driving better customer outcomes. IT leaders should use Gartner's predictions as planning assumptions on which to base their strategic plans.

Key Findings

- Software designers are adding more human-centric designs to business and individual computing-based solutions. Machines are taking a more active role in enhancing human endeavors.

- Digitalized "things" are making assisted economic decisions.

- Renovating the customer experience is a digital priority.

Recommendations

- Use Gartner's predictions as planning assumptions on which to base your strategic plans.

- Evaluate the near-term flags that indicate whether a prediction is trending toward truth or away from it.

- Position predictions with longer time horizons as having a lower probability of coming true than those with shorter time horizons.

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By 2018, digital business will require 50% fewer business process workers and 500% more key digital business jobs, compared with traditional models.

By 2017, a significant and disruptive digital business will be launched that was conceived by a computer algorithm.

By 2018, the total cost of ownership for business operations will be reduced by 30% through smart machines and industrialized services.

By 2020, developed world life expectancy will increase by a half-year, due to the widespread adoption of wireless health monitoring technology.

By YE16, more than $2 billion in online shopping will be performed exclusively by mobile digital assistants.

By 2017, U.S. customers' mobile engagement behavior will drive mobile commerce revenue in the U.S. to 50% of U.S. digital commerce revenue.

By 2017, 70% of successful digital business models will rely on deliberately unstable processes designed to shift as customers' needs shift.

By 2017, 50% of consumer product investments will be redirected to customer experience innovations.

By 2017, nearly 20% of durable goods "e-tailers" will use 3D printing to create personalized product offerings.

By 2020, retail businesses that use targeted messaging in combination with internal positioning systems will see a 5% increase in sales.

Analysis

What You Need to Know

Gartner's Top 10 Predictions for 2015 and beyond examine a shift in the age-old relationship between man and machine, due to the emergence of digital business. That shift can most easily be characterized as a re-examination of the roles machines play in our everyday lives. Computer-based machines are now being used to create an ever-expanding variety of experiences that extend human endeavors. In addition, the machines are taking on more human characteristics to develop a more personalized relationship with human beings. Put together, these trends will enable us to predict a near-term future in which machines and humans are co-workers and, possibly, even codependents.

This year's top predictions are grouped into three categories that envelope these ideas of human-machine cooperation and growth:

- Machines are taking a more-active role in enhancing human endeavors.

- Digitalized things are making assisted economic decisions.

- Renovating the customer experience is a digital priority.

Machines Are Taking a More-Active Role in Enhancing Human Endeavors

We say that machines are taking a more active role in enhancing human endeavors, because the machines are more connected than ever before, they are sensing their surroundings, and they are becoming smarter. Because of this, they have an increased ability to supplement (or even supplant) human jobs and to reduce the cost of operations. Gartner's predictions examine the shifting of certain jobs toward business acumen and away from repetitive process steps, mostly due to the creation of more machines to automate routine work. And, we look at the cost reductions in operations brought about by industrializing and routinizing processes that are better handled with smarter machines.

These concepts are in line with the expectations we have had of computing machines since they were invented. However, today we see a rise in the ability of the machines to affect both our business destines and our lives, with or without our help. As little as 10 years ago, it would have been difficult to sell the idea that a computer might create a business model that could challenge human-designed businesses, but one of our predictions this year does just that. It examines the idea that, as computers gain more knowledge about the operation and interactions of our businesses, they are becoming smart enough to create business scenarios that might work better in many cases than existing scenarios. Imagine a disruptive business conceived mostly (if not entirely) by a machine being your next challenge.

On another front, the rapid growth of wearable devices has allowed wireless health monitoring to explode as a category of illness prevention. This has grown to the extent that wearable medical devices can now be seen as a major force for extending human life by cementing health monitoring as a common occurrence for us all.

So, while machines are still performing and perfecting the roles they have always played, we have now evolved to a point where we now feel increasingly comfortable allowing machines to participate in activities at a level formerly reserved for the brightest of us. Business innovation and medical examination were once solely the domains of human ingenuity. Now these machines extend those endeavors to a new level.

Digitalized Things Are Making Assisted Economic Decisions

The increased use of computing machines in decision making is extending into the realm of financial choices with increasing consistency. This makes one begin to think about how many of the economic decisions we make will be supported by, then automated through, digital technologies.

One of our predictions this year discusses the support of our buying behavior by digital assistants that help us locate, shop, and then purchase goods and services. Few people are unfamiliar with online shopping these days, but the use of mobile digital assistants that are getting smarter all the time is still a novelty. Since the amount of shopping affected will be large (in the billions of dollars), that novelty may become a staple of online shopping right in the middle of the decade. In fact, customer engagement through mobile devices is an assumed and expected reality of most people to the degree that mobile commerce is expected to become too big for anyone to ignore.

Renovating the Customer Experience Is a Digital Priority

And then we come to the customer experience. This might seem a bit incongruous when taken together with our discussion of machines and things. However, it only serves to highlight even more the use of digital machines to enhance human pursuits. The customer experience may be the most impactful area of innovation available to businesses today. With the rapid rise of personal digital technology, customers have become savvier and more demanding about how they want to interact through technology. No longer can a business assume that the experience it has with its customers is good enough, or that it will not need to change in a short time. So, surprising innovations are beginning to arise — from personalized 3D printing (3DP) to pizzas and consumer goods being delivered via drone. The practical digital business sees customer experience innovation as the next frontier, and half of all consumer goods product investments are likely to be directed toward improving the customer experience.

Who can ignore the prevalence of technologies and advertisements heralding the ease of use of products or extoling the virtues of customer satisfaction? The customer has all the power today, and responding to that power effectively will bring great benefits. However, to get there, some businesses will need to take risks that might not have been evident in the past.

We note that the use of unstable business processes is on the rise. Unstable business processes are those that may change their execution from moment to moment — ones that cannot be relied on to operate the same every time. Some call these asynchronous processes or ad hoc processes, but whatever the name, they can be unstable and very agile. And make no mistake, this instability will be deliberate.

A deliberately unstable process is designed to be agile and to dynamically adapt in potentially unexpected ways to changing priorities and requirements. The changes these processes face as

they execute in a digitalized environment (see "Digital Business Technologies Are Changing the Nature of Change") are likely to be cumulative (serial and fluid) and will evolve the process as it goes. Unlike a stable process, the unstable process does not depend on repetition of known steps, but on adapting to the situation. The instability inherent in this is used to increase its ability to respond to a wide range of unexpected or seldom-seen disruptions — unstable flight platforms make a good metaphor (see Note 1).

A great potential use of deliberately unstable processes is with indoor positioning systems. As we gain more information about where people and things are within a building or complex, we open the door to even more innovation regarding customers. Imagine a time when customers have access to store discounts based on how often they walk past the store in a mall. Imagine the ability of customers to capture, carry and share images of products in a store in a virtual shopping cart that maps their path to the items through multiple stores and across multiple visits. Certainly, these experiences are on the horizon, and they will enhance our ability to do what humans do best — acquire things.

