IDC FutureScape: Worldwide IT Industry 2017 Predictions

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IDC FUTURESCAPE FIGURE

FIGURE 1

IDC FutureScape: Worldwide IT Industry 2017 Top 10 Predictions
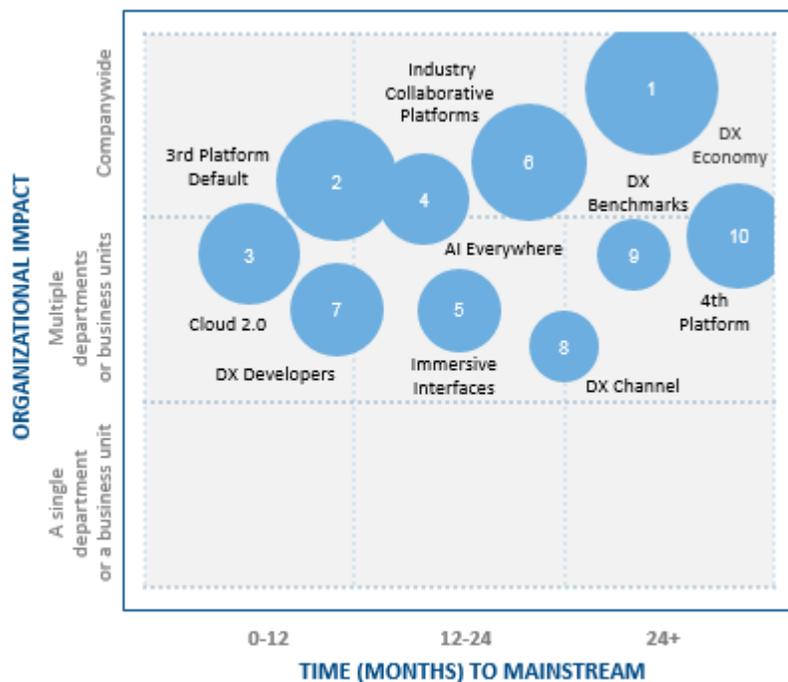
Note: The size of the bubble indicates complexity/cost to address.

Source: IDC, 2016

Figure 1 presents IDC's IT industry top 10 predictions in terms of their likely impact across the enterprise and the time it will take for the predictions to reach mainstream. By mainstream, IDC means the broad middle of the bell curve of adoption (i.e., the 40-60% of enterprises that are neither the first movers and early adopters nor the last to act). Each bubble's size provides a rough indicator of the complexity and/or cost an enterprise will incur in acting on the prediction.

EXECUTIVE SUMMARY

This IDC study predicts 10 key developments in the tech world in the next 18-36 months, and beyond, that will impact every enterprise's ability to grow and compete. Our predictions track the biggest story of our time: the continuing emergence and evolution of the 3rd Platform/digital transformation (DX) marketplace. In 2017-2020, we will see the emergence of digital transformation at a *macroeconomic* scale – the dawn, if you will, of the "DX economy." In this new economy, enterprises will be measured by their ability to hit and exceed a whole new set of demanding performance benchmarks enabled by cloud, mobility, cognitive/artificial intelligence (AI), Internet of Things (IoT), augmented reality/virtual reality (AR/VR), and the digital transformations fueled by these technologies.

According to Frank Gens, IDC SVP and chief analyst, "We are at an inflection point. Over the next three to four years, digital transformation efforts will no longer be 'projects,' 'initiatives,' or 'special business units' for most enterprises. They will become the core of what industry leaders do and how they operate. In effect, every (growing) enterprise – no matter its age or industry – will become a 'digital native' in the way its executives and employees think and how they operate." The 2017 IDC FutureScape for the worldwide IT industry identifies 10 strategic IT industry shifts executives need to understand and act on in order to compete and win in the looming DX economy.

IDC Worldwide IT Industry 2017 Predictions Team

The following IDC analysts made major contributions to IDC's predictions for 2017: Frank Gens, Crawford Del Prete, Philip Carter, Larry Carvalho, Gary Chen, Chris Chute, Adam Dodds, Glen Duncan, Bill Fearnley, Serge Findling, Al Gillen, Greg Girard, Leslie Hand, Al Hilwa, Pat Kenealy, Kim Knickle, Monika Kumar, Ramon Llamas, Alan Louie, Scott Lundstrom, Bryan Ma, Carrie MacGillivray, Robert Mahowald, Tom Mainelli, Stephen Minton, Deepak Mohan, Henry Morris, Tomoaki Nakamura, Giorgio Nebuloni, Eric Newmark, Sandra Ng, Tony Olvet, Robert Parker, Joe Pucciarelli, Mike Rosen, Dave Schubmehl, Eileen Smith, Hayley Sutherland, Vernon Turner, Michael Versace, Dan Vesset, Richard Villars, Lewis Ward, Meredith Whalen, and Steve White.

IDC FUTURESCAPE PREDICTIONS

Our predictions this year continue to track the biggest story of our time: the continuing emergence and evolution of the 3rd Platform/digital transformation marketplace (see Figure 2).

FIGURE 2

IT Industry Context: The Evolving 3rd Platform and DX Marketplace

Source: IDC, 2016

It's been a quick 12 months since last year's predictions (see *IDC FutureScape: Worldwide IT Industry 2016 Predictions – Leading Digital Transformation to Scale,* IDC #259850, November 2015), so it's not surprising that several core topics in this story remain the same, including:

- Digital transformation as a strategic business imperative
- 3rd Platform technologies as the foundation for DX strategy execution
- Industry and developer communities as essential ecosystems for scaling up DX success

So what's new in *this* year's outlook? Four macrotrends – discussed in more detail in the sections that follow – stand out:

- **Digital transformation will attain *macroeconomic* scale and impact.** We are at an inflection point. Over the next three to four years, DX efforts will no longer be "projects," "initiatives," or "special business units" for most enterprises. In effect, every (growing) enterprise – no matter its age or industry – will become a "digital native" in the way its executives and employees think and how they operate. The global economy will be reshaped in the process.
- **The 3rd Platform's four "pillars" – cloud, mobile, social, and big data – will all shift into a *new "2.0" evolutionary stage* to support the scaled-up DX economy.** Many in the industry think they have a grip on what these technologies are and what they're capable of. But they will

dramatically "morph" — requiring all enterprises and IT suppliers to reassess their plans to use the core technologies.

