Digital Business 2020: Getting there from here!
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The Journey to 2020
We know: You’ve heard (seemingly forever) how digital technology will revolutionize business. It started in the mid-1960s with the advent of commercial mainframes and green screens. Gurus gushed breathlessly about the impending paperless office and repeated that mantra throughout the 1970s as minicomputers and dedicated word processors selectively supplanted big iron. They raised the rhetoric in the late 1980s, pinning their hopes and dreams on networked PCs and Unix servers, and continued through the 1990s (into current times) with the mainstreaming of the Worldwide Web and so-called “Internet of Things.” And still, the average worker generates more than two pounds of paper per day … so much for the paperless office!

Given all this, it might sound a bit naïve to proclaim that the era of digital business is now upon us. Yet as this issue of Cognizanti reveals, new technologies, tools and techniques are rapidly converging to push the vision of end-to-end digital business over the final barrier into an approachable reality. Big changes in the way we work, live, digitally maintain our health and manage our finances are right around the corner and are likely to become accepted norms sometime in the next decade. And this time, when we say “digital,” we really mean it. Business leaders of the future will compete not on things we can touch but on something that’s as intangible as it is powerful: code. When businesses successfully distill and apply meaning from the digital data that surrounds every person, process, organization and device (what we call a Code Halo™), they rise above the fray, turn over entire industries and emerge as indomitable — and fierce — competitors.

It is our contention that business meaning made from Code Halo intersections will separate industry leaders from also-rans in this new digital economy. And for businesses in all industries, the path to digital success will be paved with a slurry mix of process reinvention, mindset shifts and deepening inter-disciplinary competency across the components of the SMAC Stack™ (i.e., social, mobile, analytics and the cloud). With this technology foundation at their core, organizations can transform their business models from simply managing widgets to trading on digits and offering personalized, engaging and fulfilling customer experiences.

In the pages that follow, our authors peer over the horizon into the next decade to see how Code Halos will create engaging and even clairvoyant enterprises that can read the minds of customers, employees and business partners, and deliver personalized products and services that offer true value at the moment of need, sometimes even before the need is realized.
Our experts examine how SMAC-charged Code Halos will empower digital business within key industries (consumer goods, banking and healthcare) and assess impending changes in fundamental business-technology disciplines (process automation, IT management, enterprise information architecture and software development).

And we conclude with practical advice on what organizations can and should do to navigate around and through the organizational, technological and business model mountains and molehills that they are sure to encounter on the way to fulfilling their holistic digital business mandates.

Setting off full-bore on developing an end-to-end digital business strategy requires leaders to see the big picture. This starts with a serious rethink of what their company is really in business for, given the Code Halo-inspired upheaval occurring across industries. From there, it evolves into the creation of impeccably designed and personalized experiences that delight customers at every digital touchpoint with meaningful and rewarding engagements that drive loyalty (as measured with every interaction and transaction). That’s not easy, of course, especially in a traditional business world in which success often pivots around feeds, speeds and other easily duplicated business advantages.

The New Digital Gestalt

As our tribute to design thinking, we hope you enjoy the new look and feel of the Cognizanti journal. We contemporized the design and created additional entry points to invigorate the reading experience. We are also moving to a digital-first approach by creating more snackable and shareable content from the get-go that is easily ported into our Cognizant Perspectives app (which can be sampled on our Web site (www.cognizant.com/latest-thinking). Feel free to share your thoughts, whether about our new look, your forays into digital business or your perspective on Code Halo thinking, with me at Alan.Alper@cognizant.com or on our e-community, Cognizant Connections (connections.cognizant.com/).
As digital tools and technologies are embedded at the core of the business, the future of work looks more connected and data-driven than ever before.

A few years ago, who could have guessed that a bunch of everyday objects, or “things,” could cause such upheaval in the way we live and do business? And yet, here we are in the midst of a data explosion, instigated in part by the so-called Internet of Things, a vast and growing network of sensor-enabled devices embedded in everything from vehicles, to healthcare equipment, to household appliances. These connected “things” — which in 2012 accounted for 0.6% of the estimated 1.5 trillion things in existence — are expected to number 50 billion by 2020 — or 6.58 connected devices per person.¹

The market for wearable electronics alone is forecast to cross the $8 billion mark by 2018,² across the consumer, healthcare, enterprise and industrial sectors. The result: A boom in global IP traffic volume, which will reach 1.4 zettabytes per year by 2017.³

This data explosion has significant implications for enterprises, particularly those seeking to sharpen their competitive edge by deftly interpreting the accumulated bits and bytes and transforming them into workable insights that inform and illuminate business strategy and direction.

The data deluge caused by increasingly chatty and connected products, services, industrial devices, consumers and enterprises has resulted in the creation of fields of information — or what we call a Code Halo™. In a business context, these halos enable meaningful connections among people, organizations and devices. Extracting meaning from Code Halos is a skill that successful enterprises of tomorrow will need to master, with the help of new technology foundations and skills based on the SMAC Stack™ (i.e., social, mobile, analytics and cloud technologies).

A Look at the SMAC Stack
Big Data & Analytics

Code Halo thinking is predicated on mastery of business analytics. To fan the analytics flame, organizations are betting big on big data, a global market that is projected to reach $48.3 billion by 2018⁴ (see Figure 1, next page). The advanced and predictive analytics software segment within the big data market is forecast to grow from $2.2 billion in 2013 to $3.4 billion in 2018.⁵ Through the application of best-in-class business analytics,
enterprises across the retail, banking, insurance, manufacturing, communications, information services, media and entertainment industries could generate value worth $2.61 trillion per year, an increase of 8% beyond current levels.6

Cloud Computing

The growth in cloud infrastructure is enabling efficient data storage and easier data sharing. As cloud computing matures, it is paving the way for next-generation IT architectures, such as software-, platform- and business-process-as-a-service. In fact, the cloud is already delivering measurable improvements, including increased efficiencies, improved employee mobility and the ability to innovate,7 spurring levels of cloud-related spending that are expected to reach $235.1 billion in 2017, according to IHS8 (see Figure 2).

Enterprise Social Networking

While social networking seems to have historically received short-shrift from enterprises, we detect a subtle shift in the air. A recent Frost & Sullivan survey9 found that 88% of respondents believe social networking will be important in the coming years, especially to enable knowledge transfer.

Thickening Clouds in Store for Enterprises

Global spending forecast on cloud architecture (in $ billions)

Source: IHS
Figure 2

Source: Transparency Market Research
Figure 1
within the enterprise and among geographically disparate employees. Social tools can also improve employee engagement, as shown in the early corporate use of “gamification” techniques. Enterprises’ growing seriousness about social is reflected in the uptake of enterprise social software to enable document-sharing, micro-blogging, wiki publishing and creation of shared spaces for communities.10

The rise of “social” offers a glimpse into the emergence of a digitally-wired enterprise that fosters a collaborative work culture and enables knowledge to flow seamlessly among connected employees over smartphones, tablets and other devices of choice.

Mobility

Whether they’re used for social engagement, transactions, entertainment or customer service, mobile devices are now a crucial channel for customer interaction. Monthly traffic from mobile devices will surpass 15 exabytes in 2018, according to the 2013 Cisco Visual Networking Index, and according to Nielsen, consumers now use their smartphones more than their PCs to access the Web.11 Both smartphones and wearable devices will push mobility even further, enabling businesses to interact more personally with customers, especially through localization capabilities that deliver offers, alerts and services to customers just when they are needed.

Impact on the Enterprise

With SMAC technologies as the fulcrum, pundits estimate that business spending on digital infrastructure will reach the $360 billion mark by 2016, transforming all functional areas of the enterprise. Social tools will improve customer engagement and unlock collaboration. Mobile will enable anytime/anywhere interactions and localized deals. Analytics will make these efforts personalized and even able to predict customer needs. Cloud-enabled digitization of processes will result in greater automation and better monitoring of internal processes. Integrated data management will be the crucial intermediary that brings disparate sources of data together and feeds the respective functions with the necessary insights.

Finance

Increasingly, financial executives will employ cloud-based SaaS solutions to supplement core financial applications in areas such as expense management and reconciliation management. Big data and analytics will enhance functions such as accounting, disclosure and governance. Accelerated runtimes for period-end reports could significantly reduce the time needed to close the books. Mobile solutions will improve employee productivity with self-service features such as data retrieval and sharing (see Figure 3).

Mobile Improvement Goals of CFOs

Figure 3
Economic Benefits of Customer Intelligence

Big data analytics plus customer intelligence will make business processes more cost-effective, resulting in enhanced output and value across industries.

According to Ovum, customer engagement systems will be the fastest growing enterprise application between 2013 and 2018, with a CAGR of 10%. Using online tools (such as social media platforms) to handle customer issues will over time prove increasingly useful in improving customer satisfaction while reducing costs.

Marketing and CRM

Advanced analytics will provide an ultra-high-definition picture of a company’s move-forward performance and promotional scenarios to refine customer engagement strategies on the fly.

A study of the UK market by the Centre for Economics and Business Research (Cebr) found that better customer intelligence, driven by big data and analytics, could infuse the UK economy with $123.8 billion (£74 billion) between 2012 and 2017 (see Figure 4), benefiting several industries, including retail, telecommunication and banking.

Human Resource Management

Meanwhile, big data is gradually moving recruitment decisions out of the hands of individual interviewers. Analyzing in-house data about high-tenure employees will help some organizations better understand the characteristics to seek in prospective job candidates.
Supply Chain

Areas such as demand planning, order management and price management are also expected to benefit greatly from big data initiatives. Big data analytics will enable more intelligent use of channel data, and a digitized supply chain will more effectively combine transactional data with interactional data to enable new forms of connectivity and manufacturing. Leaders will be able to interpret signals in the supply chain and transmit them to the right person at the right time to make the right decision.

Meanwhile, 3-D printing’s print-on-demand capability is set to have a massive impact on the industrial economy in terms of savings in logistics and inventory. The economic implications of this technology will amount to $550 billion a year by 2025, according to McKinsey & Co.

Preparing for the Digital Future

While the specifics of digital enterprises will vary by industry, the fundamentals of getting it right are consistent for everyone. End-to-end process digitization is not just about the technology that binds a multitude of devices into a coherent whole; it also involves the organization’s culture, its present and future workforce and, importantly, its leaders.

Some important factors of successful digitization are:

- A robust enterprise architecture:
  Continuous adaptation to a changing business environment requires an agile and elastic digital IT architecture, as well as an increasing array of analytics to guide decision-makers through a constant deluge of data. Enterprise architects need to work in tandem with key business stakeholders to keep the enterprise poised for continuous transformation.

- People-centric digitization: Digitization efforts must focus on the people who make business happen. Decisions should be guided by the company’s culture; if the organization moves too fast, it risks alienating traditional thinkers and skeptics, but if it moves too slowly, it risks market irrelevance. The imperative is to get employees thinking positively about digital.

- New skills: Data scientists, business and data analysts, data visualizers, big data programmers, data architects, behavioral scientists and academic researchers will all be key to creating a digital future.

- Preparing for complexity: Digital enterprises are based on a complex environment, full of sensors sending and receiving data. To excel amid this complexity, enterprises will need to support product digitization with equivalent process digitization.

- Managing structural transformation: End-to-end process digitization requires large-scale and holistic change across the organization. Many enterprises will appoint a chief digital officer — a seasoned and savvy individual with a mix of the right leadership and technical skills — to oversee this change. Alternatively, individual business units could run their own digitization efforts using a shared infrastructure.

Footnotes


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Why Smart Hands and Machines Will Power the Second Industrial Age

By Robert H. Brown

Whether your organization completely digitizes its business processes or takes a one-off approach, advances in foundational information technology, process automation and analytics, as well as machine intelligence, will unleash the potential for more productive and innovative ways of working.

With digitally-fueled automation likely to wreak industry-wide change everywhere, will most humans effectively be “out of a job” by the end of the decade? Hardly. Imagine instead a future where functions become intelligent through technology, allowing humans and digital processes to put their heads together to create a more intuitive, more responsive enterprise. And through that collaboration, better business results will be delivered via new digitally encoded processes.

Historical Precedent Informs the Future Movement of People, Goods ... and Information

Consider an analogy from the mid-19th century, when business entered the Industrial Age for good. The first transcontinental railroad was the emblem heralding the shift from the Agricultural Age to the Industrial Age, and it created new, unforeseen functions, jobs and economic possibilities. In terms of outcomes, people could get other people, goods, services, things – and importantly, information – from point A to point B in a radically more efficient and effective way.
We’re at a similar juncture today. It’s not a stretch to say that the impact of SMAC technologies (aka social, mobile, analytics and cloud) on business processes feels like the 21st century version of rails, steel, telegraph poles and locomotive engines. We’ve started to see the metaphorical digital track being laid and tunnels being blasted. And, like the railroad, the impact will be at a scale not previously seen before in the history of business.