It's no coincidence that these three categories support the ideals of digital business. Digital business refers to business that blurs the distinction between the virtual world and the physical world, while using digital assets and/or capabilities. Within that concept, there is an implied expectation that machines will become closer to the human experience, simply because we are using more of our physical surroundings and resources to facilitate digital interactions. Human context such as location, identity, movement and a host of others are now credible bits of data that can be inserted into digital processes to affect a more satisfying human experience. And, the machines are helping us change our surroundings through the use of 3DP technology that takes virtual representations and recreates them in the physical world to support virtually unlimited usage scenarios.

We are moving from a world where people behave the way computers work, and toward a world where computers work the way people behave. This must be the mantra for both the design and use of computing technology and machines in the 21st century. The machines will no longer be passive responders to human requests. They will take proactive steps to solve problems and to generate valuable interactions. Humans will no longer bend to the dictates of programmer and hardware designer's whims, but will expect the software and hardware to adjust to their needs as these needs evolve.

Last year we stated that, "… the days when digital business, smart machines and the Internet of Things (IoT) change what computers are may not be far off." This year, we note even more aggressively the strength of that proposition.

Selecting Predictions

The selection process for our prediction research included evaluating several criteria that define a top prediction. The issues examined included relevance, impact and audience appeal. More than 160 of the strongest predictions across all research areas were submitted for consideration this year.

Our top predictions are intended to compel readers to action and to position them to take advantage of the coming changes, rather than being damaged by them. Clarity and conciseness are also essential characteristics of our top predictions; the average reader of The Wall Street Journal should be able to follow each prediction and to trace its effects on his or her areas of interest.

These top predictions are for general technology areas, rather than being applicable to specific industries. A separate report covers Gartner's top industry predictions (see "Top Industries Predicts 2014: The Pressure for Fundamental Transformation Continues to Accelerate"). When reading these predictions, it will become apparent that our top predictions are pulled directly from research that is topical and ongoing. They include implications and recommendations for organizations seeking change opportunities. IT professionals should examine these predictions for opportunities to increase their support for cost control, revenue generation and business transformation initiatives.

Strategic Planning Assumptions

By 2018, digital business will require 50% fewer business process workers and 500% more key digital business jobs, compared with traditional models.

Analysis By: Ruby Jivan, Frances Karamouzis, Alexander Drobik, Robert Handler and William Maurer

Key Findings:

- The consumer need to get faster, less expensive and better products and services in a mode that supports any time, any place, any channel is fueling the digital business revolution. Digital technology availability and the Generation Z obsession with the IoT, is changing consumer expectations and increasing the demand for an agile service experience.

- The digital business revolution is driving significant enterprise investments for purposes of leveraging digital technologies (i.e., the IoT and mobility) to exploit new channels of customers, and address market disruptions. The race toward digitalizing business processes is requiring nontraditional and specialized business and IT skills and competencies that are scarce in the market — for example, in data science, a shortfall of 140,000 to 190,000 data scientists and 1.5 million managers with the skills to use the insights to drive decisions).

- With consumers' preference for using the Internet and mobile services to drive business efficiencies and optimize time management, every industry is striving to improve the customer experience and meet the demands of Gen Z by simplifying, automating and making more intelligent end-to-end processes, and minimizing manual interventions, enabling the consumer to self-serve.

- Business to business (B2B) processes are also continuing to be streamlined to drive down costs by decreasing the number of redundant manual interventions. This is being accelerated by new technologies focused on providing more intelligent and predictive processes linked to the IoT to speed up and automate even skilled-people-based processes. In addition, the move to cloud computing is driving a new wave of services that are displacing traditional business processes owned and staffed by organizations.

- Educational systems globally (and specifically in the developed countries) have been slow to change their curricula and effectively address the need of specialized business and IT capability to future digital technologies market. University graduates continue to learn traditional information and communication technology (ICT) and computing skills that are quickly becoming obsolete and soon will no longer be needed. According to a study from researchers at Georgetown University, the current higher education graduation rate is stagnant, and the economy will face a shortage of 5 million workers with the necessary education and training by 2020.

- Although many CEOs have elevated IT to a top priority, and more than half are planning to increase their investments in IT, CEOs correctly perceive talent as the No. 1 constraint on growth.

Market Implications:

The rapid evolution of social media and mobile technologies is driving consumer behavior, especially with Gen Z, which grew up expecting on-demand, speedy, but flexible services. Cloud services and the IOT are proliferating at an unprecedented rate to meet consumer demand and expected experience — for example, based on the Gartner prediction that, by 2020, the installed base of the IoT will exceed 26 billion units worldwide (which is reinforced by a recent Cisco press release), globally there will be 15 billion networked devices in 2015, an increase from 7 billion in 2010. Therefore, few organizations will escape the need to make products intelligent and the need to interface smart objects with corporate systems. These Internet connections with people, business and things are generating large amounts of data. Those who conquer the data with analysis can win and disrupt the market toward extreme profits.

These behavior trends and supporting technologies will significantly change how we go about our daily lives — for example, refrigerators can order groceries, robots can collect them and drones will deliver them to your door, eliminating the need for grocery clerks and delivery drivers. Thus, this new digital business environment will profoundly change business processes, along with the employment demographics and the need for higher competencies for both the consumer and the providers across all industries.

The need for speed and the large volume of activities due to "on-demand" expectation and user experience cannot be managed by increasing head count. Automation, robots and technology (sensors) will need to be embedded in the processes to achieve the scale needed to meet consumer expectations. Thus, with the availability of digital technologies, in the near future, organizations will need half the human staffing to manage the end-to-end process. However, the new technology competency roles will increase fivefold, but will require significantly different IT knowledge, skills and competencies, as well as non-IT skills generally lacking in traditional IT organizations, such as visioning, strategic thinking, collaboration, facilitation and organizational change management.

Traditional IT roles such as developer, system engineer and software tester will be automated using machine learning, cognitive technologies and robotics, which collectively are referred to as "smart machines." Those employed will need to know how to work with smart machine technologies and

be able to program robots. These skills are neither available, nor are they taught in educational institutions preparing the graduates for the future. For example, in Europe, the mismatch of skills required versus available is expected to create shortage of 90,000 IT professionals by 2020, which is why, in March 2013, the European Commission is leading a multistakeholder partnership to tackle the lack of digital skills in Europe and the several hundred thousand unfilled ICT-related vacancies.

Demographics data shows that enrollment in the sciences is down, and science, technology, engineering, and mathematics (STEM) graduate shortages have been reported. No immediate relief, or even near-term relief, is on the horizon. A 2012 report by President Obama's Council of Advisors on Science and Technology, for instance, stated that during the next decade, 1 million additional STEM graduates will be needed. In the U.K., the Royal Academy of Engineering reported last year that the nation will have to graduate 100,000 STEM majors every year until 2020 just to stay even with demand. Germany, meanwhile, is said to have a shortage of about 210,000 workers in the mathematics, computer science, natural sciences, and technology (MINT) disciplines.

Thus, although many of the traditional IT roles and low-to-medium-skill process worker roles will be eliminated by automation and artificial intelligence (AI) robotics, there will be a fivefold increase in high-skilled technology workers to support the highly digital business environment. A study carried out toward the end of 2013 found that Britain will need 750,000 skilled digital workers by 2017. If they can't support that growth, it could cost the U.K. as much as £2 billion each year.