- **Adoption of the 3rd Platform's innovation accelerators will occur much faster than most expect — with dramatic effect.** A clear pattern is emerging: The adoption of innovation accelerators — especially cognitive/AI, the Internet of Things, and AR/VR — will happen much faster than the 3rd Platform's four pillars. Enterprises that embrace these accelerators earlier will grab big competitive advantages.

- **The 4th Platform is edging over the horizon.** We can finally see the clear outlines of what lies *beyond* the near-term to midterm 3rd Platform/DX world. Enterprise leaders — most especially in consumer-facing industries — need to pay close attention.

Beyond these shifts, you'll notice three core themes running though our predictions:

- **Things are moving faster than previously predicted.** You'll notice this in DX adoption, 3rd Platform technology adoption, expansion of the DX developer community, adoption of AR/VR technologies, developer use of cognitive/AI technologies, and DX-driven enterprise performance improvements. Speed is a core skill for success in the DX economy.

- **Consumer scale is becoming mandatory for every enterprise.** Whether your enterprise touches consumers directly or indirectly — through consumer-facing partners — competing will become more and more difficult without connecting your value to consumers, their homes, and their lifestyle (even for traditionally B2B enterprises).

- **Ecosystems are as important as your core IP.** Maximizing leverage in all aspects of your enterprise through partner communities — developers; partners, competitors, and customers aggregating around industry collaborative platforms; and the emerging DX channel community — will determine much of your success in the DX economy.

Summary of External Drivers

IDC has identified 12 drivers affecting the future of the IT industry and the organizations that use IT for competitive advantage and has described them in *Critical External Drivers Shaping Global IT and Business Planning* (IDC #US41607816, July 2016). For the predictions discussed in the sections that follow, we identified 6 of the 12 drivers that form the most significant environmental backdrop:

- **DX:** Technology-centric transformation altering business and society
- **Everything, everywhere:** The rise of computer-based intelligence
- **Platform economy:** The ecosystem battle for scale
- **Shifting economics:** Data as digital capital
- **Materialization:** Revolutionizing industrial and commercial processes
- **DX delta:** Industry leaders widen performance gap

Please look in the External Drivers: Detail section at the end of this study for more detail on these six key drivers. We also urge you to explore *Critical External Drivers Shaping Global IT and Business Planning* (IDC #US41607816, July 2016) for more detail about all 12 of these key macrotrends.

Predictions: Impact on Technology Buyers

We start with predictions 1 and 2 that look at the "big picture" for IT industry change over the next several years: at the business level (DX) and the technology level (3rd Platform technologies).

Predictions 3-5 look at three key technology areas that will drive lots of market change – and strategic investments – over the next several years: cloud, cognitive/AI, and immersive interfaces.

We'll then shift gears, as Predictions 6-8 look at critical ecosystems that will shape both enterprises' and IT suppliers' success in the rising DX economy: industry collaborative platforms, DX developers, and the emerging DX channel.

Putting the prior big picture predictions, technology predictions, and ecosystem predictions together, Prediction 9 looks at what enterprises will need to look like to compete in the DX economy.

Prediction 10 looks at "what's next?" – as we see the 3rd Platform provide an ever-maturing foundation to the DX economy, what might the 4th Platform bring to the marketplace?

Prediction 1: Dawn of the DX Economy — By 2020, 50% of the G2000 Will See the Majority of Their Business Depend on Their Ability to Create Digitally Enhanced Products, Services, and Experiences

For the past several years, more and more organizations have embarked on digital transformation journeys, using the cloud, analytics, social technologies, and more to create competitive advantage through new offerings, business models, and relationships. But for most enterprises, digital transformation has been at the level of "projects" or "initiatives" or perhaps as big as special business units.

Over the next three years, we'll see DX shift to an entirely different scale – a *macroeconomic* scale – as many global businesses generate more than half of their business from digitally transformed offerings, operations, and supplier, distribution, and customer networks.

In effect, every (growing) enterprise will become a "digital native" and the global economy will be reshaped in the process.

IT and Business Impact

As DX becomes more material – and increasingly core – to enterprises over the next four years, we'll see these additional impacts:

- **Growth impact:** By the end of 2017, revenue growth from information-based products will be twice that of the rest of the portfolio for one-third of the Global 2000 (G2000). For industry leaders, DX is where the fastest *growth* is already coming from.
- **Leadership impact:** By 2020, one-third of CEOs and COOs of G2000 companies will have spent at least five years in a tech leadership role. Enterprise leaders are evolving into a deeply "bilingual" community – comfortable in business and IT discussions. And this evolution is not just about language: It's about a way of thinking about and behaving in the marketplace.
- **Investment impact:** In 2019, worldwide spending on DX initiatives will reach $2.2 trillion, almost 60% larger than in 2016.

Guidance

- Develop plans to transition digital transformation efforts and organizations from isolated incubators or special business units to being integrated within the operations and culture of the entire enterprise. Digital products and services plans should be considered and developed for every part of your enterprise.

- Carefully assess the leaders at all levels within your organization: Do they not just speak but also think in an integrated fashion about technology and business?
- Look for IT suppliers that orient offerings and go to market around the largest and fastest-growing DX use cases.

For more information about IDC's digital transformation predictions, check out *IDC FutureScape: Worldwide Digital Transformation 2017 Predictions* (IDC #US40526216, November 2016).