But much as trains need a destination, business processes — digital, or otherwise — are useless if they don’t support a business strategy. That means helping smart people make smarter decisions in support of differentiating activities.

Maximizing Digital Processes by Connecting Industry Value Chains

Signs of a powerful interplay of knowledge workers and digital processes are already evident on the road to 2020. This is especially true when you look at middle- and front-office processes within industry value chains.

Take healthcare and the ecosystem of dependent processes among medical providers, payers and pharmaceutical companies. For a healthcare payer, a claim is the “main character” in the insurance process story that passes from a patient, to a doctor, and then to the insurance company to be paid. It becomes powerful when wrapped with a Code Halo™ (i.e., the digital data that accumulates around people, processes, organizations and devices). For instance, think of how a patient Code Halo, rich with metadata that captures the individual’s vital signs, offers meaningful insights to a payer about the correlation between the level of care a patient receives and her wellness (e.g., a $50 co-pay for a doctor’s visit vs. a $1 million heart transplant).

When a doctor or nurse is given paperless mechanisms to create the claim as “digital” from the outset, qualitative and quantitative benefits across the industry value chain emerge in tandem with the caregiving process. These include increased speed (or elimination) of claims management, improved accuracy and consistency, and compliance.

In addition to better patient care, other benefits of digitization, automation and Code Halos include improved results of clinical trials, increased accuracy of clinical trial yields and improved judgment and decision-making of physicians, such as avoiding the wrong combinations of pills when prescribing medications to patients. All of these advances help accelerate and improve the precision of regulatory approval for new and powerful drugs.

Consider a day when Facebook, Amazon or Google reveal that they have acquired, partnered or otherwise developed digital processes that facilitate the discovery of new drugs that cure cancer. That would be a definitive milestone for humanity — a signaling event — far surpassing the “driving of the golden spike.” But it would also change the pharmaceuticals industry forever, prompting competitors to clamor for a response, as fast as possible, in search of cures of a similar magnitude.

So to prepare for these coming new digital realities, the journey to the future of process needs to...
begin today, by imagining how work will get done
tomorrow. And to be sure, most organizations will
need to walk before they can run down the path to
the future.

‘Big D’ and ‘Little d:’
Digitization at the
Process Level

Some simple questions to ask include: “How
do I eliminate paper-based process inputs, such
as invoices or claims, and make my process
truly ‘digital’ from the outset?” “Are the people
delivering my processes today adding value, or
injecting risk?” “What are we learning about our
business or industry value chain as data is applied
to process-level algorithms, and is it facilitating
people to make better judgments?”

Many companies are talking about, and in limited
instances actually using, “RPA” (robotic process
automation) today. Think of this as “little d”
digitization of information inception (such as
e-invoicing, or optical character recognition). As
part of this, some organizations are running batch
process or presentation-layer macros that automate
pieces of end-to-end workflows (using software
providers such as UI Path, WinAuto, Blue Prism,
Automation Anywhere, etc. that rely on those
process inputs). Commonly, automation at this
level is an “inside-out” play – simply an incre-
mental improvement on existing, intra-enterprise
processes. In railroad terms, RPA is the railroad
spur in the switchyard.

But there may be a gnawing concern that “little
d” automation initiatives like RPA fall short of
truly transformational, “Big D” process digitiza-
tion – that is, re-imagining and instrumenting a
process from its beginning to harness the power of
code. Truly digital processes can use Code Halos
to automate processes right from the outset, but
the real prize is the data that’s produced as a result.
Information and meta-data in Big D processes are
inherently “born as digits.” And as physical value
chains digitize, process feedback and analytics
become instant. Open process loops are closed
closer. Insights come faster. Traceability, tracking
and auditability are enhanced.

Today, delivery models such as business process as
a service (BPaaS) probably come closest to making
the promise of Big D digital processes a reality.
While many BPaaS offerings are almost entirely
automated, their outputs are leveraged to help
process and knowledge workers make quicker,
more informed business decisions, using a model
that’s typically less costly than traditional sourcing
options.

By automating systems to better sense, predict
and deduce the data they consume, employees can
work heads up, not down, with intelligence from
digital processes supporting their own knowledge
and experience. And the ability to capture infor-
mation about the movements of people, goods,
information and services through space and time
is allowing leading-edge businesses to re-imagine
processes as digital from the outset. Consider
the Internet of Things, in which sensors – sure
to include nanotechnologies in the near future
– are beginning to totally digitize and automate
processes in a straight-through data flow. Those

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companies that harness these types of digital technologies to recombine and drive innovation in their business processes will out-compete those who can’t—or don’t—for years.

Steps to Take Now, On the Journey to the Future of Process

Business process leaders can take practical action now to get their digital process train on the right track:

- **Analyze your company at the process level:** Review in detail your processes as they exist today (new product/service development, sales and customer relationship management, operations, etc.). Infuse a digital process plan, including the applicability of Code Halos, by re-imagining moments of customer engagement or constituent journeys. Target tangible process metrics: cost-per-claim, clinical trial yield, healthcare unit cost, fraud prevention rates, etc.

- **Perform an automation readiness assessment:** Map processes to a level of detail that includes inputs, process and outputs. Scan the market for tested and ready-to-implement technologies that have established tangible proof of success. Apply “little-d” automation technologies that are minimally invasive to operating environments today, but keep your eye on the prize for where “Big D” transformation makes most sense tomorrow.

- **Help humans evolve toward the work of tomorrow:** Start by giving employees access to digital processes and machines that help them do their jobs better, smarter and with more meaningful impact to the business. It’s not about the number of people tied to “doing the process”; it’s about outcomes and making smart people even smarter.

To get to the future of process, don’t wait. Start today, by imagining how the future of work will look tomorrow when digital machines, information and processes help humans do their jobs better, faster and with greater impact.

Footnotes

1 Before it fell into collapse, historians believe the Roman Empire was tantalizingly close to having discovered the steam engine in the 1st century AD; the first recorded rudimentary steam engine being the “aeolipile” described by Hero of Alexandria. Had his invention come a century—or even decades—earlier, it is arguable that 1,000 years of Dark Ages could have been circumvented, and the Industrial Age and Information Ages accelerated by one millennium.


3 Our book Code Halos refers to “amplifiers” for digitization (Chapter 4, pages 38-40). The best-known ones include laptops, location-aware mobile apps, wearables like the Apple Watch, Google Glass or Nike Fuelband and increasingly the Internet of Things (i.e., Google Nest).

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Get Ready to Meet Your Customers
By Steven DeLaCastro

New data modeling and predictive analytics techniques are emerging to help banks create insightful digital strategies that map to their business objectives and strengthen customer relationships.

Make no mistake: Getting to know customers is a major undertaking for banks. It requires extensive analysis, development of consistent channels and constant encouragement to use lower cost channels like mobile and online.

No wonder banks have relied on guesswork for so long. But guesswork is expensive. By finding out who their customers are and then mapping that information to business objectives, banks can skip the speculation and create the personalized customer experiences that are the hallmark of online channels.

The first step is developing the underlying data techniques. Equally important is converting the data and newfound customer focus into business results. Data enables banks to map for multiple objectives, such as attrition and market penetration. It also allows banks of all sizes to benefit from micro-segmentation.

The strategy that your bank adopts to guide its digital evolution through 2020 and beyond depends on the data, analytics and direction it wants to pursue.

Thinking Big
New channels require new ideas. Imagine presenting contextual offers to customers at their preferred point of consumption, for example. Or issuing merchant-funded, digitally redeemable offers to customers as they pay for purchases with mobile wallets or debit cards. Or using geolocation services to generate custom offers.

Fully digital channels also require a new value proposition: Banks and customers swap information more freely. Consumers’ digital lives have changed the rules of banking: They expect personalized options — lots of them — and they want them now. In exchange, many are happy to reciprocate by divulging important personal details. According to one recent study, 70% of bank customers are willing to trade information about themselves for greater personalization or better service.

That free exchange of data forms the heart of customer centricity and the future of digital channels. The more data that banks have on customers, the greater their opportunities to make use of Code Halos and deliver personalized products and offers.
Developing the Underlying Data Techniques

With mass marketing still in force at most banks, how can banks begin driving the customer journey through digital channels? Data techniques are key. Engaging customers means understanding who they are — or who you want them to be — by creating customer personas. Personas are detailed, multi-dimensional representations of your customers and prospects that illuminate their motivations and propensities. They are instrumental in shaping products and marketing strategies and determining customer needs and preferences.

Convert Customer Focus to Business Results

How can banks convert customer journey maps to real business results? Because journey maps uncover many data points, they serve as a form of computer modeling to determine the likelihood of occurrences. Organizations can accurately predict customer behavior rather than operate on guesswork. The more variables tracked, the more accurate the predictions will be.

Banks can map for multiple objectives, including attrition, market penetration and channels of preference. For example, journey maps can

Engaging customers means understanding who they are — or who you want them to be — by creating customer personas.

While personas identify your customers’ attributes, customer journey maps let you walk in their shoes. Journey maps are powerful visual tools that trace customers’ steps as they travel through key banking activities, such as opening accounts, exploring additional products and services, and resolving problems.

Journey maps provide the big picture. They deconstruct banking processes from the outside in: Instead of viewing customer experience from an organizational point of view, journey maps follow customers through channels, decision paths and, perhaps most importantly, emotions.

For many banks, journey maps are eye-openers. Having never traveled as customers through their organization, many institutions only guess at the routes consumers follow, and they often find the reality is quite different from what they imagined. Barriers become apparent. Frustrations are noted. The customer journey is frequently revealed to be far less linear than organizations realized, requiring customers to switch channels for positive and negative reasons.
Encouraging the Right Channel for Each Customer

By better understanding the customer journey, banks can encourage more efficient channel use. They can empower consumers to take advantage of the channels that make the most sense for them, whether it’s digital channel conveniences or hands-on attention that human-assisted channels provide.

For example, by determining the information that customers regularly request and then proactively providing it, banks can predict and preempt the use of human-assisted channels for the low-value interactions that mobile and online channels process much more fluidly.

Conversely, banks can offer mutually beneficial encouragement for use of human channels. By funneling customers with little digital propensity as well as those with high-value interactions (such as financial advice and complex sales) toward the costlier hands-on channels, they strengthen those relationships that genuinely require individual assistance and improve operational efficiency.

Five Steps to Becoming Customer-Centric

Moving toward micro-segmentation and arriving at personalization is an evolutionary journey. The customer-centric strategy your bank adopts to guide its evolution depends upon the data, analytics and direction it wants to pursue. Objectives might include increasing market share, penetrating new markets or lowering costs. Other goals might be reducing attrition, improving product take-up and increasing loyalty.

It is important to start small and show early success, gradually building your program and fine-tuning it based upon your findings and successes as you go.

Here are five steps your bank can take to begin creating insightful digital strategies and channels:

1. **Evangelize the need for increased customer insight and the types of data and process-sharing it requires.** Determine inherent organizational constraints to sharing customer data across lines of business. Examine siloed channel processes such as line-of-business-based call centers.
Identify the changes that will work in your environment with the least initial disruption.

2. **Determine potential sources of data from all channels.** Prioritize the highest and lowest cost channels, as they will yield the most benefit from the least effort. Audit the data sources for availability and suitability. Assess data gaps and determine remediation. Create a data strategy that supports your objectives.

3. **Assess the organizational changes that may be required.** Reinventing your bank for greater customer focus can require organizational change to support the new objectives. Dismantling siloes is hard work, typically involving retraining and functional role modifications. How will your organization evolve in response? To ensure your bank is ready, follow best practices for organizational change management.

4. **Review your existing technology against your short- and long-term objectives.** Customer-centricity isn’t just about reframing existing processes; it also involves reinventing customer-facing processes through the use of techniques such as customer journey mapping and new technologies.

5. **Examine must-have analytics capabilities and tools.** Analytics is the cornerstone for achieving greater insight into customer propensity and preferences, as well as for correlating the data needed to achieve a suitable degree of digital segmentation.

Many of the standard technologies no longer do the job for banks when it comes to predictive analytics. Understanding the new options is a top priority. Be sure your organization has a plan for integrating the new functionality with its existing data sources.

While banks have lagged behind their retail industry counterparts in embracing digital—and retailers’ successes have raised customers’ expectations for online experiences—banks need to cater to the new digital reality as it continues to evolve and accelerate.

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**Footnotes**


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**Author**

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Code Halo™ is a pending trademark of Cognizant Technology Solutions.
By leveraging data and analytics, Key Bank can better understand customer preferences and behaviors and deliver tailored offers, services and solutions.

