White Paper

Unlocking the Economic Impact of Digital Transformation in Asia Pacific

Sponsored by: Microsoft

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November 2018

IN THIS WHITE PAPER

This white paper aims to shed light on the tangible and intangible impact of digital transformation (DX) on Asia Pacific's businesses, economies, and societies. In this joint study by IDC and Microsoft, we also studied the challenges and traits that set DX leaders apart from the rest, with the aim of helping organizations realize the full benefits of DX. As data is the key to unlocking the potential of DX, we looked at the ways in which organizations currently leverage data. More specifically, how far they have gone in terms of introducing new key performance indicators (KPIs) to measure their digital businesses and technology investment choices. Conducted across 15 Asia Pacific countries, the survey covered 1,560 business and IT decision makers across education, financial services, government, healthcare, manufacturing, and retail.

EXECUTIVE SUMMARY

DX is no longer something to consider for organizations in Asia Pacific – it is happening. Organizations have responded to increasing pace of change and disruption through digitalization. In Asia Pacific, accelerating DX is marked by enterprises' increasing initiatives to digitalize operations, empower employees, improve productivity, and engage customers. These initiatives are laying the groundwork for organizations to innovate their business models and to derive new revenue streams through digital products and services.

The collective impact of these efforts is culminating into Asia Pacific's digital economy. IDC expects that by 2021, 60% of the region's GDP will be derived from digital products or services created through DX. Over the same period, DX will add 0.8% annually to Asia Pacific's GDP, or US$1.16 trillion by 2021.

AT A GLANCE

KEY STATS

By 2021, 60% of Asia Pacific's GDP will be derived from digital products or services created through DX. Over the same period, DX will add 0.8% annually to the region's GDP, or US$1.16 trillion by 2021.

WHAT'S IMPORTANT

The extrapolation of DX's impact at the macroeconomic level provides policy makers, business and IT leaders the frame to view the extent and speed in which digital technologies are impacting countries and markets.

November 2018, IDC #AP40434316

Our study shows that 85% of Asia Pacific organizations surveyed in 2017 have embarked on their DX journeys. Whilst majority of these are still in early stages of DX, these organizations have experienced significant benefits in productivity, profit margins, cost reductions, customer loyalty, and revenue growth of up to 17%. By 2020, further improvements of close to 50% are expected, and these will accelerate growth of the digital economy even further as DX efforts scale across organizations.

Yet, benefits of DX are not evenly accrued to all who have embraced it – leaders in transformation are expected to gain the lion's share of the economic opportunities. In fact, only 7% of Asia Pacific organizations surveyed can be classified as Digital Leaders. The study shows that Digital Leaders experienced double the benefits of Digital Followers, and these improvements will be more pronounced by 2020. The study identified five organizational traits in what set the leaders apart from the others:

Digital Leaders experienced double the benefits of Digital Followers, and these improvements will be more pronounced by 2020

- Less risk-adverse culture and higher adaptability to change.
- Self-organizing teams with greater collaboration and agility.
- Greater organization-wide alignment in strategies and metrics.
- Identified DX leadership and structure.
- Dedicated DX budget.

Collectively, these traits represent an embedded "digital mindset" in leading organizations which enables them to reap greater benefits.

In the digital economy, data is the key to unlock the DX potential. To this end, our findings show that Digital Leaders are ahead of the pack in terms of data capitalization efforts. For example, leaders are more likely to use data-related metrics and KPIs to measure their success, as well as prioritize investments in key technologies like big data analytics (BDA), artificial intelligence (AI), cognitive and robotics technologies. Beyond business benefits, DX is also expected to bring about societal benefits. These include potential increase to personal income, creation of higher value jobs, increased educational and training opportunities, and smarter and more efficient cities. In terms of labor market development, accelerating DX initiatives are driving the changing nature of jobs. Respondents expect 86% of jobs will be transformed in three years, and half of the jobs in the market today will be redeployed to higher value roles, or workers will be reskilled to meet the needs of the digital age. While 27% of jobs are expected to be outsourced or automated, these will be mitigated by 26% of new jobs created.