Near-Term Flags:

- By end of 2015, most western economies will report a 50% increase in unfilled digital technology jobs, such as data scientists.

- By 2016, 20% higher unemployment in semiskilled process worker jobs than in the past.

- By 2016, the use of cloud services, including SaaS, for business processes will have accelerated past current forecasts by 30%.

Recommendations:

- Begin now to assess the skills needed in your organization to support the new digital technologies, processes and environment (i.e., collaborative, with high levels of ambiguity and constant change); identify those who can be trained; budget for new hires with the required skills; and train those who are capable by involving them into innovative technology projects.

- Establish a team to review digital business opportunities in your organization. Identify the key skills, technologies and infrastructure needed to serve your markets, and digital processes inside your organization. Ensure that emerging projects are protected against organizational inertia that will only delay the inevitable, while missing out on business opportunities.

- Use service providers, when necessary, for innovation projects, being mindful of that technology transfer cuts both ways, and embed capable resources to learn new technology development and management.

- Develop new hiring practices to recruit for the new nontraditional IT roles, such as AI programmers, process automation integrators, data scientists and IoT engineers. Recruiters should prepare for a dearth of candidates and expand their searches outside the country or recruit from Ph.D. candidates doing technology research — possibly in loosely related disciplines, such as biology and ecology, where analyzing living data is more commonplace.

- Individuals who are in low-skill roles in services industries e.g., bank tellers, grocery clerks and delivery drivers, must consider retraining for other service skills that cannot yet be digitized (e.g., plumbers, electricians and mechanics) to remain employable. Government, in collaboration with business industries and education institutions, should define the job roles, skills and competencies needed in the next five to 10 years and initiate a road map to prepare for the next generation of employed workers.

Related Research:

"Solution Path: Prepare for the Changing IT Career"

"Smart Machines Mean Big Impacts: Benefits, Risks and Massive Disruption"

"Maverick* Research: Surviving the Rise of 'Smart Machines,' the Loss of 'Dream Jobs' and '90% Unemployment'"

"Exploit the Rise of Smart Nonindustrial Robots for Work and Home"

"Rio Tinto Rolls Out Ambitious, Autonomous, Mine of the Future" (Arisplex) and "Rio Replacing Train Drivers Paid Like U.S. Surgeons" (Bloomberg).

"Robot Pets Help Elderly Japanese Cope in Tsunami Aftermath" (Techcitement) and "An Interactive Robot in a Nursing Home: Preliminary Remarks" (MIT)

Strategic Planning Assumption: By 2017, a significant and disruptive digital business will be launched that was conceived by a computer algorithm.

Analysis By: Andrew Frank

Key Findings:

Advances in big data and distributed computing have rekindled interest and investment in AI. Google, for example, recently acquired U.K. AI startup DeepMind for more than $500 million. IBM's Watson, which thrust AI into public consciousness by winning at Jeopardy, now provides advice on financial products, based on market conditions, life events, a client history and available offerings. Innovative startups such as Path Intelligence and Qlikview are providing AI-based business intelligence to a wide variety of sectors. And, in 2013, Oxford University estimated that, in the near future, AI could take over nearly half of all jobs in the U.S.

Agent-based computational economics research is the branch of AI that seeks to model dynamic systems of interacting agents to simulate economic processes and markets. One company, Growth

Science, is using business model simulation to predict whether startups will fail, using algorithms inspired by Clayton Christensen's theory of disruptive innovation. Another example comes from the Center for Global Enterprise, which is pursuing a program it calls computational enterprise analytics. This seeks to describe complex business ecosystems by analyzing sources of news about startups, product and partnership announcements, and investment data.

The demand for such AI applications is being spurred by a potent mix of opportunity and hype developing around the coming wave of digital business. The blurring of the physical and digital worlds brought on by the arrival of things in the Internet, alongside people and businesses, provides fertile ground for a new crop of disruptive startups featuring novel marketplace business models on the cusp of viability. It's an environment where network effects and timing, not just ideas, is critical to success. It's now feasible to combine computational economics with game theory and big data from the real world to discover and score disruptive business models that are sound enough to attract funding and succeed in exploiting emerging technology to disrupt legacy value networks.

Supporting Evidence:

The availability of data, both open and for sale, has recently exploded, with one recent estimate claiming that 90% of the world's data has been generated during the past two years. This provides virtually unlimited real-world, real-time input into analytic models.

In accordance with Moore's law, the computing power of the world's fastest supercomputers has increased by a factor of more than 400,000 in 10 years, from 131 gigaflops in 1993 to 54.9 petaflops in 2013, and cloud computing is making such resources far more accessible than the days when they needed to be on the user's premises.

The world economy has become ripe for digital disruption, as evidenced by global marketplace companies (such as Uber and Airbnb) that are disrupting ground transportation and hotels, respectively. Because such businesses exhibit network effects (that is, their value increases with each new participant) they tend to form natural monopolies, but are challenged by complex regulatory and marketplace dynamics, which make them amenable to computational analysis. Meanwhile, the wealth creation upside of success in such models — valuations in the tens to hundreds of billions of dollars for companies less than five years old — represents an irresistible attraction for capital investment.

Near-Term Flags:

- By 2016, the rate of new AI-related product announcements will rapidly accelerate. Through 2015, the most highly-valued initial public offering (IPOs) will involve companies that combine digital markets with physical logistics to challenge pure physical legacy business ecosystems.

- By 2017, more than 80% of venture capital investment funds will use applied AI to model and evaluate investment opportunities.

Recommendations:

- **Marketing leaders:** Shift focus from promoting and distributing existing offerings to sensing and anticipating technology-driven market transformations and developing strategies to lead or react to an accelerating pace and intensity of well-planned disruptive challenges. Develop skills in rapidly establishing brand value positions for new offerings, focusing on the human aspects of storytelling where computers still lack skills.

- **Business leaders:** Embrace the use of data and analytics to anticipate disruption and analyze responsive scenarios. Consider how to provide infrastructure and investment for incubating and scaling rapid-growth new business ideas and spin-offs. Form task forces that include marketing and technology leaders to investigate disruptive scenarios and the tools to evaluate them.

- **IT leaders:** Elevate the detection and analysis of business disruption to the top of your list of objectives for sourcing and evaluating big data investments and programs. Educate business and marketing leaders on the implications and limitations of current and potential AI systems.

- **Investors and entrepreneurs:** Make the potential of AI to identify and design new business opportunities a major factor in your investment plans.

Strategic Planning Assumption: By 2018, the total cost of ownership for business operations will be reduced by 30% through the use of smart machines and industrialized services.

Analysis By: Frances Karamouzis and Ruby Jivan

Key Findings:

- The consumer's need to get faster, cheaper, better products and services in a mode that supports any time, any place, any channel is fueling the digital business revolution. And the digital revolution is predicated on velocity. The absolute obsession is speed, which is displacing cost as the dominant evaluation criteria for buying services. Consumers want responses (information, context, insights) regarding business transactions at the speed of digital transactions, which is not a human physical capability.