Retail bankers are redefining convenience in high-stakes bids for customers. Let’s face it — customer expectations have changed dramatically in just the past decade. It’s no longer enough to offer banking via the Web, mobile device or app. Such services are mere table stakes.

Above all, customers value clear and simple solutions to their personal financial challenges. Customers want banking to be easy. They expect — in fact, demand — an engaging, intuitive and consistent experience across all channels, including when they visit the branch, dial a support center or engage in an instant chat session.

There is no way to deliver this experience without fully digitizing critical internal and external processes across the front-to-back office. And from where I sit, Code Halo thinking is critical to transforming today’s loose assortment of digitized assets into a coherent, interconnected ecosystem that provides true value to banking customers by offering expertise that stems from anticipating customer needs, wants and desires before a single request is articulated, input or even swiped.

Decoding and applying meaning from the data swirling around people, processes, organizations and devices is something we are seriously applying to our digital business transformation. Getting there requires a strong IT foundation built on social, mobile, analytics and cloud technologies — the SMAC Stack. Digitization 1.0 entailed moving existing banking capabilities to the Internet to streamline and enable customer interactions, 24x7. The impact to banking processes was minimal. Social, mobile, analytics and cloud have the potential to change things, from customer interactions all the way to the end of the business process.

As we continue our journey with data and analytics — and leveraging Code Halos — we are developing different ways to discern our customers’ unique needs and preference so we can offer services that we believe our customers value. As we develop these data capabilities, we can better understand customer preferences and sentiments by capturing and analyzing their social media interactions and their previous transactions/interactions with us. And we can marry these insights with third-party demographic data to understand what people like them need and want from a bank like ours. At that point, we can make offers and deliver services as if they were a market of one rather than a number in a large demographic.

How will we do this? By seeing customer Code Halos and distilling meaning from intersections with our processes and people. We can create customer profiles that can be used across channels to ensure that we do not ask customers time-consuming and frustrating questions for which we already have the answers (like home address, account numbers, preferred language and channels). We reward them with offers that fit their preferences and requirements, not ours. We proactively alert them on unauthorized or unrecognized behavior, helping to keep them secure, confident and loyal.
Consider this simple scenario: We see out-of-state credit card transactions for a customer who typically transacts in Ohio, perhaps in another region of the country or the world. An integrated ecosystem that leverages SMAC capabilities enables us to see this in real time. We then alert the customer to verify whether the transaction is valid. As our call center staff solidifies and protects the relationship, they can also share advice on credit card protection online, or offer an incentive for procuring additional safeguards from us.

SMAC technologies are not only increasing our ability to digitize our business; they are allowing us to increase speed and agility. In fact, actions that typically take hours or days to complete pre-SMAC (a question on a credit or debit issue, loan status or a product offer) will be handled by customers themselves, across channels, in real time. We believe this will provide significant value to our customers, as well as enable operational efficiency and cost savings for Key.

Increased digitization will connect our customers to our online support, branches and call centers as if those banking channels were one channel.

Beyond protecting customer assets, we find relevant and timely reasons to reach out and engage with customers by offering targeted deals based upon our “data-enabled” understanding of their needs. This helps us to provide tailored solutions and remain top-of-mind. In retail banking, mindshare translates into market share as measured in terms of share of wallet.

The challenge in all of this is to make sure we apply predictive analytics and data insights in ways that create customer intimacy while maintaining customer privacy and avoiding the perception of being invasive.

Digital Empowerment

Code Halo thinking and digital business transformation also benefit customers by empowering them to work with us when, where and how they want. Increased digitization will connect our customers to our online support, branches and call centers as if those banking channels were one channel. This interconnection will enable customers to seamlessly move among the channels as they choose — allowing them to easily interact with us and to see and resolve issues for themselves.

While SMAC technologies are core to enhancing the client experience, these capabilities also enable true end-to-end transaction processing. This process transformation requires not only technology change, but also an evolution in our approach to business processes, as well.

I see Code Halo thinking as a way to drive transformative change across the retail banking landscape. By embracing a digital architecture end-to-end, banks can work proactively and unlock insights and foresights contained in data intersections. These insights and foresights can help banks provide services that banking customers truly value.

Such a capability is critical in our business, where rival services are a click, swipe, phone call or instant chat away. Therefore, we must become omniscient, internally and externally, and proactively deliver offers and services by reading our customers’ minds. Code Halo thinking is integral to knowing, rewarding, protecting and empowering our customers. We are convinced that connecting and making meaning from Code Halos is a critical component to solidifying and extending our standing among the country’s major regional banks.
Footnote

Author
Amy Brady is the Chief Information Officer at Key Bank, a unit of Cleveland-based KeyCorp and one of the largest bank-based financial services companies in the U.S., with assets of approximately $91.8 billion. Key companies provide investment management, retail, commercial banking and investment banking products and services to individuals and companies throughout the U.S., and for certain businesses internationally.

Code Halo™ is a pending trademark of Cognizant Technology Solutions.
By digitally transforming how consumers interact with the healthcare system, payers and providers can help individuals better manage and monitor their health, leading to higher levels of engagement, better outcomes and lower costs.

Transmit the blood sugar results from a digital glucose monitor. Snap a photo of breakfast to capture its calories. Upload your latest weight reading and number of steps walked. Once done, get an instant fitness report via your tablet. No, this isn’t a scenario from *Doctor Who*. It’s a reality for an increasing number of healthcare consumers.

A radical reshaping is taking place of how individuals interact with the U.S. healthcare system, thanks to a proliferation of technology advances, such as wearable activity monitors like Fitbit and Jawbone, at-home medical devices such as glucose and blood pressure monitors, and mobile transmission of all types of consumer and business data. These interactions, referred to as “connected health,” often are touted as the tonic for achieving healthcare’s triple aim: reduced cost, improved quality of care and enhanced patient experiences as consumers take more responsibility for their care.

It would be a mistake, however, to focus only on consumers’ self-directed interactions with these powerful and smart devices. The bigger and more important story is told by the vast volumes of data that healthcare consumers are generating with their wearables, devices, smartphones, apps, Web searches and more. We call these personal and persistent collections of data “Code Halos.”

So far, much of the market is overlooking the essential processes of analyzing a patient’s Code Halo to uncover hidden insights and meaning, and then acting on those findings with real-time, individualized responses. Yet these data-fueled interactions are necessary for the industry to achieve its goals, as these engagements will encourage individuals to adopt and maintain more effective health practices, whether to sustain their health and engage in preventive care or better manage a chronic condition.

**Getting the Most from BYOhD**

More than ever, individuals are empowered to manage their own healthcare. These “activated” patients have the tools to collect data on vital signs, genetics, health history, fitness levels, activity levels, body-mass index, sleep patterns and more. All of the data generated by “bring your own healthcare devices” (BYOhD) is becoming part of an individual’s Code Halo.

Further, these activated consumers have a total medical spend that is 21% lower than passive ones. These consumers offer a glimpse of the...
healthcare industry’s future: smart mobile tools, greater individual accountability for health management, and reduced medical spending. Contrast these individuals with passive consumers, who only see healthcare professionals after a problem develops, fail to fill prescriptions and neglect to follow the latest information on their conditions.

But while self-monitoring is an improvement over passivity, it doesn’t sustain behavioral changes all by itself. Last year, we launched a Fitness Challenge in which 270 Cognizant employees received pedometers and were encouraged to “walk around the world,” compiling mileage via their daily steps (see sidebar, next page). The pedometer was the only support tool provided. Our analysis showed that after about seven weeks, activity faded. Further, while some apparently highly motivated participants achieved their goals, 80% of the group did not achieve their desired results. The missing piece, it turns out, was real-time, high-touch interactions, such as personalized coaching. This is what the industry needs to offer as a complement to the high-tech data collection model. These interactions drive meaningful engagement that sustains patient behavioral changes, increases quality of care, and improves the customer experience while lowering costs.

Under this engagement model, the following changes will be possible by the year 2020:

- Instead of intermittent physician office visits, individuals will interact with passive/virtual and active/live coaches whenever needed.
- Health education will improve, with educational data pushed to individuals based on their current health or condition and personality type.
- Passive data collection and transparency, in addition to coaching, will increase adherence to prescriptions, fitness and therapy regimens.
- Patients will join a nurturing ecosystem that provides encouragement and motivation.

The right platform will combine motivation, ability and triggers — three interlocking pieces that will ensure that patients sustain new, different and better behaviors.1

Achieving Meaningful Patient Engagement via Connected Health

Equipped with these insights, we built a connected health platform, called HealthActivate, that integrates the following features to achieve successful, sustainable engagement:

- **Analytics.** Our platform collects the BYOhD data that consumers are willing to share from virtually any device, insulating healthcare organizations from operating system and device differences. Our analytics engine then deciphers the meaning created at the intersections of these Code Halos, using this meaning to power all interactions.

  For instance, an automatic upload of data such as self-reported food consumption, a real-time blood sugar reading and the number of steps taken in a given timeframe can reveal how well a patient is managing a condition. Analytics also determines what kind of coaching and/or intervention will be most effective for the patient’s profile (see sidebar, page 34). The analytics engine continually monitors the data streams to trigger necessary alerts and notifications to patients and/or coaches.

- **Patient activation.** Success here requires an understanding of various patient segments and what motivates them, as this can determine optimal interactions and incentives. Some consumers are motivated by team-based challenges, while others are inspired by immediate feedback. Some patients are satisfied with intrinsic rewards, such as receiving a badge for attaining a new fitness level. Others look for extrinsic value: a free device for reaching a specific level or winning a department lunch. Gaming principles are built into medical and prescription adherence, vitals monitoring, diet and fitness management and patient education.

- **Coaching.** Coaches actively participate in the patient’s journey, facilitating instead of dictating care. Our connected health platform enables virtual and live coaches to help patients set and track goals, and it proactively prompts interventions when needed. This personal reinforcement, informed by analytics, helps patients gain the knowledge, skills and confidence to manage their own healthcare effectively.
Closing the Circuit for Empowered Healthcare Consumers

Healthcare institutions must engage patients beyond the physician’s office to achieve the improvements necessary to support emerging value-based care models. Interactions can range from daily smartphone app reminders and tips, to weekly calls from a remote nurse or coach to set goals and overcome objections, to real-time alerts from a virtual coach about maintaining blood sugar levels or low-cost generic drugs.

Many of these interactions initially will be with healthcare consumers who are already activated and generating patient Code Halos. By supporting these consumers with a proven engagement framework like the one detailed above, healthcare organizations can begin truly transforming their patient care, quality and cost models. This approach will not only enable the healthcare industry to enhance ongoing cost containment measures, but it also represents an opportunity for players to step forward and match individuals’ efforts to manage and be accountable for their health.

Quick Take

A Personal Commitment to Wellness

Our engagement platform, HealthActivate, supports an internal program called iCommit2Fit. Employees with high body-mass index readings were given a Fitbit monitoring device, as well as access to nurses for weekly goal-setting meetings. Compared with the Fitness Challenge initiative, we saw greatly improved fitness results, which we attribute to personal coaching and accountability to a third party. All participant segments showed improvements, with the majority increasing from the self-reported baseline average of 33,000 steps per week to an average of 70,000 in four weeks, then sustaining that level for 19 more weeks as of this writing.

One of our clients has launched a pilot program using HealthActivate to engage nearly 2,500 diabetes management program members. The platform will monitor medical adherence, offer real-time feedback on at-risk behaviors and promote sustainable change with tips, challenges, quizzes and incentives.
A Patient and Her Virtual Coach

In our vision of consumer engagement, it all starts with patient Code Halo data collected via a “bring your own healthcare device,” or BYOhD. Together, these elements congeal to form a radically new approach for enabling a rich set of effective interactions that transform the patient-provider relationship.

Consider the following scenario: Sally is managing her diabetes with the help of her smartphone, BYOhD and the connected health platform. She starts her morning by stepping on her wireless scale; she’s already wearing a Fitbit activity tracker that will upload data on the quality of her sleep the night before and will count her steps and activity level throughout the day.

1. Sally’s smartphone receives a ping.
Sally: “Oh, that’s my 7:30 reminder. Time to take my Metformin.”

2. Sally pricks her finger on a special strip and loads it into a Bluetooth-compatible glucometer. The device uploads the results to her account on the connected health platform; if the results are outside of normal value ranges, her care team will be alerted to intervene.
Sally: “That’s looking good.”

3. (By clicking “TAKEN,” Sally opens an app that reminds her of today’s goal: keep her blood sugar in her safe target range. The app also offers a one-minute video with tips about how to accomplish that.)
Sally: “That was good for 50 points. I need about 750 more to earn that digital scale that measures body fat percentages.”

4. (Sally watches the video as her coffee brews. When she returns to the home page, there’s an offer to engage in a three-day medication adherence challenge.)
Sally: “Let’s see: Confirm all my medication doses for three days and earn 500 bonus points. I can do that – I’ll earn that scale in no time. I accept!”