Prediction 2: 3rd Platform by Default — By 2019, 3rd Platform Technologies and Services Will Drive Nearly 75% of IT Spending — Growing at Twice the Rate of the Total IT Market

3rd Platform technologies — cloud, mobile, social, and big data technologies, joined in recent years by IoT, cognitive/AI, AR/VR, 3D printing, robotics, and next-generation security technologies — are clearly no longer "emerging" technologies. They are now the default choices for virtually all enterprises' competitive advantage systems.

This is by far the least surprising prediction of the 10. This transition to 3rd Platform technologies has been underway for a decade.

But it's important to note: Our prediction represents a major *acceleration* from last year's outlook, when we predicted 3rd Platform technology and solutions would account for over 60% of IT spending by 2020.

IT and Business Impact

As 3rd Platform technologies even further dominate enterprises' IT spending over the next several years, we anticipate the following additional impacts:

- **The "four pillars" will evolve:** The 3rd Platform's four pillars will evolve dramatically as their growing capabilities enable, and the expanding needs of the DX economy require, more of the following:
    - **Mobility:** IoT, 5G, and wireless power will deliver "mobile everything," "always connected," and "always on" — use cases will explode.
    - **Big data:** The focus — and adoption — will shift dramatically to cognitive/AI (we'll discuss this more in Prediction 4).
    - **Social:** Social will become increasingly "immersive" through virtual reality (we will touch on this in Prediction 5).
    - **Cloud:** Cloud will evolve in at least six different dimensions (we will describe this shift in Prediction 3).
- **Innovation accelerators will go mainstream:** As we'll see in Predictions 3, 4, and 5, IoT, cognitive/AI, AR/VR, and next-gen security (blockchain) will see surprisingly rapid adoption in the next three to four years.

Guidance

- Master 3rd Platform technologies, as this remains a top *business* priority. Expertise in these technologies must be a key requirement when hiring and retraining IT *and* business staff.
- Relentlessly assess technology and business partners. How strong is *their* expertise in 3rd Platform technologies and solutions?

- Reassess the possible. Virtually every 3rd Platform technology is expanding its capabilities and use cases dramatically over the next three years. It's important to regularly reset your assumptions about what your organization can/cannot do with these technologies and in what time frame.

For more information about IDC's 3rd Platform technology predictions, check out IDC's FutureScape 2017 webcast portal (**www.idc.com/events/futurescapes**).

Prediction 3: "Cloud 2.0" — By 2020, 67% of All Enterprise IT Infrastructure and Software Spending Will Be for Cloud-Based Offerings; the Cloud Will Morph to Become Distributed, Trusted, Intelligent, Industry Focused, and Channel Mediated

Many enterprises have shifted to a "cloud first" strategy over the past several years. Over the next several years — as two-thirds or more of IT spending shifts to the cloud — many organizations (and IT suppliers) will get steadily closer to "cloud only."

Fueling this shift is the fact that almost every enterprise will be a cloud service provider of innovative services to its own marketplace (see Predictions 6 and 7), making cloud capability not just an IT issue but also a core business operations issue.

Just as importantly, as cloud adoption expands in the next four years, what clouds are and what they can do evolve dramatically — in at least six important ways (see the IT and Business Impact bullets that follow).

IT and Business Impact

- Cloud services will become much more *distributed* (and interconnected):
  - 60% of enterprise IT will be off-premise by 2018, driven in large part by the shift to public cloud services.
  - More than 85% of enterprise IT organizations will commit to multicloud architectures by 2018, driving up the rate and pace of change in IT organizations; a key element enabling multicloud environments will be the rise of containers (by 2019, at least one-third of all public cloud IaaS capacity will be deployed as containers).
  - By 2019, at least 40% of IoT-created data will be stored, processed, analyzed, and acted upon close to or at the edge of the network.
- Cloud services will become more *trusted*:
  - By 2020, cloud will be where secure and trusted IT services live: Cloud-based encryption, threat analytics, user and entity behavior analytics, blockchain, and compliance services will proliferate. Enterprises *not* leveraging the cloud for security services will be viewed as unsecured.
  - Blockchain adoption will accelerate:
    - By 2019, at least 25% of global banks will have implemented blockchain in production systems.
    - By 2021, an IoT trust-based protocol enabled by blockchain will emerge — given recent IoT-based DDoS attacks, there will be tremendous incentives for suppliers to accelerate this development.
- The cloud will become much more *intelligent* (see Prediction 4), more *industry specialized* (see Prediction 6), and more *channel mediated* (see Prediction 8).

- Cloud leadership will become much more *concentrated*: By 2020, the top 5 cloud IaaS/PaaS players will control at least 75% share (versus about 50% in 2016).

Guidance

- Become heavily cloud centric, in technology adoption and in skills, over the next several years – or find yourself stranded on the outskirts of digital transformation in your own industry.
- For those enterprises already familiar with the cloud, get ready for significant changes in what clouds are able to provide in support of the DX economy. The assumptions about (and use cases for) the cloud – as it becomes more distributed, trusted, intelligent, and industry specialized – will greatly expand.
- As the cloud "megaplatform" (IaaS + PaaS) community consolidates, be sure to carefully assess providers and align with the winners.

For more information about IDC's cloud predictions, check out *IDC FutureScape: Worldwide Cloud 2017 Predictions* (IDC #US41863916, November 2016).

Prediction 4: AI, Everywhere — By 2019, 40% of All Digital Transformation Initiatives, and 100% of All Effective IoT Efforts, Will Be Supported by Cognitive/AI Capabilities

The startlingly fast proliferation of cloud-based cognitive/AI capabilities – from IBM, Amazon Web Services, Microsoft, Google, and others – is putting tremendous power in the hands of DX developers in start-ups and Global 2000 giants alike.

The power of AI is being put to a very wide variety of uses, including medical diagnostics and treatment, predictive analytics for industrial equipment, customer advise/assist capabilities in retail, fraud detection/prevention in financial services, and cybersecurity threat analytics.