- The epicenter and driver of business decisions has shifted from an enterprise-centric focus to a consumer focus. Consumerization of business and IT is a topic that Gartner has published on for several years. The most important manifestation of consumerization is the need for enterprises to significantly improve and create intelligent business operations that "smartly" target the right consumer and know the customer (see "Design IT Self-Service for the Business Consumer").

- Business processes and the entire value chain of business operations will shift from a labor-driven and technology-enabled paradigm to a digital-driven and human-enabled model. Smart machines will not replace humans, because people still need to steer the ship and are critical to interpreting digital outcomes. Thus, smart machines will displace complacency and inefficiency and add tremendous velocity to business operations.

- With consumers' preference for using the Internet and mobile services to drive business efficiencies and optimize time management, every industry is striving to improve customer experiences by simplifying, automating and making more-intelligent end-to-end processes, while minimizing manual interventions and enabling the consumer to self-serve.

- Smart machines are here — this isn't a future fantasy and it's not 10 or more years away. Smart machine technology and services are available today in the commercial market (see "Digital Business Innovation With Smart Machines" for several case studies). Smart machines demonstrate certain key attributes: They deal with high levels of complexity and uncertainty to form hypotheses based on what they've learned and they test these hypotheses to refine probabilistic conclusions. They have also developed a better understanding of task-specific contexts than many people had predicted.

Market Implications:

- The current leaders in a given industry will not necessarily remain there. They need to identify potential disruptors and stay ahead of the game. Physical or knowledge assets will not be enough to "milk the cash cow" of products and services for the next five years.

- New unusual suspects (enterprises) will proliferate to bring new products and services to market and quickly grab "mind share" or market share.

- Consumption "portions" will be more "bite-sized" or "time-sliced." For example, compare the business model of renting a vehicle from Hertz by the day with renting a vehicle from Zipcar by the hour. In the old model, you often interface with at least one human being (sometimes as many as three) to complete the rental car transaction. With the zipcar, you never even see a human being. It's all done digitally, including starting the engine of the car. Similarly, for some younger consumers, it's been years since they actually walked into a bank branch to transact business.

With all this in mind, here are a few examples of shifts in business operations using smart machines that are reducing TCO. One of the top five media companies in the U.S. implemented smart machine technology for one of its customer service functions. The shift in business operations in the initial three-month period included reducing the average time to resolve a customer issue from 18.2 minutes to 4.5 minutes. The average time to address the issue started at 55 seconds (with a head count of 76) and was reduced to two seconds (with the smart machine technology in place and 32 people). Gartner has documented a number of similar case studies across a variety of business processes, including wealth management in financial services, and in the oil and gas industry.

More importantly, the time value to realize the benefits and the commercial terms for these types of deals is at a digital pace. The example above was achieved in three months. The enterprise had to pay for any upfront costs, because this was an outcome-based model in which payments were made when results were achieved. This has significant implications as to how products and services are purchased. The buyer's expectations and minimal-level bar will eventually shift from "paying for effort," which is input based (number of labor hours, cost of materials or parts), to "paying for outcomes" (which is a result-driven metric).

The bottom line is that Gartner estimates that, in less than four years, there will be many types of business operations in which the TCO will be reduced by at least a third through the leverage of smart machines and industrialized services.

Near-Term Flags:

- By 2015, more than 40 vendors will have commercially available managed services offerings that leverage smart machines and industrialized services.

- By 2016, more than $20 billion of business-outcome-managed services signed contracts will be in the marketplace (which leverage smart machines and industrialized services).

Recommendations:

- Proactively ask yourself two key questions: How will my enterprise create new disruptors in our industry? How will we respond to business disruptors (at digital speed)?

- Sourcing teams, enterprise architects and digital business teams need to work together to address the three key layers of run the business, grow the business and transform the business. This will be done at different volume levels and velocities. In the run-the-business layer, it's volume and precision (i.e., being on time, on budget and on scope). In the grow-and-transform layers, it's about incremental innovation and big changes (i.e., transformational shifts). This is based on fast failures, rather than precision and being on time, on budget and on scope.

- Let the technology suit the use case that operationalizes the business strategy. Smart machines will revolutionize many business sectors. They rely on nontraditional technologies (such as deep neural networks and natural-language processing); however, they can also incorporate 30-year-old expert systems and other techniques.

- Use precursor "almost-smart machine" technologies and "phantom robotic business process automation" to get your employees culturally accepting of full-scale smart machines.

- Do not shy away from technologies just on the edge of smartness, and do not wait for full technology maturity before sticking your foot in the water. Waiting would have been a $100 million dollar annual operating expense mistake for Rio Tinto (see "Digital Business Innovation With Smart Machines"). How much can you tolerate losing while you wait for others to build the winning use cases?

Related Research:

"Diligently Evaluate Outcome-Based Managed Services Versus Capacity-Driven Staff Augmentation"

"Enhance Your IT Agility and Grow the Business by Optimizing the Three Layers of Adaptive Sourcing Strategy"

"Bimodal IT and Adaptive Sourcing Are Critical to Digital Business Success"

"Riding the Wave of Industrialized Low-Cost IT Services"

"Synergies Arise at the Intersection of Smart Machines, the Internet of Things and Digital Business"

"Digital Business Innovation With Smart Machines"

"Smart Machines Mean Big Impacts: Benefits, Risks and Massive Disruption"

"Rio Tinto Rolls Out Ambitious, Autonomous, Mine of the Future" (Arisplex) and "Rio Replacing Train Drivers Paid Like U.S. Surgeons" (Bloomberg)

"Robot Pets Help Elderly Japanese Cope in Tsunami Aftermath" (Techcitement) and "An Interactive Robot in a Nursing Home: Preliminary Remarks" (MIT)

Strategic Planning Assumption: By 2020, developed world life expectancy will increase by half a year, due to the widespread adoption of wireless health monitoring technology.

Analysis By: Ken Dulaney and Angela McIntyre

Market Implications:

Extending the average life expectancy for people has revolved around three major eras in technology: biological (approximately 1500 through 1930), including vaccinations and improved sanitation; mechanical (1931 through 2013), including corrective surgery and nonbiological augmentation and replacement (e.g., pacemakers); and genomelectronic (2015 and beyond). The genomelectronic era will feature simultaneous innovations in genome therapies alongside the integration of the Nexus of Forces (1) into medical and lifestyle components. They will operate across the spectrum of prevention, intervention and monitoring. The electronic innovations will be mobile, networked to the Internet, powered by the cloud, and linked to extensive information, sensor data and social context sources.

Solutions under development will create the infrastructure for merging data relevant to health. Funding initiatives from Qualcomm, Apple (HealthKit), Google (Google Fit), Samsung (SAMI), Nike and Intel, among others, will build on the rudimentary innovation fitness trackers, such as those from FitBit or Jawbone. In the prevention area, solutions combining inexpensive connected devices and personalized analytics could attack two leading killers — cardiovascular disease and diabetes.

These health-monitoring solutions along with individualized incentives will help change unhealthy behavior attacking root causes of diseases, in particular obesity and lack of exercise. Insurance companies and corporate wellness programs are incentivizing people to use health-tracking devices to cut healthcare costs. Additional deaths can be averted by alerting medical and emergency response teams to quickly aid a person having a heart attack or other health crisis. However, we expect this to have only a minor impact on longevity, compared with the impact of prevention or delay.