(Sally clicks on the button, and the virtual coach pops up.)
Virtual Coach: “Wow! 500 points will really move you ahead! I know you can do it. One dose, one day at a time!”

(But at 1:00 p.m., when Sally’s phone beeps again to remind her to take her Metformin dosage, this time she clicks “NOT TAKEN.” The app asks her why she is not taking the medication.)

Sally: “I always seem to get nauseated with this midday dose.”

(Sally clicks on “side effects” to answer the app’s query. The app then offers a “call pharmacist” button. Sally clicks, and she and the pharmacist discuss her symptoms. The pharmacist recommends that Sally take the dose with her lunch instead of on an empty stomach.

The connected health platform notifies Sally’s health coach of the call to the pharmacist. If Sally were to skip another dose, the platform would trigger an alert to a live coach to contact Sally.)

(With that, Sally takes her evening blood sugar reading; it uploads to the connected health platform, where the analytics indicate her results are just within normal range. The virtual coach pings her.)

Virtual coach: “Good job today, Sally!”

(At dinner time, Sally’s phone app prompts her to take her medicine. She does and enters “TAKEN.” Sally also reviews her blood sugar history.)

Sally: “Another 50 points toward my scale. Hmmm ... my blood sugar level is better when I do more steps and remember to eat a real lunch. I’m going to pack a lunch for tomorrow and try to get up to 8,000 steps.”

(Virtual Coach: “Time to take your medicine”)

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Footnotes


Author

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Code HaloTM is a pending trademark of Cognizant Technology Solutions.
How We Will Travel in the Year 2020
By Nitin Virmani and Sandeep Andugula

By harnessing Code Halo thinking, travel and hospitality companies can transform their business models to streamline and personalize the travel planning experience.

Think of the last time you planned a trip. If you’re like most travelers, you went through a lengthy and labor-intensive process to determine the travel timeframe, decide on where to go, figure out how much you can spend and book the reservations. In an informal survey of our employees last fall, we found that it took one or two weeks for them just to plan a simple three-day trip.¹

The fact is, travel planning is still time-consuming, despite radical changes in the last decade due to the Web and social media. Although technology has made it easier to access information, share opinions and make comparisons, today’s travelers must navigate a range of channels at every turn. They might view photos of a friend’s trip on Facebook or Instagram, check TripAdvisor for reviews, do further research on destination Web sites and compare hotel and airline prices on Orbitz and Expedia. Additionally, they might check their bank account or credit card balances to determine their budget realities, as well as the calendars and schedules of their travel companions to determine a travel timeframe.

But by 2020 — if the current pace of consumer digital activity and technology advancements continues — travelers can expect a much more automated and personalized approach to how they plan trips. By then, a single entity — an intelligent planning engine — will aggregate and analyze the far-flung pieces of data that are either provided outright or generated implicitly through the digital behaviors of travelers, devices, organizations and other entities within the travel and hospitality ecosystem. The result: intuitive development of a customized trip plan that is personalized to individual preferences, availability, spending habits and scheduling needs.

By offering this type of predictive and personalized capability, the travel industry follows other industries that have been disrupted by future-thinking competitors (i.e., Amazon, Google, Pandora) that are making meaning from the digital trails of people, organizations and devices. We call these digital pools of data a Code Halo™, and they not only form around travelers — many of whom lead vibrant online lives, sharing their digital information with travel agencies, social media Web sites, search engines, banks and more — but also companies (where travelers work), hotels (where travelers stay) and travel intermediaries (where they often book trips). By analyzing these Code Halos and distilling meaning at key intersections, airlines, hotels and travel intermediaries can better understand current behaviors and even anticipate future needs and desires in ways they never could before.²
Because both parents work full-time, and the kids are school-age, their available timeframes are bound by vacation policies, national holidays, school and activity schedules and when they can get time off. Much of this information is available in digital form, but the family has never centralized its schedule on a shared online calendar. Even more complicated, the parents are eager to optimize their departure and return dates to attain the best deals available.

A schedule-aggregating capability determines the vacation schedule by consolidating everyone’s calendars, availability and holidays into a single view.

The parents also need to determine the budget, which often involves a mix of both rational and emotional thought processes. In addition to checking their available funds and credit card debt, they divert into discussions on whether to splurge on this year’s vacation to celebrate their oldest child’s high school graduation or be conservative, given the wife’s desire to reduce her work hours.

A budget management capability automatically analyzes account statements, spending patterns, credit lines, future payables, income expectations and cash flow to determine budget. It also checks last year’s vacation expenditures to benchmark this year’s spending levels.

The parents have spent hours trying to find a locale with a blend of outdoor adventure, family-style restaurants and some cultural activities. They’ve visited travel sites, watched video tours, read online reviews, asked for recommendations from their social networks and perused their friends’ posts and photos. Each year, their destination choice seems like a reinvention of the wheel, as they seek a location that meets the expectations and interests of the whole family.

A dynamic promotion packaging capability suggests the optimal destination, based on explicit and implicit information that signals group preferences, including supplied data and digital behavior, such as social network likes and posts and clicked responses to promotional offers.

Finally, the parents spend more time identifying the best-price supplier and booking their online reservations, which requires more analysis of the options in order to optimize the when, where and mode of travel.

An intelligent planning engine optimizes booking options, based on the previously mentioned capabilities: schedule aggregation, dynamic packaging and budget management.
For instance, the brand and type of a hotel or resort can connect to form a destination Code Halo that reveals the place and type of travelers it attracts. Or the browsing or social networking data of a group can form a traveler Code Halo, which can reveal the destinations they prefer by examining which ads they clicked on (providing insight into their preferences) or social posts they “liked.”

Figure 1 illustrates how Code Halo thinking will radically change how a family plans a weeklong trip.

Getting from ‘Here’ to ‘There’

To understand what needs to happen to enable this transformation, let’s consider the three types of information that would populate the Code Halos used by the personalized planning capability, as well as the meaning that could be derived (see Figure 2).

- **Primary data**: Basic, readily available information, including:

  - **Places and locations**: When information about numerous destinations is categorized in a standard way, with an adequate volume of guest rankings, travel providers could systematically determine the best places and locations for individual travelers.

  - **Suppliers and availability**: By analyzing offers and packages in real-time, providers could offer dynamic packaging based on supplier data and the estimated number of guests who would be interested.

  - **Schedules**: An intelligent planning engine could synch the schedules of the travel group and plug in the information related to holidays, vacations and time off. Once these timing constraints are shared, the system could determine the optimal time for vacation.

  - **Budget and financials**: Spending boundaries would be established, based on funds data and credit availability.

- **Explicit data**: Factual information pertaining to an individual or group that is explicitly expressed. Examples include:

  - **Preferences**: Most groups and individuals have a fair idea of what they don’t want; if they supply information on these preferences, an intelligent engine can use these inputs to eliminate the obvious.

  - **Past expenses**: Expenditures from previous vacation expenses, such as hotel, travel, food, amenities, etc. can offer valuable input for the planning engine to determine the budget for various activities.
Enjoy the new underwater hotel!

While you admire the modern architecture, your son Zack can explore the undersea games, and your wife Cassie can enjoy half-off the full-service Ayurvedic skin spa.

Last week, your cousin Tom and family stayed here and rated it with four stars. This week, your college roommate Sandy will be there for three nights. Both Cassie and Zack “liked” this and are waiting for you to authorize the booking*.

*Offer will expire in 2 days 3 hours

Trip Planning App

The following depicts an optimized travel plan that an intelligent planning engine might suggest for a group traveling together, including schedule, destination, cost and comments from social networks. If the traveler agrees to the plan, he or she can click to book the trip.
Travel providers need to understand two Code Halo principles to develop a successful intelligent planning capability:

- **Process melt:** In addition to delivering highly personalized experiences, travel and hospitality companies can apply Code Halo thinking to more accurately estimate future demand, and provide better and more targeted promotions. Consider an offering that we call the “reverse Groupon” approach. When group-sharing Web sites offer deals, it is difficult for them to predict how many customers might be interested and, thus, how many offers the promotion will yield. But if we think through the prism of Code Halo thinking, a dynamic package can be formed by reversing the model. In the Code Halo world, we call this a business process “melt.”

For example, suppliers and travel intermediaries could collate implicit and explicit preferences of travelers to analyze how many people in the New York area are interested in a trip to Hawaii. They could then negotiate airline and hotel prices with suppliers for this group to develop a New-York-to-Hawaii trip package for these selected travelers. By synchronizing the demand and availability equation, the planning engine could match the group with interested suppliers and build a dynamic package, customized to their needs. The underlying assumption here is that the dynamic trip package is unique and not available anywhere else.

- **The give-to-get principle:** Consumers are increasingly savvy about the worth of their personal information and are unwilling to give it away if they don’t trust how the data will be used and protected and without the promise of something in return. In our informal employee survey, 82% of respondents said they provided online feedback for just three out of 10 trips they took. However, if a reward was associated with providing feedback, then 91% of respondents said they would provide online feedback for eight out of 10 trips.

In many cases, the prospect of time or cost savings, targeted deals and customized experiences is enough of a lure to encourage the sharing of personal information. The bottom line is that giving information needs to be worth the perceived reward value.

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### Travel Planning at the Crossroads: Circa 2020

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**Market Capitalization**

- **2013-14** Emergence of social sharing, digitization of personas and ever-rising customer expectations.
- **2014-15** New technology to store and analyze big data. Improved user data security.
- **2015-18** New models and processes based on enhanced information and analytics.
- **2017-19** New models reach critical mass, and industry leadership shifts.
- **2020** Commercial acceptance of new models leads to extinction of old ways.

*Source: Cognizant’s Center for the Future of Work, Figure 4*
Jump-starting the Transformation

Travel and hospitality providers can begin to transform their business models and develop an intelligent planning capability by taking the following steps:

1. **Build a strong “product/places halo.”** Form alliances to develop and maintain a standardized catalog of various places and locations in different regions and geographies. An intelligent planning engine will heavily rely on such a database of places, with authentic listings of “things to do” along with genuine traveler ratings.

2. **Build a “traveler halo.”** Develop innovative ways to assimilate the traveler information from social media networks, digital trails and different travel entities to build a complete traveler halo. Such profiling will help the planning engine sort implicit traveler preferences.

3. **Build capabilities for Code Halo interfaces.** Different entities across industries should build new interfaces through which they can collaborate. For instance, tourism board information on local festivals could be used for effective promotion to travelers who have interest in local cultures and cuisines. The exchange of such digital data will enrich traveler Code Halos, offering important insights that can be distilled by the planning engine to determine next trip budgets.

4. **Build an ecosystem of sharing Code Halos.** Seemingly unrelated organizations should develop digital channels to expose information upon authorized request. For example, travel agencies cannot currently see travelers’ available vacation days. The sharing of individual calendars and schedules can help the planning engine optimize the best time for a group to travel.

Fast Forward: Travel 2020

The transformation of the travel industry will at first be marked by sporadic change, but gradually, as the digital ecosystem matures, the environment will be ripe for the development and widespread use of intelligent trip planning (see Figure 4). Already, many of our hospitality clients are mining the social media data they collect to track travelers’ implicit preferences, which is helping them build new systems to generate offers to individuals based on their explicit historical data. A few players, such as Flextrip, Gogobot, Tripit and Stay.com, have already begun the transition by focusing on the social aspects of trip planning and incorporating these insights into their offerings.

While there are undoubtedly challenges and obstacles that stand between “here” and “there,” including data privacy and regulatory changes, companies cannot ignore the vital signs exhibited by the early adopters of Code Halo thinking, such as the ability to predict customer preferences and expectations. As new business models elicit increased customer acceptance, the industry will gradually be defined by seamlessly integrated travel planning engines. The time is now for the travel industry to identify the sparks of change and begin planning to compete on code and distill meaning from Code Halos.

Footnotes

1. Our Travel and Hospitality Practice conducted a focus group survey of 90 employees in October 2013.
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Code Halo™ is a pending trademark of Cognizant Technology Solutions.
Consumer Goods

Creating Sustainable Relationships with Consumers

By Angus Burgess

With predictive analytics, consumer brands create new value with consumers — and drive growth for their organizations today and tomorrow.

Brands may find out who their friends are through social media, but it’s predictive analytics that lets them build lasting — and more profitable — relationships.

With analytics, brands get to know and communicate with their customers as individuals. They discover their likes, dislikes, preferences and habits. Analytics imbues the engagement with immediacy: Brands can communicate with consumers within hours and days, and sometimes even as they shop.