IoT and cognitive/AI technologies will especially be closely coupled to each other, as our prediction suggests. This is because IoT devices, and the flood of data that comes from them, have very limited value without AI technologies, which are uniquely capable of finding valuable insights from IoT data. Indeed, they will be so tightly linked that we've coined the term "AIoT" as a mnemonic cue for executives, to encourage them to think about these as the two connected ends of many of the next generation of competitive advantage systems.

IT and Business Impact

- **Developer adoption is accelerating:** By 2018, 75% of developer teams will include cognitive/AI functionality in one or more applications. (This is a major increase from our prediction last year that 50% of developers would leverage cognitive/AI functionality by 2018.)
- **Consumers will be essential to cognitive/AI adoption:** By 2019, over 110 million consumer devices with embedded intelligent assistants will be installed in U.S. households. (Given the pace of Amazon.com's Echo and Dot sales, and with Google Home about to ship, this could be a gross underestimate!)
- **Industry focus is the key to cognitive/AI growth:** In 2017-2020, 7 of the top 10 cognitive/AI use cases will be industry focused and account for 85% of the top 10 investments.
- **The "battle of AI platforms" will play out in 2017-2020:** The concentration of market share we referenced in the cloud prediction section (see Prediction 3) is going to be driven in large part by which of the competing cloud megaplatform players can win the battle for developers in the cognitive/AI space.

Guidance

- Within the next 12 months (if you haven't already), ask: How can we use AI capabilities (and the data required to feed AI systems) to take our offerings, customer engagement, operational efficiency, and executive and field force decision making to the next level? With 40% of DX projects leveraging cognitive/AI capabilities, it's obvious that many in your industry will be asking the same question.

- Look at your technology providers to see how cognitive/AI capabilities are being included in their product road maps and the enterprises can make use of these capabilities.

- Learn about the various cognitive/AI software platforms available and start testing some new applications on them. A number of these platforms are free for development use. IT organizations need to build in-house expertise in these areas along with data science and big data analytics.

- Be on alert for rising privacy, ethical, and other nontechnical issues, as cognitive/AI solutions become embedded in a wider variety of services and solutions. Your competitive advantages from these technologies could be hamstrung by social backlash and legal hurdles.

For more information about IDC's cognitive/AI predictions, check out *IDC FutureScape: Worldwide Analytics, Cognitive/AI, and Big Data 2017 Predictions* (IDC #US41866016, November 2016).

Prediction 5: Immersive Interfaces Gaining Traction — In 2017, 30% of Consumer-Facing G2000 Companies Will Experiment with AR/VR as Part of Their Marketing Efforts

Interfaces are the essential gateway to customer engagement, and they are evolving much more quickly than many have anticipated.

Over the next three to four years – through augmented and virtual reality and advances in integrating *all* senses with the digital world (notably voice) – we will see more of the digital world enter the real world, people immersed into the digital world, and greatly intensified individual engagement in the DX economy.

By 2020, the "coolest" mobile and web experiences of today will seem very flat and hopelessly boring.

IT and Business Impact

- **Mobile augmented reality adoption will near half a billion people by 2018:** In 2018, the monthly active user base of consumers using mobile augmented reality apps will exceed 400 million. The Pokémon GO phenomenon of 2016 demonstrated very vividly that "flash adoption" of new technologies can come from apparently nowhere when the right combination of emerging technology, engaging content, and a widely available platform (in this case, mobile phones) come together. In our view, this will happen again, over and over, with immersive interface technologies.

- **The "voice-fication" of the home will explode:** Looking back at our cognitive/AI prediction (see Prediction 4), those over 110 million consumer devices with embedded intelligent assistants that we predicted will be installed in U.S. households by 2019? Almost all will have voice interfaces.

- **Look for the verticalization of voice-AI mashups in the enterprise:** For example, in 2019, companies will deploy earworn wearables, with voice interface, as digital assistants for customer-facing roles.

- **Get ready for "immersive social":** Virtual reality will offer a new, immersive dimension to social networks. By 2020, at least 20% of professional/commercial media on Facebook will be Facebook 360 (360-degree video and photo) content, driving a disproportionately large number of views and shares. A "dark horse" scenario (not as likely, but possible and worth considering): If one or more key players – Facebook, Apple, Google, Microsoft, or Samsung, for example – greatly simplify consumers' ability to create and experience 360-degree media over the next 24 months, we could see up to 20% of *all* media on Facebook be immersive by 2020 – as we saw Pokémon GO-style "flash adoption." From a different angle, Google will leverage YouTube's growing VR content as a cornerstone for its effort to expand its consumer engagement and reboot its social media presence.

- **Look for mass AR/VR adoption by 2021.** Putting AR and VR together, by 2021, we predict over 1 billion people worldwide will regularly access apps, content, and data through an AR/VR platform.

Guidance

- Consumer-facing industries must have immersive interface explorations and initiatives underway in 2017. There will be a lot of stops and starts, successes, and missteps over the next 36 months. But leaders will be rewarded with dramatically increased customer engagement, measured in number of views, length of views, multiple views, and shares.

- IT departments need to work closely with CMOs and LOBs to coordinate efforts, particularly around application development and possibly even hardware should deployments be required. Developers with experience and skills in technologies like Unity Engine will also be relevant.

- Companies need to watch for competing standards in the VR space, especially given how young the industry is today. Smartphone-based platforms like Google Daydream may give the widest reach, whereas PC-based systems from HTC and Oculus-Facebook give the most immersive experience (think: shopping mall kiosks and experience centers).

For more information about IDC's AR/VR predictions, check out *IDC FutureScape: Worldwide Wearables and Augmented Reality/Virtual Reality 2017 Predictions* (IDC #US41864416, November 2016).