This report elaborates on the projected economic impact of DX on the Asia Pacific's economy, organizations, and society. More importantly, we look at Digital Leaders' success factors to help organizations in accelerating enterprise-wide digital mindset to unlock the full potential of DX.

ECONOMIC IMPACT OF DX ON ASIA PACIFIC

IDC defines digital transformation as the application of 3rd Platform-related technologies to fundamentally change the way something is done in the organization, generally with a design-led approach to business process redesign. 3rd Platform technologies are the technology enablers that allow businesses to accelerate their DX. At the core are the four pillar technology areas: big data and analytics (BDA), cloud, mobile, and social. These technologies are the foundational elements in a

digital enterprise that can disrupt the market and successfully adapt to a new digital economy. Coupled with Innovation Accelerators (IAs) such as AI, Internet of Things (IoT), and robotics, these technologies can aggressively propel growth and are necessary to bind organizations' strategic and tactical elements together to deliver enhanced digital experiences.

DX is about reimagining how organizations bring together people, data, and processes to create value for their customers and maintain a competitive advantage in a digital-first world. As DX takes root in the Asia Pacific region, we are seeing business and government leaders grapple with the rapid changes brought about by related initiatives.

The Macro and Micro Economic Impact of DX in the Asia Pacific

With challenges ranging from an aging population, rapid urbanization, and maintaining international competitiveness, several countries in the Asia Pacific have launched smart nation initiatives. For example, Singapore is ranked as one of the world's leading Smart Cities through its "Smart Nation" initiative. Its lead implementation agency, Government Technology Agency (GovTech), reports into the Prime Minister's Office (PMO) and is tasked to provide a resilient and scalable infrastructure and systems for timely information collection and transmission across the country. Initiatives range from remote elderly healthcare services, public safety smart video surveillance, and smart connected traffic solutions. Countries like China, Japan, South Korea, Malaysia, Thailand, India, and Indonesia have also launched similar national programs. Alongside private efforts, these top-down driven programs are catalyzing the acceleration of the digital economy.

The extrapolation of DX's impact at the macroeconomic level provides policy makers, business and IT leaders the frame to view the extent and speed in which digital technologies are impacting countries and markets. To this end, we developed a projection model based on publicly available economic data, in-house research data, as well as data from the study in which respondents provided insights on their current DX initiatives and the impact that these have had on their top and bottom lines. The model provides two key levels of insights:

- Micro-economic impact: The growth impact experienced today and expected in three years, by companies undergoing DX.
- Macroeconomic impact: The wider impact aggregated at national and regional levels, based on the percentage of companies currently undergoing DX and forecasted penetration by 2021.

At the micro level, 3rd Platform technologies such as cloud, mobile, social and BDA have enabled opportunities to streamline business operations, empower employees, engage customers, and drive productivity improvements. The increasing adoption of AI in various industries are setting the foundation today for further growth by catalyzing data-driven engagements, insights and efficiencies across businesses.

The continuation of DX efforts is also leading to the transformation of business models, which will drive new consumption patterns and socio-economic structures. At the aggregate level, the model postulates how the economic impact of DX will manifest in two ways:

- Digitalization of existing products and services.
- Growth in new digital products and services; evolving traditional business models.

Digitalization of Traditional Products and Services

One of the outcomes of DX is the transfer of current business and consumption models into digitally-enabled ones. Not all digital products will be net new products, as many of these products will be converted from non-digital offerings. For example, while ride-hailing has grown fast in the region, a majority of this spending is a transfer from other forms of public transportation available.

The majority of DX initiatives today aimed at productivity improvements are also setting the stage for growth in digital revenues. For example, a restaurant investing in mobility solutions using tablets to take orders will result in manpower costs savings only. However, by 2021, these digital orders will be used to drive AI predictions and optimize value-chain activities. The cook will still cook the meal but may be assisted by robots. Orders may be predicted by AI with the high precision based on historical data, seasonality, and weather information, and the meal may be delivered by drones, or autonomous vehicles. A business, in this case, becomes highly dependent on digital technology, and such transformation can then be regarded as contribution to digital revenues.