Immediacy alters the conversation, however, changing the quantity and quality of brand messaging. The more that marketers know about consumers, the more they can effectively communicate with them — and the more personalized and relevant the messaging can be. In a world gone social, the most compelling narrative to advance relationships isn’t always a “buy” message; it’s often a value exchange.

Analytics helps brands create new value with customers. But to make value sustainable, marketers have to embrace a dramatic shift, moving away from traditional campaigns and 15- or 30-second spots to the far more fluid application of insights from today’s 24x7 streams of information.

Embracing Code Halo™ thinking will get brand owners on the road to digital business for 2020. A Code Halo is the swirl of digital information that surrounds consumers, organizations, processes and devices. By generating a unique virtual identity for each consumer’s halo of clicks, swipes, comments and posts, brands can add context and value. They can launch conversations and begin to foster relationships.

The powerful combination of Code Halo data and predictive analytics is enabling marketers to create the one-to-one relationships with consumers that will ensure continued prosperity.

How to Make Sense of the Data Deluge

Data has always has been at the heart of manufacturers’ new market opportunities. Traditional direct marketing relied on reams of consumer data, such as addresses, household income and credit scores. It knew how many kids consumers had, and the make and model of the cars they drove.
But such information is a droplet compared with the tsunami of data points that swell up daily for modern marketers. And compared with the weeks and months it used to take for consumer input to accumulate, marketers today are increasingly empowered with real-time analytics that surface patterns and correlations on an up-to-the-second basis. As we move closer to 2020, marketers will be clued in to not just which cars consumers drive, for example, but also when and where they last bought gas and the snacks they purchased while refueling.

Already, analytics engines distill the structured data that marketers have traditionally relied on, such as databases, spreadsheets, CRM systems and third-party information. It also brings order to the burgeoning — some might say chaotic — sources of unstructured data, from social media posts, tweets and pins, to call-center recordings, images and feedback from wearable technology like Fitbits. With analytics, data has met its match.

For marketers, new forms of consumer intimacy and immediacy will emerge over time by distilling Code Halo intersections, interaction by interaction, transaction by transaction.

Manufacturers, Meet Your Consumers

In order to put analytics to work in brand-building and one-to-one relationships in this more intimate, immediate environment, however, businesses will require new tools and fundamental changes to marketing. Many marketing budgets today are failing to reflect the shift and remain weighted toward traditional media. But to make use of customer Code Halos, brand owners need to look beyond the aggregated, often sporadic view of the consumer afforded by current methodologies and tools.

Take product sampling, for example. Distributing samples used to be as close as marketers got to shoppers. Companies spent millions of dollars on mass-mailing samples or handing them out at retail locations. It was an expensive leap of faith — and typically the end of a potentially profitable relationship with consumers.

With analytics, marketers are starting to draw on more refined data to get their product samples into targeted hands. As they do, analytics enables sampling to become a game-changer, providing marketers with a mechanism to follow up and foster relationships. Would the consumer recommend the product to friends and family? Would they post about it on social media? Would they buy it in stores? It won’t be long before manufacturers will be able to push notifications to their sample recipients, prompting them, for example, about a store sale on the product as they pass by.

By probing Code Halos for additional consumer information, marketers can use analytics to identify their products’ relevance and quickly determine a consumer’s lifetime value for the
brand. They can evaluate how much individuals will contribute to the brand’s success, and whether they want to continue to invest in them. Analytics can also surface audiences that marketers had never considered.

Analytics’ real benefit for marketers is in using the metrics to predict future behavior. Marketers today are learning to mash-up macro data — like weather, geography and economic information — with micro data that pertains to individual consumers, such as e-mail addresses. They are also experimenting with creative real-time marketing, for example, forecasting growth by tracking social conversations related to current events.

Given analytics’ technological progression, this lens will only gain acuity in the near future. Marketers will soon be able to shape product messages by decoding personal halos to an even finer level, such as anticipating shopping patterns by cross-tabbing participants in a hashtag campaign with product purchases.

The goal is to convert metrics into higher acquisition and retention rates. Viral hits produce a spike of interest — who didn’t like the infamous Oreo SuperBowl tweet? But overemphasis on creating them often distracts marketers from the bigger picture: Focusing on the customers who want to interact with them.

It’s marketing’s mission to create consumer relationships that are sustainable. Customer engagement is key — and will grow even more important moving forward as consumers become increasingly accustomed to more curated and personal experiences, services and offers.

Rather than crafting splashy individual moments, CG marketers need to review their plans and then continue to listen to consumers, learn from them and optimize their efforts. When they do, the important moments occur organically.

In our work with Code Halos, we see distinct patterns of how they emerge within corporations. The consumer industry’s long history of data use makes it ripe for Code Halo thinking. Initiatives often need to incubate for periods of time as companies master the technology and processes needed to build the halos. But once they do, marketing programs can begin to scale their use of Code Halos and leverage the insights gained into core customer-facing capabilities.

How to Begin Building Relationships

How can marketing organizations begin using predictive analytics to create more insightful strategies? The following steps enable marketers to start building relationships that will prepare them for and sharpen their competitive edge into the next decade — and beyond:

- Promote a cultural shift in how your organization engages consumers. The “mass marketing machine” remains institutionalized within most companies. But marketing has moved from 15- and 30-second spots to a 24x7 communications cycle. To realize the business potential of one-to-one consumer relationships, start making the cultural shifts

To realize the business potential of one-to-one consumer relationships, start making the cultural shifts necessary to evangelize the power of connecting with individuals.
necessary to evangelize the power of connecting with individuals. Examine how your company can respond in relevant ways to always-on customers connected across multiple channels.

- **Create an enterprise view of consumers.** Break down brand silos by examining how consumers might engage with the entire portfolio of brands. Why, when, where and how might shoppers purchase across all of an organization’s brands? Today’s consumers want more opportunities, and cross-portfolio strategies can provide them. Code Halo thinking can inform customer needs, wants and desires. For instance, by distilling transactional and interactional data, correlated with product halos, brand owners can see where markets are heading, and what products need to be developed or refined, before customers even articulate their preferences.

- **Form a dedicated consumer relationship group.** Managing across the organization’s portfolio of brands requires focus. Assemble a team to carry out the task. To ensure the integration of brand planning with relationship management, assign a consumer relationship expert to each brand.

- **Deploy a predictive marketing analytics engine.** Successfully executing relationship marketing strategies and tactics requires an advanced understanding of consumer behavior via analytics and predictive modeling of consumer data.

  Generating and applying insights is the key to developing meaningful consumer relationships. So is mastering new predictive analytical tools. Typical measures of marketing effectiveness are backward-looking, while predictive analytics looks forward. This requires marketers to move beyond traditional methodologies and aggregated tools for data and adopt formats that allow them to be predictive and take action. Being familiar with the tools is only the start. Using them to build customer relationships is the next — and necessary — step.

  Our thinking on predictive analytics solutions is reflected in our Consumer Insights Command Center (CICC), which analyzes consumer data.

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**Converting Data Into Insight**

We follow a four-step approach to convert big data into insights.

1. **Data Capture**
   - Siloed
   - Structured
   - Unstructured
   - Social media
   - Internal sources

2. **Data Cleanse**
   - Captured data is aggregated and cleansed. The CICC solution then classifies data, structure insights, and creates sentiment measures.

3. **Cognizant Analytics and Run-time Engine**
   - With the CICC’s custom analytics models, benchmarks and KPIs, clients begin applying predictive analytics to their marketing efforts.

4. **Interactive Reporting**
   - Marketers can tailor automated reports by brand, topic, issue and event.

**Figure 1**
consumer activity and behavior and enables marketers to begin to create one-to-one relationships (see Figure 1).

- **Test, learn and optimize.** Today’s influx of insights allows for more innovative methods of engagement and high-impact creative. For example, how can you connect with in-store customers through mobile channels? Looking ahead, brand owners must be willing to test new outreach models like smart shelves and connected-home devices. Keep in mind that both success and failure provide insights and opportunities to optimize your marketing program. Risk is inherent. Don’t fear it.

- **Plan beyond the initial consumer engagement.** It’s a post-campaign world. Gone are the days when marketers’ programs consisted of, say, planning five spots in advance. Marketers today need to think of long-term engagement. Apply the steady stream of consumer insights to continuously explore new methods of adding value to the relationship.

- **Focus brand marketing expenditures to build awareness.** The typical marketing budget allocates an estimated 70% of its spend to brand awareness through mass marketing techniques like broadcast, and 30% to consumer engagement. We see predictive analytics upending that tradition. While companies will continue to spend on mass marketing, they will direct a much larger percentage of their budget to building consumer engagement through digital channels, including testing new communication opportunities in social and mobile to gain relevance with consumers.

Backed by the powerful combination of predictive analytics and Code Halo data, marketers can begin to create lasting one-to-one relationships with consumers for sustainable and mutual value over the near and long term.

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**Footnotes**


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**Author**

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Code Halo™ is a pending trademark of Cognizant Technology Solutions.
By placing the customer at the center of the corporate strategy, businesses across industries can apply Code Halo thinking to create more satisfying and personal experiences that drive innovation, loyalty and performance.

One of the most exciting aspects of the Code Halo™ age is how digital tools and techniques are advancing the way we interact with — and get value from — the companies we do business with. Our Code Halos are taking W. B. Yeats’ old phrase, “There are no strangers here; only friends you haven’t yet met,” and replacing it with a new one: “There are no strangers here; only code that hasn’t yet collided with my code.”

Any algorithm that “gets” how my affection for Wilco, Lowell George, Ralph Vaughan Williams and Elvis Costello makes me not only one seriously cool dude but also likely to appreciate the so-cool-I’ve-never-heard-of-them Shovels & Rope — as well as interested in driving the yet-to-roll-

off-the-production-line E400 from Mercedes Benz — and interested in knowing that my brother’s 7-year-old would love an American Girl Pajama Pal, which I could pick up on my business trip to Manhattan next week (if, of course, I didn’t want it shipped overnight by the Amazon Drone) — is revolutionizing what we do, when we do it, how we do it, even why we do it. The “code that knows” is the catalytic converter at the heart of the spark changing every aspect of life and work before our very eyes.

As Code Halo thinking unfolds, it will usher in more intuitive ways of interacting with people and institutions that know us, understand us, remember us, anticipate us and serve us in ways that only the 1% of the 1% has ever really experienced before.

To dig a little deeper into what businesses and public sector organizations are doing to deploy and optimize these new approaches, we recently commissioned Oxford Economics, a leading global forecasting and research firm, to examine how the customer interface is morphing in markets undergoing rapid digitization. We chose to focus on the customer interface — among all major areas where Code Halos are impacting business — because it is the prominent touchpoint at which Code Halo thinking is most highly developed and having the greatest impact.
You, Mr. or Ms. Customer, are Really King (or Queen). No, Really

From our preliminary analysis, it is clear that more and more companies have received the Code Halo memo. They understand that digital consumer technologies have changed, and are continuing to transform customer expectations. Now they want to follow in the footsteps of Amazon and Netflix and are, therefore, beginning to prioritize a revamp of the entire customer experience. Roughly 60% of respondents say they value digital-and customer-centric growth initiatives — such as increasing customer retention and engagement and creating new customer experiences — more highly than traditional objectives and goals like geographic expansion, M&A and even recruiting high-quality employees.

While the customer has always been and will remain king, Code Halos are now giving enterprises a way to really put customers at the center of their strategy. Well over half (58%) of respondents say customer data and analysis is the key element of their company’s innovation efforts, and another 47% report that digitizing the customer experience to deliver mass personalization is a core strategic goal. One executive, Mike Kozub, vice president of customer insights and analytics at Nationwide Insurance, put it well: “We really care about being outstanding at delivering personal and personalized experiences. The essence of that is in building a personal relationship with our customer in a digital environment.” In fact, creating personalized experiences was the second most cited focal point for respondents.

Building Code Halos: Work in Progress

That’s the good news; the not so good news? For all the focus on using customer data, collection methods are musty. Companies still rely heavily on familiar tools — spreadsheets and the like — to capture vital customer information, and a broad range of customer data remains uncollected, resulting in missed opportunities to develop and enhance digital profiles that illuminate Code
Halos. In fact, less than half of respondents say they collect data such as browsing and spending history, demographics and Facebook “likes,” while use of social media is immature. Less than one-fifth of companies use API traffic to understand the customer journey, an essential part of compiling customers’ digital profiles.

In addition, once data is collected, the job of turning it into information and then insight or foresight remains a challenge due to both human and technological factors. Nearly half of respondents say they lack adequate skills and tools for effective data analysis, creating a substantial drag on innovation potential.

Businesses that are furthest along in collecting and using customer data are seeing measurable return on their data programs. Companies that follow in the footsteps of Code Halo leaders will maximize insights and foresights gleaned at the customer interface — where personal, process, organization and device halos intersect. Creating a gestalt from these digital details can make all the difference. To make a sale, says Jørgen Klüwer, head of e-commerce at Dansk Supermarket Group (DSG), “We need not just a good price to set a good promotion at the point of purchase — we also need to be there a month before this customer goes and buys a new TV.”