Prediction 6: Industry Collaborative Platforms Proliferate — By 2018, the Number of Industry Collaborative Clouds Will Triple to More than 450; By 2020, Over 80% of the G500 Will Be Digital Services Suppliers Through ICCs

For several years, IDC has pointed to the emergence of cloud services platforms and marketplaces that provide services aimed at specific industries (e.g., financial services, healthcare, manufacturing, and government). We have coined the term industry collaborative platforms for a strategic subset of these platforms that we believe will be the most important: cloud-based platforms through which *multiple companies in an industry collaborate* in some fashion toward a common goal, such as improving industry insight and/or capability.

As the previous prediction indicates, IDC believes we are about to see these "innovation crossroads" in virtually every industry take off over the next several years. Indeed, new technology and industry partnerships around industry collaborative clouds (ICCs) are becoming almost weekly events (e.g., the recent ABB-Microsoft partnership).

Industry collaborative clouds focused on aggregating information are the fastest growing, in both quantity and size, accounting for more than 40% of all industry collaborative clouds created in the past year. By 2018, IDC expects the number of industry collaborative clouds focused on information and

data will triple from 50 in 2016 to more than 150 by the end of 2018, with the data residing inside them growing to exceed 250EB of information.

IT and Business Impact

- **Compliance as a service will become the no-brainer ICC offering:** By 2020, almost 60% of enterprises will actively participate in compliance clouds. IoT and cognitive/AI will drive further adoption.

- **More enterprises will be digital suppliers through ICCs:** By 2020, 75% of Fortune 500 companies will be suppliers of digital services through industry collaborative clouds.

- **Partnering with cloud megaplatforms will be the rule:** By 2020, at least 90% of industry collaborative clouds will partner with a cloud megaplatform provider like Amazon, Google, IBM, and Microsoft.

- **Industry cloud platforms will be technology providers for SMBs in their industry:** SMBs will access industry clouds for the technology platform and basic applications, as the economies of scale available via an industry cloud based on a reference architecture will help SMBs drive improved IT operational performance both near and long term.

Guidance

- In 2017, all enterprises should become familiar with the ICCs serving their industry and formulate plans for building ICCs into their supplier networks. Using ICCs will increasingly be considered a "must" for high-cost, complex, and non-differentiating industry processes and services (including compliance).

- In 2017, enterprises should consider the strategic value of creating (or being a founding partner of) an industry collaborative platform. As noted previously, there are already dozens of leading companies, across every industry, that are positioning themselves as suppliers to the rest of their industry — a potentially very powerful position. With the ramp-up in ICCs we foresee in the next several years, now is the time to decide your own enterprise's ICC role: as a consumer or a supplier or both.

- For those creating an ICC, when selecting technology partners, it is important that companies select vendors that have:
  - Deep industry-specific expertise, with a strong book of references
  - Proven understanding of industry-specific regulations and compliance initiatives
  - A referenceable portfolio of previously built industry clouds

- Enterprises should look for help from partners regarding the strategic design, creation, and ongoing maintenance of industry clouds. Service providers (SPs) that were involved early in the development of new industry clouds will be best positioned to partner with you on these initiatives.

For more information about IDC's industry cloud predictions, check out *IDC FutureScape: Worldwide Cloud 2017 Predictions* (IDC #US41863916, November 2016).

Prediction 7: DX Developer Teams Expand, Faster — By Year-End 2017, Over 70% of the G500 Will Have Dedicated Digital Transformation and Innovation Teams

Early this year, we conducted a census of the Fortune 100, looking for how many had formed a dedicated team, or even business unit, focused on digital transformation and innovation. We found that

about 60% had done so. We expect this focus on digital transformation – spearheaded by DX teams/organizations – to rapidly expand in the next 12 months.

By the end of 2017, we anticipate that *over 90%* of the Fortune 500 will have dedicated digital transformation/innovation teams. More importantly, as we already predicted, this trend will spread out to many more enterprises, as over 70% of Global 500 (G500) enterprises will do so.

IT and Business Impact

- **DX developer teams are growing faster:** As we noted in last year's IDC FutureScape for the IT industry, enterprises' capacity to innovate for the rising DX economy is gated by the size and skill of these "DX developer" teams. By 2018, enterprises pursuing DX strategies will expand their developer teams by two to three times. This is an increase from our prediction last year that DX developer teams would double by 2018 – this phenomenon is accelerating.

- **DX developers' innovations will dwarf the traditional software industry's:** By 2019, more than 50% of the value of software will be monetized through "things" and consumer and business services — most of that emanating from developers outside the traditional software/IT industry.

- **The pace of software-based innovation will speed up:** By 2018, enterprises that embrace DevOps processes and enabling technology (and DX developer teams are leading the shift to DevOps) will increase the number of annual application code releases by 50% – often moving from quarterly or semiannual releases to monthly or even weekly or daily deployments.

- **Open source communities are key:** By 2020, DX teams will source 80%+ of their solution components from open source communities.

Guidance

- Make hiring talented DX developers a top business priority immediately. But as we noted last year, it will be equally important for enterprises to *phase out* as much non-differentiating software development as possible – by embracing more standardized SaaS offerings and by externally sourcing developer services.

- Within 6-12 months, evaluate current and planned use of DevOps open source technologies and consider how to best support these environments at scale. Evaluate the cost, security, and reliability of running internally supported community open source code, commercially supported vendor open source solutions, or hosted or public cloud SaaS and PaaS offerings that leverage open source.

- Bridge DX developer teams with the enterprise's broader IT management world – this should be a top priority for CIOs and their senior managers. Two-way exchange of skills and resources will be critically important as enterprises become "digital natives." DX teams are getting funding for 3rd Platform technologies and skills – critically important for the IT organization as well. And DX teams need to be integral players in the enterprisewide technology community, around issues of information management/governance, security, core infrastructure, vendor management, and so forth.

For more information about IDC's developer predictions, check out *IDC FutureScape: Worldwide Enterprise Infrastructure 2017 Predictions* (IDC #US40775516, November 2016).