In 2020, 30% of deaths in the developed world can be postponed by health-monitoring solutions. The United Nations predicts that lifespans in the developed world will increase to 79 years by 2020. With health-monitoring solutions, that average life expectancy can increase to 79.5 years. Since

2000, the elder population has increased by a factor of four, increasing the demand for healthcare. From 2010 through 2015, at the world level, people who survive to age 60 can expect to live 20 additional years. With the time for a doctor to reach medical practice estimated at 12 years, healthcare must respond to the demand with ever-greater efficiency. Controlling demand through prevention or delay is essential and electronics will play an increasing role.

Wearable monitors hold huge promise. Today, a simple wristband can collect data on heartbeat, temperature and a number of environmental factors. Wireless heart-monitoring patches, smart shirts and sensors in accessories promise more accuracy, choice and comfort to wearers. Transmission through wireless is straightforward. Data can be correlated against large cloud-based information repositories for sanctioned actions and through social networks for anecdotal advice. We expect data from remote monitoring devices to provide continued access from patient to medical practitioners. Diabetics' blood glucose will be automatically monitored and levels continually adjusted. Data security will be important, as will data management and privacy, and will lead to new regulations and best practices. We expect health monitoring to exceed a $40 billion market by 2020 and to deliver its half-year increase in life span.

Near-Term Flags:

- By 2017, costs for diabetic care will be reduced by 10% through the use of smartphones. Already there are strong movements to incorporate smartphones in the management of diabetes. The reason the cost parameter is so important is that is a key motivating factor for expanding use. And if costs are reduced, it means that there are lower recidivism rates, which, in turn, mean that lives will be lengthened.

- By 2018, 200 million people will use wearable devices that measure their heart rates.

- By 2016, 30% of corporate wellness programs will capture biometric data about employees.

Recommendations:

Based on the broad scale impact of this prediction on the health of billions of the world's population, the following recommendations should be considered:

- Medical device suppliers should redouble their efforts to participate in the health-monitoring technology area.

- Healthcare providers should evaluate outcome protocols for potential inclusion of expanded health monitoring.

- Businesses should discuss the impact of health monitoring on costs with their healthcare insurance suppliers.

Strategic Planning Assumption: By YE16, more than $2 billion in online shopping will be performed exclusively by mobile digital assistants.

Analysis By: Adam Sarner

Key Findings:

Promising mobile digital assistant technologies, such as Google Now, Siri and Cortana, are already tapping into preferences and explicit context like spoken questions and commands, time and place. They are connecting pieces of need/want assessment, information gathering and evaluation, all elements along a buying process sans autonomous purchasing.

By YE15, mobile digital assistants will have taken on mundane tactical processes such as filling out name, address, credit card information (no one wants to keep doing those things over and over). Fixed events such as grocery replenishment (buying paper towels every three weeks or getting new filter for ice maker) will be common and will build trust for these types of assistants to take on more. By YE16, slightly more complex purchase decisions, such as buying back-to-school backpacks (something superhero and in stock) and chained events — such as scheduling a highly rated, date-type movie along with dinner and car pickup on an anniversary — will be easily achievable. Yearly autonomous mobile assistant purchasing will reach $2 billion annually, representing about 2.5% of mobile users trusting assistants with $50/year. Digital assistants will be on multiple platforms; however, mobile will be the most accessible, adopted device for digital assistants and will be the "killer application" by YE16.

With almost three billion people worldwide now having gone online, the drivers are clear. The explosive adoption and flow of digital information and the increasing areas of choice and decision making for facilitating life events will take some automated help. Armed with user-defined, filtered preferences, demographic and psychographic information, augmented with those aspects of our personality that compel us to buy, mobile digital assistants (with a sizable budget) will begin to off-load areas of our decision making and make purchases on our behalf, ranging from the tactical to the strategic.

Our need to sift through increasing amounts of information to make purchasing decisions will grow, and the digital assistant will be a top tool to perform the task. With the ability to connect, gather, sort and process information better than the individual, digital assistant decision making will start freeing up more strategic life events, taking on assistant roles, such as those of the travel agent, the financial advisor, the nurse, the attorney, the contractor, or the "wing man."

Businesses will need to take a fresh look on how to influence, market and sell to these key decision makers. Current techniques such as asking for social likes, buying pop ups ads or creating blast email campaigns will not win over a mobile digital assistant.

Near-Term Flags:

- By YE15, mobile digital assistants will have taken on mundane tactical processes, such as filling out name, address and credit card information (no one wants to keep doing those things over and over).

- By 2016, 2.5% of mobile users will trust assistants with $50/year.

Strategic Planning Assumption: By 2017, U.S. customers' mobile engagement behavior will drive mobile commerce revenue in the U.S. to 50% of U.S. digital commerce revenue.

Analysis By: Jennifer Polk, Michael McGuire

Increasingly powerful smartphones and tablets, and the correspondingly rich and powerful applications available for each, enable consumers and business customers to interact seamlessly with companies, content and commerce experiences at virtually all stages of the purchasing process. Product and service purchases can start on a smartphone, with a customer using mobile search to identify options, migrate to a tablet where they review how-to videos on YouTube, shift to scanning a brand's Facebook page and third-party review sites for customer feedback via mobile applications, and end with a sales transaction on the company's mobile-enabled website or mobile application, or through mobile payment in their physical locations.

Gartner defines digital commerce as the buying and selling of goods and services using the Internet, mobile networks and commerce infrastructure. We define mobile commerce as the buying and selling of goods (physical and digital) and services (i.e., booking and prepaying for services) by customers using mobile devices accessing the Internet via mobile networks and commerce infrastructures. Mobile commerce does not necessarily require a unique mobile payment capability, such as Apple Pay. Mobile applications, for example, enable a user to store payment information (e.g., a credit or debit card account), which allows the consumer to complete an in-app payment without having to re-enter this information for each purchase. Mobile-enabled websites also enable customers to manually enter payment information (e.g., credit or debit cards).

Based on Apple's recent announcement about the addition of Apple Pay to the upcoming release of their iPhone 6 and iPhone 6 Plus, competitive pressure and market demand for mobile payment will increase. Roughly 220,000 merchants are already set up to accept Apple Pay. Other mobile device manufacturers, technology providers and credit-card companies (such as Visa), and major retailers such as Wal-Mart are signalizing plans to launch their own mobile payment solutions or support existing Near Field Communication (NFC) offerings, such as Google Wallet.

Some sectors will migrate more quickly than others to accepting mobile payments and promoting mobile commerce. This will be due largely to customer demand. For example, big-box retailers may not need to move as quickly as other industries (e.g., travel), because the in-store experience is still a critical part of their value proposition and the customer experience, making digital and mobile commerce a smaller portion of their overall revenue. However, new credit card standards will cause a shift in liability for fraudulent transactions. This shift will take effect in 2015, requiring retailers to make updates to their point of sale (POS) systems for safer credit card transactions. This opens the door for POS updates to also accept mobile payment.