This need for clairvoyance is exactly what Code Halos can fulfill; many enterprises recognize this. Nearly half (45%) of respondents say they expect digital profiles to spark gains in profitability (see Figure 2). Many see that the continuous interaction of a Code Halo-rich environment will ripen and deepen in a virtuous circle of “giving and getting,” in which the value of the code we provide is positively outweighed by the value of the code we receive in return.

The Democratization of Luxury

In our book on Code Halo thinking,3 we examine how the digital customer interface is the focal point of personalized attention and service, amenities that were traditionally available only to the well-to-do. Code Halos are democratizing luxury and

Customer Engagement Pays Off

What value do you expect to gain from improved customer experience and engagement based on your use of digital profiles? (percent of respondents who rated each response as providing “good” or “substantial” benefits)

- Increased profitability: 38%
- Improved customer retention: 45%
- Increased market share: 37%
- Improved ability to develop new products and services: 30%
- Increased revenue: 28%
- Attracting the next generation of customers: 17%
- Expansion into new lines of business: 14%
allowing the promise of mass customization to become real, with benefits for individuals and corporations alike. Cracking the Code Halo, embracing the digital trace and deciphering the fingerprint are all activities that are opening up completely new, uncharted territories and launching a new gold rush — of potentially unprecedented dimensions — in which code is the new gold.

Our latest study shows that many businesses get this. But it also shows that a lot of work needs to be done to unleash the full potential of these new ideas. Stay tuned for our forthcoming report, which will provide additional detail, analysis and insight into the steps that organizations are taking to optimize these once-in-a-generation opportunities.

Footnotes
1 That’s “hello” for all you non-coders.
2 Oxford Economics undertook a global survey of 300 business and technology executives in April 2014 and conducted a series of in-depth interviews with executives tasked with leading digitization initiatives within their organizations.

Author
Ben Pring co-leads Cognizant’s Center for the Future of Work. He joined Cognizant after spending 15 years with Gartner as a senior industry analyst, researching and advising in areas such as cloud computing and global sourcing. Prior to Gartner, Ben worked for a number of consulting companies, including Coopers & Lybrand. His expertise in helping clients see around corners, think the unthinkable and calculate the compound annual growth rate of unintended consequences has brought him to Cognizant, where his charter is to research and analyze how organizations can leverage the incredibly powerful new opportunities that are being created as new technologies make computing power more pervasive, more affordable and more important than ever before. Ben graduated with a degree in philosophy from Manchester University in the UK. He can be reached at Benjamin.Pring@cognizant.com.

For more on how companies are embracing Code Halo thinking, look for our upcoming report, “Putting the Experience in Digital Customer Experience,” available this fall.

Code Halo™ is a pending trademark of Cognizant Technology Solutions.
Trolling in the Data Lake? Get Yourself a Fish-Finder

By Thomas Kelly

A semantically-rich information architecture can help businesses see hidden patterns in the murky and fast-proliferating data pools that surround people, organizations and devices.

You say you want to play in the world of Facebook, Instagram or Amazon, creating data-rich, customized user experiences that draw tens of millions of users? Do you dream of crushing industry giants with individualized, online recommendations the way Netflix and Pandora do?

If so, to quote the police chief in Jaws when he sees the famous shark, “You’re gonna need a bigger boat” – in this case, to hold all the data you’ll need. More importantly, you’re going to need a smarter boat, one that can help you find the meaning in the giant lakes of data created by everything from social media to the evolving Internet of Things. In other words, you need a fish-finder for identifying the business insights among the volumes of data continuously generated by people, products, processes and organizations, which we call a Code Halo™.

Size Matters

Consider what we call the “Trillion-Dollar Club,” which consists of companies that together generated more than $1 trillion in market value over the last decade: Apple, Amazon, Google, Facebook, Netflix and Pandora. These businesses upended entire industries by analyzing and acting on the Code Halos generated “only” by the 10 billion devices connected to the Internet, and mostly used by people.1

Coming soon, to an industry near you, are the billions of devices in the Internet of Things. When everything from smart fitness wristbands to smart cars to jet engines and shipping pallets are constantly and automatically generating information about their operation and their users’ activities, the term “big data” will seem hopelessly quaint. As the number of connected devices grows ten-fold to 100 billion, data volume is expected to double every two years to 44 zettabytes, or 44 trillion gigabytes, by 2020.2

This data growth is not only inevitable, but it is also essential to creating and improving your all-important algorithms to create better, more personalized experiences for customers. It is this data that you will need to store, manage and extract meaning from, if you are to avoid an “extinction event.” This data might fuel a mobile
app that guides customers to parking spaces near your store rather than a competitor’s, based on historical turnover at Internet-enabled parking meters. Or it might underpin a corporate app that orders inventory for neighborhood drugstores based on usage reports from local smart insulin monitors, combined with area Web searches for cold remedies.

Your mission (whether or not you accept it) is to not only manage the sheer bulk of data, but to also draw meaning from the bits and bytes. This requires going way beyond traditional data repositories to what we call the data lake. You won’t be able to afford the time, effort and cost of loading all this data into a big data repository, nor could you easily find and use the data you need in it. Semantic technology lets you build on and extend your data warehousing and big data investments to drive much more powerful insights from a much broader data set more quickly.

Jump in the Lake

Think of a data warehouse as a dusty, expensive building filled with papers in static file folders, all organized in a rigid classification system that was obsolete as soon as it was created. That’s your classic data model, and it won’t let you fully exploit the Code Halos that you need to succeed.

Think instead of all the data from all your sources, internal and external, old and new, flowing into a massive “data lake.” As the lake gets bigger and bigger, with more and different types of data, how do you identify and gather the data you need without going broke or getting lapped by your competitors?

The data has to tell you itself. What you need is the data equivalent of a fish-finder that can peer into the murky darkness of the data lake and tell you which ghostly image is an old sunken tree, and which is a school of prized game fish.

Data Lake Management

Figure 1
This “fish-finder” for business insights is here, in the form of a smart, semantic model that captures the meaning of data, as well as the related domain expertise from data (whether it is structured, unstructured or semi-structured). The building blocks for such a model are standards and technologies such as:

- **The Resource Definition Framework (RDF),** which organizes data in a graph structure, reducing development time and cost while delivering business value more quickly.

- **The Web Ontology Language (OWL),** which provides a comprehensive model of data definitions and relationships that is human- and machine-readable.

- **The SPARQL Query Language,** which is a SQL-like query language for semantic data that can leverage ontological relationships to execute smarter questions across multiple databases in a single query.

- **Inferencing,** which makes it easier for users to construct queries by capturing and embedding expertise in the ontology model.

**Give Me Meaning – or Else**

Remember that what drives business-changing insights and user experiences isn’t just data, but also meaning. We need to know what the data means and what it represents before we can use it in Code Halo algorithms that deliver business and user benefits.

For example, when a user, an application or a device searches for “customer,” does the query come from the perspective of a shared services organization, in which the “customer” is an employee within the business? Or is it from the perspective of sales, in which the customer is an outsider who pays for a product or service? Without a semantic model to guide you to the right “customer,” you’re not only wasting your time, but you could also undermine the customer experience.

An intelligent semantic model can deliver meaning and intelligence that empowers better decision-making. A conventional business intelligence system might describe “PPM” as “defects per parts per million.” That’s a good start, but it doesn’t deliver the full business meaning. Try, instead, a fuller semantic-enabled explanation, such as, “PPM, or defects per parts per million, is used by our specialty components line to justify premium pricing for our XL line of products.” That gives business users a richer idea of what the data means to them.

This semantic model also helps identify the data needed to craft more personalized customer experiences. An electric utility, for example, might use the model to find and combine a customer’s name, address, account number and service area with data from his Web-connected thermostat and smartphone location to offer a smart-home service for adjusting the air-conditioning temperature 20 minutes before he arrives home.

A semantic model makes it easier to embed domain expertise — field-based insights into how your customers, products or markets work — into the data. An ad placement application on a music streaming site might, for example, might “learn” that listeners who prefer classical or jazz respond more often to detailed, fact-oriented ads, while those who like popular music respond better to simpler, more emotional appeals. Now you’re talking targeted ads, a win for both the advertiser and the consumer — if it’s done right.

**Start Small, Focus on the Achievable**

Building this “fish-finder” — an intelligent semantic model that sits on top of your current information architecture — probably sounds daunting. But it can be done, starting with important but gradual changes:

- **Prioritize the onboarding of data** by its ability to create truly individualized customer experiences or generate business-changing insights into market needs or operations.

- **Onboard data assets** as they become available, without waiting for a specific use case. Those uses will emerge when you least expect them, and when they do, you’ll need the data immediately. At a minimum, map the data to the semantic model for easier access.

- **Load the data** without filtering or transforming it, since new data rules may override old rules. Filtering and transformation rules can be applied as the data is moved to an analytics engine, or during query execution.
Model the data using familiar terminology. This makes it easier to change the model as needed without physically moving the data. Customize models for specific business groups, encouraging them to ensure its accuracy and completeness.

Enable search mechanisms that make it easier for business users to see the data that is available and accessible.

Balance legal and compliance needs for security, with the imperative to improve the customer experience through analytics.

We could go on and on with suggestions, but the most important one is: Don’t wait. Start building your private semantic Web now to understand your customers, markets and industry before your competitors. Don’t be the last in your data lake to get a fish-finder to reap the insights that enable your organization to deliver the next great user experience, product or service.

Footnotes


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Code Halo™ is a pending trademark of Cognizant Technology Solutions.
Software Development in the World of Code Halos

By Aita Salasoo and Jeff Boyle

By taking advantage of the Code Halos spawned by programmers, business partners and tools across the Agile lifecycle management process, IT organizations can better manage application development performance, delivering software that is more closely tied to business objectives.

From Amazon to Netflix, consumer-oriented business leaders today are competing on code and distilling insights from the digital information surrounding people, processes and things. Winners in these industries use data-driven insights to predict what customers need and want, and where markets are heading. But while this Code Halo™ thinking took root in online retailing and media/entertainment, it is also increasingly applicable to internal enterprise operations, such as software development. By 2020, Code Halo thinking¹ will permeate IT organizations that have embraced Agile development approaches.

To leverage Code Halo thinking inside their four walls, companies need new technology-driven solutions, which in turn require new approaches to software development and management. Smart companies are adopting Agile approaches to deliver such solutions. Agile and associated application lifecycle management (ALM) tools produce Code Halos that radically change how work is conducted throughout the organization. These halos hold digital information on people, teams, tools, processes and disciplines within the organization.

Organizations that have tightly aligned Code Halo thinking with Agile methods are unleashing software development activities that are focused more on what matters: applying Agile Code Halos to inform software program management in ways that yield more timely and predictable business outcomes (see sidebar, page 67).

What is Agile?

At the heart of Agile are 12 principles for how to build software in organizations.² These principles focus on working products, flexibility that leads to less disruptive change and collaborative teams. With most Agile methodologies, production-ready software is produced in small chunks at a regularly-paced rhythm of weeks, accelerating time-to-value. Smaller chunks of work, prioritized for business value, increase flexibility and predictability once a software development program begins.
This situation stands in stark contrast to the waterfall method: six months for requirements definition, 18 months to get new business capabilities into the hands of eager users, and up to 12 months to make necessary changes to get the software into production. Over time, the waterfall method has become increasingly expensive and disruptive. With Agile, work backlogs, made up of meaningful stories, can be reprioritized and tweaked as changing business conditions dictate, allowing for more fluid and collaborative application development. This typically results in code that is better aligned with business requirements.

**Agile Adoption and Code Halos**

Code Halo thinking has begun to infiltrate Agile IT organizations. Following the four stages of the Crossroads Model, Agile Code Halos “ionize,” “spark” and “enrich” over time, transforming industries in their wake. During the Enrichment stage, Code Halos expand and grow in scale, permeating the Agile software development process. Overall planning becomes product-focused and enterprise-wide as the program Code Halo quantifies user demand and business benefits. Continuous requirements-gathering processes that involve grooming and prioritizing a backlog of stories establish this demand. IT responds by using predictable, short cycles or sprints of software delivery activity, managed through tool-enabled performance metrics to quantify the supply and delivery trajectory.