Prediction 8: Here Comes the DX Channel — By 2020, Over 70% of Cloud Services Providers' Cloud Revenue Will Be Mediated by Channel Partners/Brokers

With the rise of the cloud, many declared the death of the IT channel community. IaaS eliminated a lot of the need for partners to help enterprises install servers, and SaaS reduced the need for partners to

install and customize packaged software. But, as seen previously, we predict the opposite: "The channel is dead, long live the channel!"

As enterprises' use of the cloud becomes more complex – more SaaS providers, more integration required across clouds, a flood of data that needs management across clouds, a wider range of use cases (including many industry-specialized offerings) – major cloud services providers are discovering what their predecessors learned: They need lots of help reaching, selling, and supporting the widening variety of cloud users and uses.

The biggest challenge has been that traditional channel players have been slow to develop cloud skills and to adopt cloud-oriented business practices (e.g., subscription model). And while new-generation channel players have risen, they are relatively small and there have been too few to match the market need.

Over the next three years, this will all change, as the "DX channel" finally emerges to bridge the implementation and value gap between major IT suppliers and enterprises.

IT and Business Impact

- **The traditional IT channel is transforming:** By 2018, major IT distributors will have transitioned at least one-third of their business from hardware sales to cloud services sales/brokering.
- **Cloud competitors will become partners/brokers:** By 2018, most cloud SPs outside of the top 10 will offer brokered access to their leading competitors' cloud services.
- **The DX channel will be industry specialized:** By 2020, the "cloud broker" landscape serving SMBs will become highly verticalized, offering cloud-based business services.

Guidance

- Assess your current ensemble of channel services providers – consultants, integrators, resellers, brokers, managed services providers, et al. Are they among the traditional players that will successfully transition to the 3rd Platform and DX world?
- There will be a large number of new services providers emerging – ones that are cloud centric, analytics/AI skilled, customer engagement focused and, increasingly, experts in your industry. Understand who the rising stars are in this community – your success will be accelerated with the right partner choices.

For more information about IDC's channel predictions, check out *IDC FutureScape: Worldwide SMB 2017 Predictions* (IDC #US41863516, November 2016).

Prediction 9: DX Benchmarks Define New Leaders — By 2020, All Enterprises' Performance Will Be Measured by a Demanding New Set of DX-Driven Benchmarks, Requiring 20-100% Better Business Performance

Competing and thriving in the DX economy will demand improvements in performance in all aspects of the enterprise, including leadership, revenue growth, customer engagement, operational efficiency, and workforce agility.

These performance levels – inspired by "digital native" organizations – will be the new normal for all organizations: Organizations that haven't transformed through leverage of 3rd Platform technologies will be unable to compete. This means that *every* enterprise – in effect – must think and operate like a digital-native organization.

Not surprisingly, we expect at least one-third of every industry's top 20 companies will fail to reach these new benchmark levels.

IT and Business Impact

- **Leadership:** 33% of CEOs will have technology leadership experience (see Prediction 1).
- **Growth:** Revenue grows 100% from information-based (digital) products (see Prediction 1).
- **Customer engagement:** The Net Promoter Score will improve 35% as customers own their own experience (i.e., are provided personalization of offerings and interactions).
- **Operational efficiency:** Through leverage of IoT and cognitive/AI, 20% of operational processes will be self-healing.
- **Workforce agility:** Enterprises with advanced DX maturity will execute 50% reductions in management layers.

Guidance

- As noted previously, digital transformation efforts over the next several years need to move beyond "initiatives" into the core of what enterprises offer, how they operate, and how employees and executives think. All enterprises will need to become "digital natives," regardless of their longevity and market position.
- CXOs must identify and communicate the most critical digital-native benchmark goals for all portions of their enterprise, including development, production/operations, sales, marketing, customer support, *and* IT.
- Executives should select technology partners that bring both 3rd Platform technology skills and experience applying them in the use cases that align with their DX benchmark goals.

For more information about IDC's digital transformation predictions, check out *IDC FutureScape: Worldwide Digital Transformation 2017 Predictions* (IDC #US40526216, November 2016).

Prediction 10: 4th Platform on the Horizon — By 2020, One-Third of Health/Life Sciences and CP Companies Will Begin to Develop the First Products and Services Tightly Integrating 3rd Platform Technologies with the Human Body; "Augmented Humanity" Offerings Will Be Mainstream in the Mid-2020s

As the IT industry has progressed from the 1st Platform to the 2nd and 3rd Platforms, technology has steadily come into closer and closer proximity to many more people, become cheaper and easier to use, and has — consequently — opened up orders of magnitude more apps and use cases.

The next major milestone in IT — the 4th Platform — will be defined by the ultimate step in proximity: the penetration of the human body and the integration of digital technologies with human biosystems, as well as the use of digital technologies to engineer biological systems at the cellular and subcellular level. This means, in many respects, that the 4th Platform is *us!*

The broad mission for 4th Platform solutions will be "augmented humanity" — fusing information technology and biological systems to provide humans with a wide variety of enhancements, including:

- **Augmented sensing:** Improvement/restoration of vision, hearing, and other senses
- **Augmented memory and cognition:** Restoration of cognitive/memory function
- **Augmented biostructure:** Tissue, organ, and skeletal repair/replacement
- **Augmented mobility**: Next-generation prostheses

- **Augmented immunity:** Repairing/immunizing biosystems from disease

Some early stage efforts are already being pursued in all of these areas. One key project is DARPA's Neural Engineering System Design (NESD) program, kicked off earlier this year, with a goal of producing a high-bandwidth, implantable direct neural interface in four years — allowing 10,000 times the current rate of digital-neural information transmission. There are also many projects underway in the world of synthetic biology, designing/constructing new biological entities (or repairing existing ones).

It's important to note that, unlike prior platform transitions, the 4th Platform will not obsolete the 3rd Platform — it will be built on 3rd Platform technologies like cloud, cognitive/AI, IoT, and 3D printing.