Gartner surveys of consumers, marketing executives and digital commerce decision makers underscore the growing power of mobile-initiated engagement and the potential of mobile commerce. They also make it clear that major industries, including retail, are likely to see a different growth rate:

- In a recent Gartner survey of digital commerce decision makers across functions (see "The Evolving Role of Marketing in Digital Commerce"), respondents reported that digital commerce makes up 30% of total revenue, and mobile commerce generates 22% of their digital commerce revenue.

- Retail respondents were in line with the average, reporting 22% of digital commerce revenue from mobile commerce. Three other industries reported an above-average percentage of mobile commerce. High-tech and financial services companies reported 24% of digital commerce revenue comes from mobile commerce, and companies in the media industry reported 23% mobile commerce revenue.

- Globally, 26% of tablet users and 20% of smartphone users in Gartner's Consumer Study reported using devices to buy products or services. (The survey was conducted in August 2013 and covered 21,514 respondents in eight developed countries, U.S., U.K., France, Germany, Italy, Japan, China and Brazil.)

- Mobile commerce will become a significant sales channel through 2017, beginning to rival e-commerce as the leading digital channel for retailers (see "Multichannel Retailers Should Prepare for an E-Commerce Slowdown and an M-Commerce Take-off").

Gartner believes that, as device manufacturers and application developers improve usability and functionality and address users' security concerns, devices will become even more of an essential tool for customers, particularly younger demographics. The link between mobile engagement and mobile commerce will become even more dynamic and more prominent. Customers who grew up using the Internet as a communications, information and transaction platform, and tethered to their mobile devices, will demand that service providers and retailers deliver on the expectation of connected and channel-agnostic commerce experiences. Recent announcements such as Apple Pay will increase competitive pressures and expedite changes in consumer behavior, which will, in turn, drive the expectations of individuals as business buyers.

Near-Term Flag:

Renewed interest in mobile payment is expected by 2015, along with a significant increase in mobile commerce, due in part to the introduction of Apple Pay and similar efforts by competitors, such as Google increasing efforts to drive adoption of its NFC-enabled Google Wallet.

Recommendations:

- Organizations with digital and mobile commerce initiatives need to focus on encouraging the development of cross-functional teams — marketing, IT, sales, customer support, legal, etc. — to create seamless path-to-purchase experiences, and postpurchase relationships with consumers who are increasingly using mobile devices to research and purchase products and services.

- Mobile marketing teams should investigate how to leverage mobile wallets, such as Apple's Passbook and Google Wallet, with the expected reinvigoration of consumer interest in mobile commerce and payments.

Related Research:

"What the Growth in Mobile Commerce Means to Marketers"

"Multichannel Retailers Should Prepare for an E-Commerce Slowdown and an M-Commerce Take-off"

Strategic Planning Assumption: By 2017, 70% of successful digital business models will rely on deliberately unstable processes designed to shift as customers' needs shift.

Analysis By: Julie Short, Elise Olding, Claudio Da Rold

Key Findings:

Many organizations are beginning or in the midst of digital business transformation initiatives. Gartner predicts that 30% of these efforts will be successful. The reason for this success is attributable to four important differentiating factors:

- Innovated business models that harness technology as the enabler.

- Business processes that are designed to be supermaneuverable, enabling them to shift as customer needs shift.

- The embracing of standardization and variable business processes, referred to as deliberately unstable processes, enabling them to productively scale and seize opportunities as needed.

- Organizational liquidity, which enables the organization to change readily and seamlessly when facing significant change.

Market Implications:

To be part of the 30% that implement successful digital business transformation initiatives (see Note 2), business and IT leaders must take bold action, whether they are ready or not, to innovate their business models and change the way their organizations function. Business and IT must be agile and adaptable to change. They must be willing and able to innovate the way they are doing business, radically rethinking their business models, and not simply apply digital technology to existing business models. They must be ready and willing to innovate rapidly from a business model, business process and technology perspective.

Rapid innovation accompanied by constant change efforts will require a bimodal approach. Bimodal means that IT and the rest of the business must now operate at two speeds — one that renovates the core of traditional IT and another that focuses on innovation. IT and business leaders must transform their organizations to become more agile if they expect to meet the demands of the digital business era. The window for digital business transformation will not stay open forever. The time is now.

As a result of business model innovation, some business processes must now be deliberately unstable. Deliberately unstable processes are designed for change and can dynamically adjust according to customer needs. They are vital because they are agile, adaptable and "supermaneuverable" (see Note 3), according to shifts in customer needs. These supermaneuverable processes exist within the context of larger, more stable processes. They are a competitive differentiator, because they support customer interactions that are unpredictable and

require ad hoc decision making to enable the larger, more stable processes to continue. They are often impossible for other competitors to duplicate.

One example is Pugachev's Cobra maneuver or a J-turn (see Note 4), which stable, traditional aircraft cannot duplicate. It is imperative to break the linear mindset of business processes and deploy the spectrum from standardization and variable processes to reap the benefits of digital business. The need for this shift is intensified by the introduction of things into the business environment (see Note 5). As things such smart machines begin to generate real-time information to other machines, business processes must be designed for change to enable organizations to exploit this information. Large, stable processes that have no ability to dynamically change according to new information will not enable organizations to deliver on the promise of digital business.

For example, there may be unstable processes in a crowdsourced insurance organization, such as competitive lending scenarios, or in hospitality services such as AirBNB, where anyone can post a listing to compete with hotels. These examples follow routine, end-to-end processes, but rely on underlying relationships and steps with lots of variability, volatility and changeability.

Deliberately unstable processes will mandate a drastic shift in the ability of an enterprise and its people to change in a more fluid manner. The ability to change faster will leverage the concepts of organizational liquidity. This holistic approach, blending business model, processes, technology and people will fuel digital business success.

The Bottom Line: To be successful in digital business transformation, innovate your organization's business model, beginning with a new customer interaction style, develop organizational liquidity and engage in organizational change approaches to enable key supermaneuverable processes that adapt to key business moments. The organizations that do so will conquer sustainable innovation and differentiation.

Near-Term Flag:

By the end of 2015, 5% of global organizations will design supermaneuverable processes that provide competitive advantage.

Recommendations:

- Innovate business models and focus on using technology as an enabler for this innovation.

- Design supermaneuverable business processes that are agile, adaptable and change as customer needs shift

- Create an agile, responsive workforce that is accountable, responsive and supports your organizational liquidity.

Related Research:

"Get Ready for Digital Business with the Digital Business Development Plan"

"Market Insight: Business Consultancies Must Shape-Not Merely Enable-Digital Business Transformation"

Organizational Liquidity Readies Enterprises for Digital Business

Drive Innovation and Big Change Efforts With Try, Harvest, Amplify and Challenge

A New Architecture and Sourcing Strategy for Customer-Driven Services at Telenor

Strategic Planning Assumption: By 2017, 50% of consumer product investments will be redirected to customer experience innovations.

Analysis By: Jake Sorofman

Key Findings:

- Gartner research shows that, by 2016, 89% of companies believe that customer experience will be their primary basis for competition, versus 36% four years ago.

- According to Gartner research, fewer than half of companies see their customer experience capabilities as superior to peers; however, two-thirds believe these capabilities will be industry-leading or much more successful than their peers within five years.