At the Crossroads, market dominance typically flips, as traditional leaders that have failed to adopt Code Halo principles are usurped by digitally savvy businesses. In the Agile software development context, this occurs when IT no longer relies on waterfall development approaches. In 2013, more than 85% of IT organizations had attempted to use some form of Agile software development, and in our experience, most software-related requests for proposals explicitly seek Agile services. Many leading Agile organizations are nearing the Crossroads. Some have entirely replaced waterfall software development models, distant and disconnected IT-business relationships, and a lack of digitally-captured performance metrics, with new and Agile structures and behaviors that continuously enrich, apply and distill digital information contained in program Code Halos. Others have gone so far as to include support organizations and contracting vehicles in their Code Halo models to yield even greater benefits.

Once companies begin competing on their Agile program Code Halos, they are more consistent in effectively and predictably building software applications that rapidly identify, create and meet business needs.

First, during Ionization, the context is set for Agile Code Halos to ignite. The conditions for Ionization include increased computer literacy of participants and computing power to support all aspects of work, pressure for faster solutions, and the desire of participants for meaningful work and human collaboration.

The arrival of sophisticated ALM tools allows for more efficient software development processes and for innovations to spark. During the Spark stage, Code Halos emerge around individuals, teams, processes and application code, itself. Many leading IT organizations are sparking Agile pilots by applying key tenets of Code Halo thinking (see sidebar, page 67).

During the Enrichment stage, Code Halos expand and grow in scale, permeating the Agile software development process. Overall planning becomes product-focused and enterprise-wide as the program Code Halo quantifies user demand and business benefits. Continuous requirements-gathering processes that involve grooming and prioritizing a backlog of stories establish this demand. IT responds by using predictable, short cycles or sprints of software delivery activity, managed through tool-enabled performance metrics to quantify the supply and delivery trajectory.

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Once companies begin competing on their Agile program Code Halos, they are more consistent in effectively and predictably building software applications that rapidly identify, create and meet business needs.
Quick Take

More Intuitive and Rewarding Retailing

A major global retailer with which we work gained competitive advantage from injecting Code Halo thinking into its Agile software delivery model. In fact, this company is now transforming its entire IT organization with Agile methodologies and tools and, in so doing, is applying Code Halo thinking to how it collects, distills and applies code generated by the Agile development process. This company’s IT organization is now transitioning from the Spark to the Enrichment phase.

With its Agile software capabilities and increasingly close ties to customer feedback data, IT has already delivered new mobile shopping experiences that increase the number of trips to physical stores, boost merchandise selection and spur the creation of convenient financial services that customers didn’t even know they wanted until the insights from their Code Halos led to the new offerings. Overall, the company is seeing a 20% increase in online traffic year-over-year, much of which is attributable to rapid and predictable delivery of technology solutions using Agile. This is how internal operational Code Halos can contribute to market-facing breakthroughs.

Inklings of the Future: Addressing Scope and Estimation Challenges with Agile Code Halos

When the IT organization of a major stock exchange struggled to stabilize scope for a large program, it agreed with our recommendation to define release capacity in story points, with the business queuing up stories until development capacity was reached, and substituting more important stories for lower prioritized stories thereafter if additional changes were still needed.

The Agile language of stories, story points and release capacity, informed by the program’s Code Halo, allowed a discipline to be established that brought IT and the business closer. Traditional scope battles disappeared, and the dialog was more constructive and frequent, ultimately leading to faster and better program results.

Meanwhile, a global accounting firm significantly increased software development predictability for a major software solution with an Agile estimation model that used ALM performance data and backlog management, combined with the Agile team’s T-shirt sizing approach for a sample of stories and a Monte Carlo simulation. Even with a huge backlog, the manager was able, early in the program, to predict the overall cost within an appropriate margin of error, as well as an end-date that has hardly moved since. The process was suddenly more participatory, with a language to discuss capacity, stories and productivity. The quantitative approach would have been unthinkable without the Agile program Code Halos enabled by the ALM tool and simulation technologies.
The result of applying Code Halo principles to Agile programs is, indeed, transformative. Once companies begin competing on their Agile program Code Halos, they are more consistent in effectively and predictably building software applications that rapidly identify, create and meet business needs. The digital intelligence from IT-business partnerships and rapid cycles of customer feedback continuously feed insights into Agile software processing, and the benefits accrue continuously and quickly for leaders.

Consider the advantage that Amazon has over traditional retailers, with more than a decade’s worth of available customer feedback hooked into its planning and distribution processes. Just as the online review capability that Amazon has built brings the business closer to its customers, so do Agile Code Halos that contain valuable digital insights.

Traditional software solutions of any significant size or complexity are notoriously difficult to estimate and track in terms of effort, cost or target delivery dates, let alone expected benefits. With Agile programs, estimation can be completed with the basic Agile unit of work — the story. Once a common definition of a story is in place, many useful metrics become available to the organization. Agile metrics are gathered and reported across short cycles of work, enhancing the Code Halo’s value for further estimating, monitoring and guiding of software development work to successful outcomes.

Agile’s enhanced digital connectedness is powerful when it comes to performance metrics. For example, a leading ALM tool provider recently mined data from over 10,000 Agile software programs via a cloud-enabled service to decode performance insights that can be applied to future Agile programs. Among the takeaways from this exercise is a significant improvement in estimation accuracy, resulting from an adjusted Agile estimation approach. On a practical level, this means that even if an Agile delivery team is at a junior level, it can still achieve efficient, high-quality software development when not forced to use an unwieldy estimation approach. In Code Halo terms, team and tool halos interact to drive an optimal process solution for managing the program.

Agile allows program managers to focus on the metrics that matter the most to business decision-making. They can do this by using the digital intelligence embedded in the ALM tool metrics that considers the intersecting digital attributes of team history, recent behavior and program needs. Together, these insights can be applied to create ongoing process improvements informed by Code Halo thinking to guide appropriate program management actions.

The basic tenets of Code Halo thinking can ameliorate, if not eliminate, two of the biggest plagues on software development: disruptive scope definition and poor estimation.

Where Halos Enable Agility

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The basic tenets of Code Halo thinking can ameliorate, if not eliminate, two of the biggest plagues on software development: disruptive scope definition and poor estimation. For example, once ALM tools are connected to production ticket systems, corporate time reporting systems and various other corporate tools as easily as Bluetooth devices are today, the Code Halo floodgates will be opened.

Using flexible analytics engines that are built into new ALM tools, program managers will be able to more effectively assess and fine-tune Agile development performance to meet the demands of various stakeholders. This will allow Agile IT organizations to produce metrics that the business can rely on, based on the common supply and demand notion of capacity for stories.
Enriching Code Halos with Data

**EXTERNAL TRENDS**
- Shorter budget cycles
- Quarterly earnings reports
- Instant customer feedback
- Knowledge gaps from retired employees
- Millennial-dominated workforce

**FUTURE ORGANIZATIONS**
Driven by values and principles

**STRUCTURE**
- Continuous build and integration
- Transformation of product owners to product managers
- Changes to HR reward systems
- Redesigned workspaces
- Best-in-breed communication tools
- DevOps and social media

**BEHAVIOR**
- Definition of 'done' becomes 'shippable'
- True product owner acceptance
- Enduring teams
- Fewer hand-offs and increased collaboration
- Real-time feedback from customers
- Continuous build and integration
- Continuous portfolio planning
- Shared risk and rewards
- Meta teams
- Historic data feeds estimation models
- Shared-outcome contracts

**ENABLES**

Figure 1
Looking Forward to 2020: The Agile Enterprise

In the near future, Agile business organizations — where the methodology permeates the entire enterprise, bridging the business and IT — will be totally responsible for driving requirements for technology-based solutions (see Figure 1). Available metrics from the Agile Code Halo will allow the business to estimate the work needed to transform its requirements into software. Such metrics, including team ramp-up, cost, quality and productivity, will move software development from educated guesses to verified insights available throughout the organization. As a result, IT services can be planned and delivered smoothly, within the constraints of available organizational capacity and productivity.

New ways of determining the cost of service, selecting outside providers and forecasting skills gaps will be enabled by the new Agile Code Halo. The ability to use trusted information will empower both business and IT to build high-trust relationships. True Agile organizations, those with transparent Code Halos, will be the engines of competition for leading companies around the world.

To get there, IT organizations need to adopt Agile software development approaches, digitize their performance data end-to-end by connecting their ALM tools with other data sources and analytics engines, gather simpler and more insightful performance metrics, and listen carefully, leveraging all the Code Halo insights that surround their teams, processes and tools. The Agile spark will come.

Footnotes
3 Stories are basic units of work in Agile software development. They describe in business or user terms who is trying to do what, and are part of a unifying language that helps IT and business collaborate.
4 Ionization is when the environment is rich for the establishment of Code Halos. The Spark phase is when new ideas and offerings are formed, based on the intersection of Code Halos. Enrichment is when halos grow by orders of magnitude, giving rise to new value creation. The Crossroads is when industry leadership suddenly and dramatically shifts based on the new Code Halo-driven economic models. For more information on the Crossroads Model, see Code Halos: How the Digital Lives of People, Things, and Organizations are Changing the Rules of Business, pp. 71-73.

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CIOs and their teams can deliver on the promise of digital business transformation by serving up qualitative insights gleaned from thick data, rich in business insight and foresight.

Let’s rise and offer a toast to Augusta Ada King,1 the Countess of Lovelace. More commonly known as “Ada Lovelace,” the brilliant English mathematician is credited with creating a computer algorithm to power Dr. Charles Babbage’s “Analytical Engine.”

Two centuries later, computer code — famously framed by MIT professor Nicholas Negroponte’s 1995 best-selling book Being Digital — is embedded in all aspects of our personal and business lives. Yet, few chief information officers or senior IT executives are empowered to do much about this development. The reason: only 10% of senior business leaders perceive IT to be a “business game-changer.”2 As such, most companies are unable to “compete on code,” a development that in many ways is driving the most significant transformation of business since Adam Smith’s 1776 manifesto, The Wealth of Nations.

More on this later.

Big Data Everywhere, But Not an Ounce of Insight

Today’s technology fashionistas have a saying (a misnomer in my opinion) for colossal quantities of computer code generated by modern-day business applications. They call it “big data,” often partnering the phrase with exotic-sounding names like zettabytes, yottabytes and brontobytes. But although “big data” is a big deal, it is only the first step in the digital transformation of business.

This finding became abundantly clear earlier this year after I delivered a keynote address to IT professionals on big data. That morning’s edition of The Wall Street Journal contained an article on the concept of “thick data,” arguing that “…what big data cannot explain is why we do what we do.” Thick data, on the other hand, offers insights into the emotional, even visceral context in which people encounter a product or service,” according to the article.3

My takeaway: Thick data, rich in meaning and insight, is much more important than big data. Quality beats quantity any day, in my view. So, I quickly incorporated a slide about “thick data” into my presentation. Interestingly, not one question during the Q&A related to big data; every inquiry touched on thick data. Making meaning of thick data was clearly important to my audience.

Flying home, I recalled the concept of Code Halos pioneered by Cognizant’s Center for the Future of Work. A Code Halo refers to “the data that accumulates around people, devices and organizations — data that’s robust, powerful and continually
Growing in richness and complexity. In my mind, Code Halos offer a palpable metaphor for thick data. Furthermore, the challenge of taming and making sense of thick data seems to be squarely fixed in the crosshairs of the CIO’s organization.

However, as I noted earlier, only a small percentage of senior leaders believe IT is “game-changing.” At the same time, paradoxically, many of these execs say that “technology factors” are their number-one consideration when making key strategic decisions. How could that be? I think, in part, it is because most companies just “accumulate” big data to inform decision-making, and few truly attempt to extract qualitative and contextual insights from thick data.

The Business-IT Divide: No Longer an Excuse

But it doesn’t have to be this way — if companies empower CIOs and their teams to transform the business by competing on code. For starters, a Code Halo-informed game plan for digital business transformation assumes a tight alignment of the business and IT strategies. This is something that winning companies figured out long ago.

Several years ago, CIO Magazine presented its prestigious “Enterprise Value” award to the Marriott Corp. After accepting the award, I invited John Marriott, the company’s executive vice president, to share his thoughts with the audience. What he said shocked me. “The Marriott Corporation is proud to receive this technology award,” he began, but then added: “… the firm doesn’t have a technology strategy. We used to have disparate technology and business strategies. That didn’t work, so we aligned the two. That didn’t work either until we converged our technology strategy into our business strategy.”

Though it was well before the term Code Halos was in vogue, Marriott’s winning application exemplified the best of Code Halo thinking. It used customer code to enhance the design and implementation of its algorithms for customer affinity and room rate optimization, which helped the company continuously strengthen its bottom line.

As this story shows, companies that understand the context of their data and their customers’ Code Halos are destined to outperform those that do not. At companies with Code Halo strategies, the wall between IT and business does not exist. As Cognizant’s book on Code Halos points out, CIOs and IT staffs at companies that apply Code Halo thinking invest almost twice as much time deeply understanding user interfaces, applications and data as companies without Code Halo strategies.