At a broader economic level, while consumption in the aforementioned example may remain the same, it has shifted from traditional means into a digitally-enabled one.

These changes are not limited to consumer-facing activities but will extend upstream in value chains impacting B2B processes. Leading digital native enterprises (DNEs) are driving the move in this direction. For example, Snapbizz, a Bangalore-based start-up aims to empower traditional "Kirana" stores with technology by onboarding them on a cloud connected platform to drive digital inclusion and transform them into a virtual supermarket. Snapbizz is revamping how these shops operate by interjecting modern analytics to improve, streamline and automate operations that have long relied on manual labor and intuition.

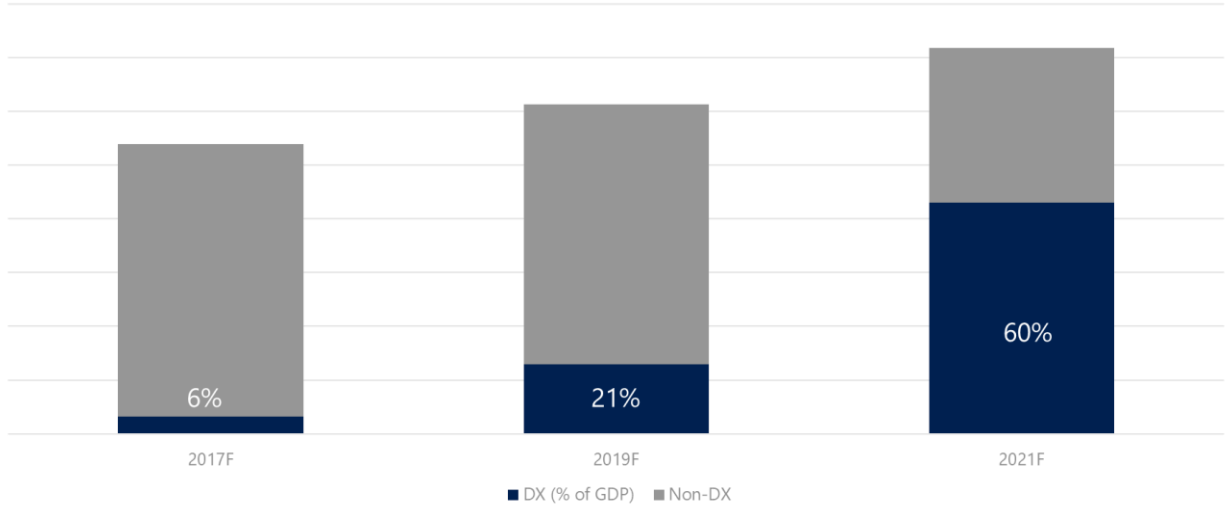
By 2021, we expect the DX momentum to accelerate rapidly with more companies investing in BDA, AI, IoT and other DX enablers. This will result in the digitalization of approximately 60% of Asia Pacific GDP, with economic activities in every industry driven by digitally-enhanced products/services, operations and ecosystems (see Figure 1). As much as two-thirds of the service industry, and half of manufacturing sectors' economic activities will be enabled by digital technologies.

IDC predicts that by 2019, 40% of DX initiatives will be supported by AI/cognitive capabilities[1] providing timely, critical insights for new operating and monetization models in Asia Pacific (excluding Japan). AI/cognitive investments continue to grow in the Asia Pacific. Many of these technology investments are to enable DX efforts based on the premise of comprehensive awareness, human decision maker augmentation, and machine decision-making automation. Harnessing data with AI is key for the enablement of the new digital operating models in which value is created from data and insights and realized with competitive monetization models.