IT and Business Impact

- **The 4th Platform will *fully* roll out over the next 10 years.** The 4th Platform encompasses a very broad variety of discovery and development efforts and is therefore hard to generalize about. However, here is our "general" take on what the rollout and adoption time frame will look like (using Geoffrey Moore's *Crossing the Chasm* framework):
    - **R&D/Innovators stage**: Now–2021 (almost no commercial offerings; leaders are researching, perhaps using early/prototype technologies and solutions in-house)
    - **Early Adopters stage**: 2021-2026 (first widespread availability of commercial offerings; adoption ramps up slowly, with most advanced/aggressive enterprises leading the way)
    - **Early Mainstream stage**: 2026 and later (adoption becoming widespread across many enterprises, consumers, and use cases; laggards hang back)
- **The next four years are the "proto" period — time to start paying attention**. This "proto" period in the 4th Platform era is much like the pre-3rd Platform period of 1999-2005. In that period, we saw unintegrated ingredients and precursors of the 3rd Platform like virtualization, web APIs, application service providers (ASPs), and BlackBerry "pre-smartphones."
- **Ethical and legal issues will come hand in glove with the 4th Platform**. No surprise here: Technologies that so profoundly impact human health and performance will create a lot of controversy and debate, for good reasons.

Guidance

- All enterprises should reflect on the past 17 years, asking: What would we have done differently in the 3rd Platform era if we'd been paying attention in 1999-2005 and anticipated the huge disruptions and opportunities on the horizon (cloud, mobile, big data, social, etc.)? For almost every honest executive, the answer would most certainly be: "We would have done more, sooner, to position for the changing marketplace."
- In 2017, health/life science and consumer product (CP) leaders should be "leaning in" — exploring the "proto" 4th Platform landscape emerging in their industries and explicitly envisioning their own strategies, roles, and offerings.
- In 2017-2018, enterprises in *other* industries (e.g., entertainment, transportation, and government) should "pay attention" and initiate some early thinking about how the merging of IT and consumers' biosystems could impact strategies and offerings.

Where Our Predictions Lead: Building an "Innovation Graph"

Putting all these trends together leads to the most important takeaway in this year's IDC FutureScape: As the DX economy expands, enterprises will be required to measure up to a whole new set of demanding performance benchmarks – in leadership, innovation, customer engagement, operating efficiency, and agility – enabled by cloud, mobility, cognitive/AI, IoT, AR/VR, and the digital transformations fueled by these technologies. In other words, aggressively pursuing digital transformation efforts over the next four years is going to be required to simply keep up with the pack!

Over the next several years, enterprises that now consider themselves "digital immigrants" — with DX efforts that are "projects," "initiatives," or new business units – must transform themselves into "digital natives," with 50% or more of their business (and much of their growth) driven by digitally enhanced offerings, business models, and relationships/networks.

To reach that goal, enterprises' strategic vision – and the execution of that vision – must be centered on a DX economy in which transformation is continuous, enabled by continuous innovation.

To support massive-scale, continuous innovation, traditional "supply chain"/"distribution network"/"value chain" models – which will look hopelessly quaint and undersized in the massive-scale DX economy – must be transformed into, effectively, an enterprise social network optimized for continuous, rapid, and massive-scale innovation development, distribution, and support (see Figure 3). We call this new model the enterprise's "innovation graph": linking the digital enterprise to very large communities of developers, data providers, tech megaplatforms (i.e., major cloud IaaS/PaaS players), industry collaborative platforms, an emerging community of DX channel players and, of course, customers, fans, and future customers/fans.

You may remember that last year we predicted that, by 2020, enterprises pursuing DX initiatives would dramatically scale up their supply chains (by 100- to 1,000-fold) and their customer engagements (by 1,000- to 10,000-fold). Building an innovation graph – built around digital services APIs – is *how* they're doing that. (Stay tuned: We'll be continuing the conversation about enterprises building their innovation graphs in the coming year.)

FIGURE 3

Competing in the DX Economy Requires Building an "Innovation Graph"
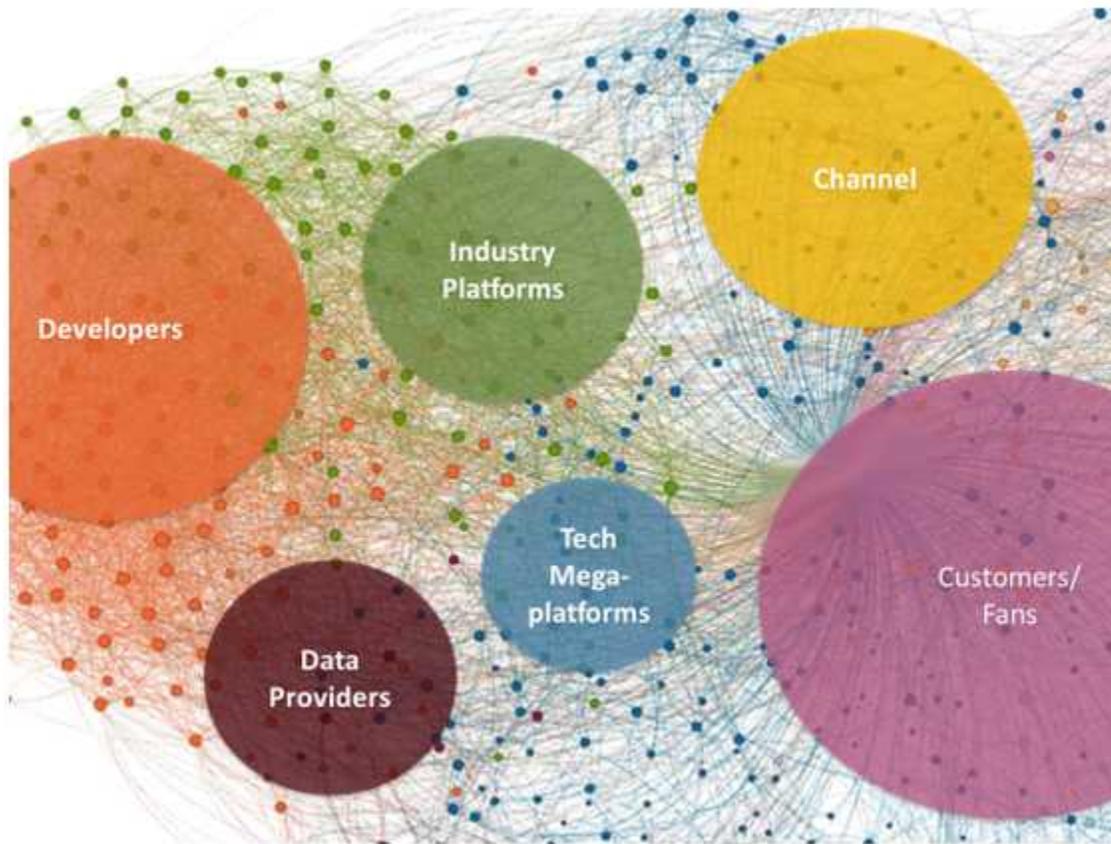
Source: IDC, 2016