Companies that apply Code Halo thinking ask why a customer or employee acts one way rather than another — and then find answers by examining connections among personal, organizational and device Code Halos. And who better than CIOs and their teams — deeply steeped in information architecture and data analysis — to inform end-to-end digital business makeovers?

Making the Code Halo Pivot

The Code Halo revolution will disrupt businesses for years to come, and it’s an uprising best led by CIOs and their teams. Why? Because it is all about digital information-led business change, and it is IT that has been at the vanguard of technology- and data-powered transformation since the
beginning of digital time. It’s a no-brainer: It just means further embedding IT into functional business areas to — in John Marriott’s words — erase the divide that has confounded enterprises since the emergence of electronic data processing (EDP).

To succeed, CIOs must think beyond accumulating big data. Rather than getting caught up in zettabytes, yottabytes and brontobytes, they must restructure and reskill their teams to connect the digital dots spewed by people, process, organization and device Code Halos. This means equipping the business with solid information architects and deep-thinking business analysts who see patterns contained in rich data mosaics and can predict the direction of market and customer sentiment before the competition does.

CIOs who see the “why” of data will become Code Halo heroes to their organizations. They will also generate more zeros for themselves and their companies — lots of them!

Footnotes


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The transition to fully digital business will be agonizingly slow and fraught with difficult decisions involving technology, operating models and organizational structures. Leaders that embrace IT merchandising, brand management, service management, Professional Engineering and purpose-driven analytics today will lead the way in the coming decade.

In my recent IT Odyssey interviews, over 80% of the executives I spoke with painfully described their struggles to find more viable business and IT models. Their current approaches appeared to be running out of steam and likely to collapse by 2020, if not sooner. This sounds like a perfect scenario for enterprises to rapidly deploy an array of extremely promising new IT alternative delivery vehicles (ADVs) and services. However, as with most things technology-oriented, the devil is in the details.

To deliver material contributions, these new IT ADVs and services (i.e., Code Halos built on SMAC technologies) require significant change to business models, IT architectures and organizational structures. Unfortunately, such bedrock enterprise fixtures typically advance far more slowly than Moore’s Law. As a result, it is hard to perceive the glacial pace at which ADVs are being applied and assimilated, especially in large enterprises.

The executives with whom I spoke pinpointed numerous factors that will impact the journey to 2020:

- While change and urgency are not optional, just getting better at what they do isn’t enough. Radical — not just rapid — change is needed.
- Dramatically different approaches, skills and capabilities are needed.
- Uncertain or weak economic factors increase the angst of introducing risk.
- Shaky shareholder perceptions entice activists to make short-term demands.
- Expanding, ambiguous regulations complicate existing businesses and delay new ADVs from moving forward.
- Non-greenfield businesses must integrate new approaches with overly complex but well-performing legacy businesses, processes, products, skills, customers and IT systems.

Many of today’s leading executives built their careers by increasing enterprise efficiencies — tightening known processes, consolidating resources, de-risking, better sourcing commodity business aspects and optimizing supply chains. The 2014-2020 timeframe should be a period of severe culture and capabilities shock for many of these execs.
How do I know? Repeatedly, the execs with whom I spoke described their difficulties in learning what IT could and should do, how to do it and how to achieve material contribution. The organizational learning involved is experiential rather than academic (i.e., taught from a textbook or brought by a new hire or consultant). Learning alpine skiing is an example of experiential learning. Watching a video or reading a text helps, but the novice learns by actually launching downhill.

For this reason, it won’t be until at least 2020 that most enterprises will have learned enough to make ADVs and their evolving application services the cornerstone of their business-IT strategies. Those that can learn or adapt more adroitly over this period should gain competitive ground by capitalizing on what their organizations can do that competitors can’t. For those still struggling in 2020, it may be too late to remain competitive. It is seldom possible to catch up on experiential learning.

The Enabling IT Capabilities of 2020

While much hype surrounds the emerging “digital business model,” few specific examples of this model or enabling capabilities exist. Pundits advocate hiring a “chief digital officer” who would report to and be empowered by the CEO to override IT naysayers. Others suggest that users be freely encouraged to select which services and ADVs they want. But by 2020, leaders with whom I spoke described broader sets of enabling capabilities that will decide corporate fates:

- **Distinctive working collaborations by the new clowns in the new circus.** The applications and services of 2020 will involve IT working in new ways with new players, such as marketing, brand management and newly empowered global executives who want to leapfrog IT and business development. Often, deep divides separate the experience, values, success factors and cultures of these new players and IT.

Enhanced collaboration demands will require a blend of project, process, subject matter, technical, creative, planning, visionary and practical capabilities, facilitated by management process, funding and governance.

Many of the following capabilities may appear to be the same or similar. As Figure 1 shows, they are dramatically unique and must work together in collaborative fashion.

### Distinctive 2020 Capabilities

<table>
<thead>
<tr>
<th>Capability</th>
<th>Objective</th>
<th>Key Skills</th>
<th>Likely Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audiencing</td>
<td>Develop audiences for specific digital marketing or potential communities.</td>
<td>Sociology, promotion, market awareness.</td>
<td>Media, entertainment.</td>
</tr>
<tr>
<td>Curator</td>
<td>Optimize the content being managed and conveyed through digital channels.</td>
<td>Librarian, awareness of content and formats, subject or audience awareness.</td>
<td>Digital librarian, SME marketing.</td>
</tr>
<tr>
<td>Merchandiser</td>
<td>Find, select, introduce and be responsible for ADVs and services offered to the enterprise.</td>
<td>IT landscape awareness, sense of business and IT architecture fit/benefit.</td>
<td>IT EA or industry analysts, applied advanced technologist, business leader interested in ADVs and services as they fit the business.</td>
</tr>
<tr>
<td>IT Brand Manager</td>
<td>Promote, grow and refresh the brand equity of an IT service.</td>
<td>Service marketing, promotion.</td>
<td>Packaged consumer goods or software.</td>
</tr>
<tr>
<td>IT Service Manager</td>
<td>Maintain and support IT services.</td>
<td>IT technical or service support across silos.</td>
<td>IT service or support manager.</td>
</tr>
</tbody>
</table>

Figure 1
IT merchandising function. Thousands of new ADVs and services will continue to arrive on the IT landscape by 2020. Customers, staff and business executives — as well as IT — may drown in those that appear to hold the most promise but are, in actuality, problematic.

As described in my earlier Cognizanti article,4 organizations require capabilities to sort through these opportunities and select those that are the most prudent and likely to offer rewards. Such capabilities resemble the art of merchandising. The IT merchandiser would be aware of the available ADVs and services, sort out which ones best fit its criteria for success (architectural fit, likely user and IT assimilation, provider viability and support, full TCO, likely benefit) and then assume responsibility for the economic return.

Audiencing and curating. Launching social media campaigns, being “liked” on Facebook or trolling your products on YouTube can’t, by themselves, significantly grow the brand and business. Leaders who are already seeing sustained impact from digital marketing and social media cite two major capabilities that must be developed, funded, resourced and maintained to yield value, brand enhancement and material new revenue:

- An audiencing function: As identified in an earlier Cognizanti piece,4 this capability identifies potential audiences, finds proper offerings, promotes offerings to that audience and expands that audience.
- A curating function: This capability determines which offerings best fit each audience, given the vast amount of collateral and formats available.

Ongoing IT brand management. Leaders in 2020 will dedicate skilled resources that extend beyond the common approaches of post it, forget it, move on, expect social masses to embrace it and then buy or use more of their product or services.

Audiences can become bored, move on to the next shiny new thing or fail to increase enterprise product use. Brand managers will, therefore, need to own and promote the success of an IT offering. This will require deft husbandry — monitoring engagement, building brand equity and ensuring continual refresh.

IT service management. By 2020, IT organizations will offer hundreds or more mobile apps, catalog services, customer/partner-facing services, externally provided XaaS (everything as a service) linkages, information reservoirs, analytical tools and self-provisioning capabilities. Winning brand managers will promote the most critical services, and service managers will ensure technical delivery and user/customer support of all services.

End-to-end, edge-to-edge quality, experience and assurance. Until recently, quality was defined by IT and generally provided through standardized IT, development standards and pre-implementation testing.

Increasingly, users and customers demand a seamless, end-to-end consumerized experience. IT organizations find themselves stitching together a tapestry of individual, best-of-breed, fit-for-purpose, edge-to-edge solutions sourced from many providers and tied into legacy systems, procedures, tools and data.

Leaders in 2020 will realize that such quality can’t be pasted on to existing approaches. A total rethink will be needed of strategy, principles, user involvement, IT operating models and governance to deliver on user expectations.

“Professional Engineers.” By 2020, IT will have many more functions tied into enterprise products or supporting mechanical and/or physical devices. Things that can harm people or present liability will be monitored by or operated over the Internet of Things. Such efforts require a variety of Professional Engineering skills and disciplines. Having these handled by a software engineer who loves to tinker is not prudent. Many IT organizations are long overdue in hiring registered Professional Engineers (PEs).

Informatics driven by and tied to material business outcomes. Code Halos represent major differentiating opportunities. However, insightful leaders cite two capabilities that they are developing to ensure material contribution by 2020.

- Having "blind squirrel" data science analysts comb through big data in search of insights seldom ensures material contributions. Instead, the goal must be to pursue targeted business purpose insights, such as which customers represent the biggest underwriting risk or which products present what types of higher warranty issues.
Uncovering purpose-driven issues requires business analysts who understand the nuances of business operations. Most analysts excel at identifying business processes but not the underlying issues that influence business success. Likewise, analytic insights don’t magically become material business contributions. Often, analysts are not connected to the business decision-makers. Skilled “happenators”5 are needed to turn informatics insights into practical changes in the business.

Software planning, funding, release, fix, update, distribution, support, asset management, conversion and retirement. Visionary leaders say that by 2020 their enterprises will need to embrace and apply key elements of the software business model. They understand that software will increasingly be user-facing, available on mobile devices, sensors and wearables, built into the product or service, or actually sold to customers. These leaders realize they are past the point that software is an administrative support sideshow.

As a result, IT must have the strategy, management processes and financials of a software business. Today’s IT finance staff is often skilled at budgeting, TCO analysis and cost control but lacks the skills, funding, resources, processes, frameworks, tools and systems suited to IT or software enterprise financial management.

An architecture of architectures. Today’s IT architecture strives for common global systems and limited core technologies or providers. A diverse cornucopia of enterprise ADVs and service offerings is already arriving that is best suited for a specific market or functional purpose.

Business capabilities such as engineering, high-performance computing, customer-facing services, e-commerce, social media, big data, emerging markets, process control, manufacturing or business analytics often require unique architectures. Wise leaders realize that a single, common, centrally conceived and locked-down architecture is no longer optimal and may limit

Progression plans vs. succession plans: Succession plans tend to replace like with like, but 2020 planning requires doing new things in new ways. Progression plans start by identifying the new things in new ways and then determining the capabilities, styles and personas needed.
I suggest you compare how critical each of the 2020 capabilities will be to your enterprise on a scale of 1 to 10 (with 1 being “not critical” and 10 being “extremely and broadly critical”) vs. your organization’s current 2020 capabilities (with 1 being “virtually none” and 10 being “fully developed and experienced”). Figure 2 summarizes the evaluation for companies looking to gain greater advantage of ADVs, IT services and digital marketing.

**Not Fumbling the Future**

No one wants to be the CEO or leader who allows his enterprise to slide down a slippery slope. As with previous IT era changes, only the enlightened will be able to summon up the capacity to make the right business-IT decisions to weather the coming transition. The DP managers of 1972 were swept away by the MIS directors who emerged later in that decade. MIS managers were then swept away by CIOs in the 1982 era change. Those DP and MIS managers were flummoxed by the formidable challenges introduced by the PC and networked computing revolution, believing they could tweak their way to the future.

Hopefully, today’s CIOs will not be hypnotized in a similar fashion. A major rethink and development of new capabilities looms for those who want to keep their organizations out front in 2020 — and beyond.
Footnotes

1. Independent, face-to-face interviews I conduct each year with over 120 IT executives.

2. Alternative IT Delivery Vehicles (ADVs) represent new ways in which IT capabilities or applications are available to the enterprise. Examples include public-hybrid-private clouds, managed services, XaaS, mobility, mobile apps, converged infrastructure, consumerized IT, BYOD, social media, big data, Internet of Things and over 60 others described by interviewees.


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Cognizant (NASDAQ: CTSH) is a leading provider of information technology, consulting, and business process outsourcing services, dedicated to helping the world’s leading companies build stronger businesses. Headquartered in Teaneck, New Jersey (U.S.), Cognizant combines a passion for client satisfaction, technology innovation, deep industry and business process expertise, and a global, collaborative workforce that embodies the future of work.

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