- To meet the challenge, Gartner research shows that nearly three quarters of companies expect to increase technology spending on customer experience in 2015.

- For the third year straight, a Deloitte survey of 4,047 consumers across 28 product categories and 350 brands found brand loyalty declining significantly.

- Digital disruptors such as Uber, Netflix and Zappos are challenging incumbents with native digital experiences that are better aligned to our connected habits.

- Gartner's 2014 CEO Survey shows revenue growth as the most pressing strategic mandate in business today. When asked for the top priority in technology-related business capabilities to support this growth agenda, CEOs identified digital marketing, followed closely by customer experience.

- CEOs expect this growth to come, by and large, from existing customers. Gartner research shows that customer retention and growing existing customers are the top two drivers of customer experience investments at 82% and 79%, respectively.

- A 2014 global study by McKinsey finds that, of all digital priorities, engagement of customers (in effect, digital customer experience) ranks first in both priority and spending, ahead of digital business model innovation.

Market Implications:

In many industries, hypercompetition has eroded traditional product and service advantages, making customer experience the new competitive battlefield. This is no truer than in durable

consumer products markets, which face disproportionate commodity pressure as consumer access to pricing and product information via search and social channels undermine brand loyalty. The reality is that focusing innovation on new products — and even new business models — is subject to shrinking periods of competitive advantage. Competitors and alternatives abound.

Perhaps more to the point, according to a Booz & Co report, a full 46% of respondents say their companies are just marginally effective or average at generating ideas and converting them to commercial opportunities to begin with. For most companies, a sustainable innovation pipeline is simply out of reach, and is a distant aspiration.

Increasing spending on R&D doesn't always equal better innovation. According to a Booz & Co. report, Apple and Google rank first and second in global innovation performance, while their R&D spending ranks 43rd and 12th, respectively. What's the difference? Experience innovation, a customer-driven approach to designing for simplicity, convenience and delight at every customer touchpoint.

The reality is that product innovation is subject to accelerating commoditization. Customer experience innovation is enduring — the secret to lasting brand loyalty. According to a recent eConsultancy study, 89% of companies see a great customer experience as a vital requirement for driving brand loyalty.

Near-Term Flags:

- By 2015, more than half of traditional consumer products will have native digital extensions.

- By 2016, nearly 90% of consumer product companies will have appointed a chief customer officer.

Recommendations:

- Invest in customer insight through persona and ethnographic research that reveals a deeper understanding of the patterns and preferences of growing demographics. Here, the focus should be on experience innovations that deliver the convenience and delight these customers have grown to expect.

- If you haven't done so already, consider appointing a chief customer officer as the locus of responsibility and authority for driving experience innovations across channels.

- Look to native digital disruptors such as Uber for examples of experience innovation executed without the burden of traditional preconceptions and conventional assumptions.

- Break out of the habit of incremental feature-driven innovation in favor of experience redesigns that take bold steps toward delivering transformational customer experience. In doing so, redirect traditional product investments to customer experience innovations.

Related Research:

"Agenda Overview for Customer Experience, 2014"

"Toolkit: A Marketer's Checklist to Guide Customer Experience Efforts"

"Use Personas to Drive Exceptional Customer Experiences"

"How to Design Customer Experiences Using Persona-Driven Buying Journeys"

"Beyond Net Promoter Score: The Evolution of Customer Experience Metrics"

"Sephora CMO: How Digital Became Core to Sephora's Brand, Culture and Customer Experience"

Strategic Planning Assumption: By 2017, nearly 20% of durable goods e-tailers will use 3D printing to create personalized product offerings.

Analysis By: Michael Shanler

Key Findings:

- Durable goods manufacturers are increasingly looking toward technologies that enable a shift from offering "configurable" products to more-personalized products that are tailored toward diverse consumer needs.

- Manufacturers are increasingly leveraging 3DP technologies to enable new design possibilities. Most durable goods manufacturers have already used or evaluated 3DP for prototyping, and are beginning to push the technology into the extended manufacturing and are building infrastructures to support engineer to order (ETO) processes.

- By 2018, Gartner expects that nearly 50% of discrete manufacturers will use 3DP to produce parts for products they sell or service.

- by 2018, the 3DP market will grow to more than $13.4 billion.

- E-tailers are poised to add portal-based, customer-facing personalization capabilities via digital business channels. To support this transition, IT and business groups are developing stronger back-office capabilities that support 3D modeling and core product life cycle management (PLM) systems that interface with CRM, ERP and manufacturing system technologies.

Market Implications:

Although many manufacturing technologies create and assemble goods, 3DP technology is a game changer. This is especially the case for the production of concepts, first-generation products and low-volume manufacturing runs. The advances in 3DP technology and the ubiquity of 3DP services during the next few years will create a new democratized manufacturing ecosystem in which the design and delivery process can be made extremely flexible. As a result, virtually any company can create, engage and launch a prototype or sell a product that uses an ETO process.

3DP is already having a profound impact by enabling startups to reduce infrastructure costs, compared with traditional manufacturing processes. Leveraging a 3DP service bureau significantly lowers a small company's barrier to entry from a capital perspective. These service bureaus also

enable large companies to branch out into new product development areas, while mitigating capital risks, and reducing project costs and overall expenditures.

As consumers increasingly look to control more products features and capabilities, e-tailers are recognizing the business potential of moving from "configurable" products (e.g., freezer with different finishes, ice maker, etc.) to "personalized," made-to-order products enabled by 3DP. Examples of personalized durable goods enabled by 3DP technologies include a wide variety of everyday products. Major brands have either initiated pilots or created partnerships in the digital supply chain to offer:

- Eyewear tailored to individual consumers' facial profiles and stylistic preferences

- Helmets, boots, shoes — custom designs and fit

- Bicycle frames, skis, skateboards, hunting and sporting firearms designed specifically for customers' body types, height, weight, inseams, grips, etc.

- Fashion, handbags, precious metal jewelry printed on-demand a variety of materials

- Toys — made to order, customized, "U design it," etc.

- Home furniture and décor — wall panels, picture frames and lighting fixtures

Almost every durable good category will see a surge in 3DP-enabled personalization, as manufacturers develop capabilities for bringing the consumer closer to the design experience. However, there are challenges that must be dealt with early. The companies that set the strategy early will end up defining the space within their categories. This requires a corporate culture that is supportive of nonconformance products, new front-office "concierge" business capabilities, and back-office IT and operations skills. It will require a new agility that go beyond rigid process automation, and may require entirely new business systems. It requires IT leaders to update their end-to-end process for order placement, order build and delivery.

The CIOs at e-tailers that put into place flexible PLM-centric systems will get a head start and become leaders in the field, because the "personalized" products may require a different bill of materials (BOM) for every order. Keeping track of the digital piece, maintaining chain of custody, and validating systems and processes to deliver one off products requires CEOs to lead a change of culture. It requires business and IT leadership to embrace innovation practices. The larger enterprises engaged with serial innovations, must be able to cope with a risk-mitigating level of failure (e.g., fail fast and inexpensive) before seeing commercial successes and the creation of new value.

Numerous opportunities are associated with delivering personalized products:

- **Socially engaged design innovation:** Customers will be able to create their own innovations, and socialize these in a larger community. This, in turn, can lead to perpetual engagement cycles, reference consumers and improved education.