EXTERNAL DRIVERS: DETAIL

As noted previously, many external factors have a direct or an indirect impact on the future of the IT industry. They come from business, social, economic, technological, environmental, legal, and political realms. IDC has identified 12 factors affecting the future of the IT industry and the organizations that use IT for competitive advantage and has described them in *Critical External Drivers Shaping Global IT and Business Planning* (IDC #US41607816, July 2016).

Summaries of the 6 of these drivers that form the most significant environmental backdrop for this IDC FutureScape are provided in the sections that follow.

DX: Technology-Centric Transformation Altering Business and Society

Description: DX refers to the application of digital technologies to fundamentally impact all aspects of business and society as a whole. DX has become the source of innovation and creativity for new business models, enhanced experiences, and improved financial performance.

Context: Every business of every size risks fundamental disruption because of new technologies, new players, new ecosystems, and new ways of doing business. Most businesses are beginning to invest in digital transformation. IDC predicts worldwide spending on digital transformation technologies will expand at a compound annual growth rate (CAGR) of 16.8% through 2019 to more than $2.1 trillion.

Everything, Everywhere: The Rise of Computer-Based Intelligence

Description: Cognitive advances – combined with robotics, IoT, artificial intelligence, augmented reality/virtual reality, machine intelligence, and massive data sets – increase the ability of systems to mimic and enhance human intelligence in real time. Interacting with intelligent interfaces in an omni-experience lifestyle environment has become as normal as interacting with real people. Yet not all is rosy. Disruptions to life as we know it may range from employment and safety to quality and productivity.

Context: The intelligence of technology – Cyber IQ – continues to improve, giving rise to entirely new product categories and even new industries. The convergence of these technologies is expanding applications, business and operating models, and opportunities. Business leaders must understand and capitalize on the opportunities presented. But this is not enough; they must also evaluate their existing products and services to mitigate vulnerabilities in light of competition.

Platform Economy: The Ecosystem Battle for Scale

Description: The "platform" is the new battleground for innovation, developers, and marketplaces. Powerful network effects continue to entrench and extend reach. Market consolidation limits choices but increases the power to consumers as a critical mass of partners, customers, and solutions converges around a select constellation of platforms. Competition is increasingly based on "winner takes most" platform-based communities and ecosystems – operating across borders and continents.

Context: Platforms have long played a key role in the IT industry. We are entering a platform economy – one in which tools and frameworks based upon the power of information and ubiquitous access will frame and channel our economic and social lives. With the transition to innovation and cloud platforms, new integration, security, infrastructure, training, skills, and compliance requirements will emerge.

Shifting Economics: Data as Digital Capital

Description: The intrinsic economic basis of the physical marketplace is scarcity. However, we increasingly live in a digital world – a domain where "scarcity" is being replaced by "abundance." IDC reports that less than 10% of data is effectively used. Collecting more data does not represent value. The more often a digital asset is "used" to improve experience, provide insight, influence decisions, and set directions, the more valuable it becomes.

Context: This shift is redefining our underlying economic assumptions; for example, return on investment (ROI) is no longer an adequate measure of value in a world of plenty. Return on assets (ROA) will become equally important, or perhaps more so, as it is extended to intangible assets, particularly information, leading to new business models and information transformation and valuation.

Materialization: Revolutionizing Industrial and Commercial Processes

Description: The world has shifted from digitizing the material world to digital technologies being able to materialize in the physical. IoT, robotics, and 3D printing are rapidly becoming mainstream technologies in industrial and commercial applications. Continuous sensing capabilities of IoT enable monitoring, management, and improvement of industrial processes that are being extended with

robotics and 3D printing. Combined with collective learning, these technologies are transforming the productivity, quality, and efficiency of industrial and commercial applications.

Context: IDC forecasts that, by 2025, 80 billion IoT devices will be online, creating 180ZB of data. Worldwide spending on robotics in 2019 will reach $135 billion, and spending on cognitive systems will soar to more than $31 billion. This has the potential to revolutionize industrial and commercial processes. Already today, UPS has started an on-demand manufacturing network to 3D print and distribute orders worldwide.

DX Delta: Industry Leaders Widen Performance Gap

Description: The best performing companies are pulling away from the rest, creating a bifurcated and unequal landscape where a few firms exhibit high productivity and profits. Digitalized sectors are the most profitable as firms adopt new technologies, deliver winning products and services more efficiently, and then protect their status through mergers, acquisitions, and lobbying.

Context: The gap is widening between the thriving companies — the best performers, leveraging their capabilities to create new digital products and services, expand digital ecosystems, and foster digitally savvy workforces — and the rest. While thrivers experience double-digit growth in productivity, market share, and revenue, others are flat or declining. This disparity will continue as the thrivers keep innovating and transforming how they operate.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

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