- **New service and support models:** New customer-facing interfaces need to be supported by easy-to-use interfaces and may need to be augmented with services to support customers.

- **Brand engagement and loyalty:** Allows consumers to interact with their favorite brands at a more intimate level.

- **Reduction in inventory in the supply chain:** Companies that previously had to stock parts, can now print parts and assemblies on demand through facilities and extensive 3DP service bureaus, thus reducing stock and unused inventories.

- **Novel customer experiences:** E-tailer order portals and product request systems are increasingly supporting more-sophisticated product requests and customizations. The companies that make this an enjoyable experience will be rewarded with repeat business.

Near-Term Flag:

By 2015, more than 90% of durable goods e-tailers will actively seek external partnerships to support the new "personalized" product business models.

Recommendations:

CIOs, product development leaders and business partners should:

- Evaluate their business opportunities to leverage 3DP technologies to create personalized offerings to provide a better end-to-end consumer-experience.

- Evaluate gaps between the existing "as is" and future "to be" state — processes, skills and technology. Determine what investments are necessary and your ability to adapt to a new and disruptive model.

Related Research:

"Hype Cycle for 3D Printing, 2014"

"Strategic Technology Trends — 3D Printing Transforms Organizations"

"Predicts 2014: 3D Printing at the Inflection Point"

"Forecast: 3D Printers, Worldwide, 2013"

"Use the Gartner Business Model Framework to Determine the Impact of 3D Printing"

Strategic Planning Assumption: By 2020, retail businesses that use targeted messaging in combination with indoor positioning systems will see a 5% increase in sales.

Analysis By: Bryan Taylor and Kelsie Welch

Key Findings:

- Digital marketers are increasingly focusing on mobile advertising and advanced analytics to take advantage of the rich opportunities presented by the growth of mobile device usage.

- Due to a wide and blurring set of channels — for example, mobile Web, in-app, email and SMS text — context is playing an increasingly central role in these efforts, enabling highly targeted ads based on recent purchases, buying habits, city of residence and interests.

- Recently, the use of indoor positioning systems has become increasingly viable. Rather than using satellites, these systems use low-energy Bluetooth beacons and Wi-Fi access points to pinpoint a mobile device's location inside a building, with accuracies in the centimeter range.

- Support within newer mobile devices for indoor positioning systems will enable location cues for targeted ads and messages, as well as real-time mapping to lead customers to store locations and to specific products themselves.

Near-Term Flags:

- By 2016, there will be an increase in the number of offers from retailers focused on customer location and length of time in store.

- By 2017, seven of the 10 largest retailers will use indoor positioning systems, combined with mobile apps, to aid shoppers in quickly locating departments and products.

Recommendations:

- During the next three to five years, retailers have an opportunity to improve sales, margins, satisfaction and frequency of visits in store through the delivery of targeted promotions using these technologies to specific customers or customer segments. By combining real-time, contextual information and advanced analytics, retailers can determine the best offer to deliver in real time to the customer. For example, they can use consumers' locations shared from their mobile phones and/or social network activities while in a shopping mall to create contextually relevant offers for nearby stores. Combine this with indoor positioning systems, and customers that accept such offers could be directed in real time to the store, as well as to the specific sale items themselves.

- Retailers that are considering targeting customers with real-time offers will require good customer data across all interaction channels, context-aware data (for example, location, recent purchases or buying history), and a vehicle by which customers can receive and respond to offers. Offer acceptance and conversion can be constrained by the performance of the delivery systems and offer relevance, which play a key role in the customer experience.

- Retailers should not attempt to supply customers with real-time, customized offers in context-aware situations until they are confident that they have adequate segmentation and behavioral analysis. The promise to provide meaningful, relationship-building and relevant offers can frustrate or offend consumers if they arrive late or seem irrelevant. Offer execution in line with basic customer expectation also plays an important role. For example, it is not enough to send timely and relevant personalized offers — the product must be in stock when the customer redeems the offer.

Supporting Evidence:

According to a 4Q13 Gartner survey, two-thirds of today's consumers report engaging in shopping activities on mobile device. As a result, retailers' opportunities to access and interact with consumers on their own devices has also increased. During the past few years, the number of consumers who have shared their location with a shopping application continues to rise; as of 4Q13, 21% of consumers reported sharing their location with a retailer via mobile devices.

As consumers become more comfortable sharing information with retailers, an opportunity to improve sales, margins, satisfaction and frequency of visits in store has arisen though the use of indoor positioning systems and targeted offers. By combining real-time, contextual information and advanced analytics, retailers can determine the "best offer" to deliver in real time to the customer. For example, a retailer may use consumers' locations shared from their mobile phones and/or social network activities while in a shopping mall to create contextually relevant offers for nearby stores. Combine this with indoor positioning systems, and customers that accept such offers could be directed in real time not only to the store, but to the specific sale items themselves

Although the delivery of targeted promotions using these technologies to specific customers or customer segments is becoming more viable, and consumer interest in receiving them has grown, the increasingly complex multichannel landscape poses challenges to executing real-time, targeted offers without compromising consumer experiences. Therefore, retailers must selectively identify the right consumers as candidates for receiving these offers, while ensuring consistent execution from the delivery of the offer to the POS.

Once one or two retailers execute targeted, contextual offers well on a large scale, consumer expectations for capability and delivery for all retailers attempting contextualized offers will rise.

Related Research:

"Survey Analysis: Mobile Real-Time, Personalized Offers Will Fail Without Transparency of Intent and Multichannel Consumer Insight"

"Hype Cycle for Retail Technologies, 2014"

"Innovation Insight: Indoor Location Technologies — The Looming Battle Between Bluetooth, Wi-Fi and Other Wireless Technologies"

"How Mobile Will Affect IT Leaders Supporting Marketing Technologies"

"Indoor Location-Sensing Technologies Enable New Contextual Experiences"

Note 1 A Short Description of Unstable Platforms

The F16 fighter jet was one of the first to take advantage of deliberate instability. Quadcopter drones are likewise unstable and require control software to remain stable in flight. The fact that these platforms are unstable makes them more agile under software control. They can adapt more readily. Digital business gives us the opportunity to examine business processes that are inherently

unstable to make a business more agile and adaptive, and we will apply that to improving customer experiences. For example, crowdsourcing brings a need for processes that change to fit crowd dynamics. Organizational liquidity speaks to an increased need for agility and adaptability. In some ways, these processes could be referred to as supermaneuverable, because they are designed for change. Digitalization forces more fluidic change into our businesses, and those who cannot adapt will suffer.

Note 2 Organizational Maturity

CIOs expect their organizations to mature rapidly during the next 18 months and to move from "niche" status to "leaders" in digital-business innovation; however, their expectations are largely unrealistic — 70% are likely to fail (see "BiModal IT and Adaptive Sourcing are Critical to Success in Rapid Digital Innovation").

Note 3 Supermaneuverability

Sukhoi Test Pilot Explains "Supermaneuverability": Su-35S maneuvers point to combat capability

Note 4
Pugachev's Cobra

The Sukhoi Cobra

Note 5 Herbst Maneuver

The J-turn

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