[1] IDC, IDC FutureScape: Digital Transformation 2018 Predictions – Asia/Pacific (Excluding Japan) Implications

FIGURE 1

Asia Pacific's DX-driven GDP Projection



Source: IDC, 2018

Growth in New Digital Products and Services

Beyond the transfer of economic activities into digitally-enabled ones, DX also drives opportunities to create new revenue streams through digital products and services, and new business models. Leveraging data in new ways, either by augmenting products and services, or by directly using data as a capital asset (i.e. data monetization) are means to generate new revenue streams.

The convergence of the following factors are key driving forces:

- Proliferation of new digital touchpoints and endpoints including home-based, or factory-based IoT devices, and biometric-based interfaces such as voice.
- Increasing commercial applications of BDA and AI across multiple domains, including healthcare and financial services.
- Growth of connected business ecosystems across verticals in which products and services are complementary to each other.
- Shortening of application development lifecycles through agile development, and software reuse through PaaS and open APIs.

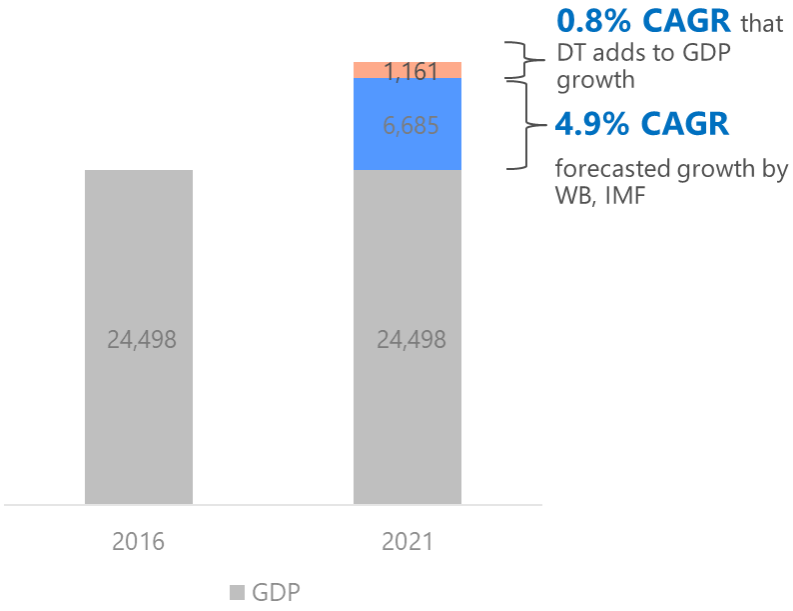
The confluence of these macro forces catalyzes the emergence of new digital products, services and business models. For example, South Korea's 365mc Hospital Group is at the forefront of adjusting processes and goals in response to the needs of the market, including exploring AI for cosmetic surgery for improved patient outcomes and successful surgery. By hooking up surgical instruments with motion sensors that are connected to AI, the hospital not only transformed how its surgeons operate, it has changed its business model as well. 365mc plans to sell its Motion capture and Artificial Intelligence assisted Liposuction (M.A.I.L) system to assist other hospitals with liposuction surgery as well as benefit other types of surgery like endoscopy and colonoscopy.

To this point, the IDC study shows that 24% of DX organizations experienced a 15% increase in revenue through new products and services in 2017, and they expect further improvements to 24% by

2020. Extrapolating these results into the economy and taking into account DX penetration in each country, we estimate DX's incremental impact on the Asia Pacific's economy to be an additional $1.16 trillion, or 0.8% incremental CAGR growth (see Figure 2).

FIGURE 2

DX Impact on Asia Pacific Countries' GDP (US$ billion)



Source: IDC, 2018

DX IMPACT ON BUSINESSES

The macroeconomic impact of DX underscores the impetus of all organizations to accelerate its DX efforts as organizations slow to adopt DX will compete for an increasingly smaller piece of the economic pie. Every growing enterprise must embrace "digital" in the way its executives and employees think and how they act, to challenge digital disruptions and become successful players in the DX economy.

In this section, we look at how organizations are embracing DX, and how they can advance further by emulating leading organizations on their DX journeys.

Top Benefits of DX

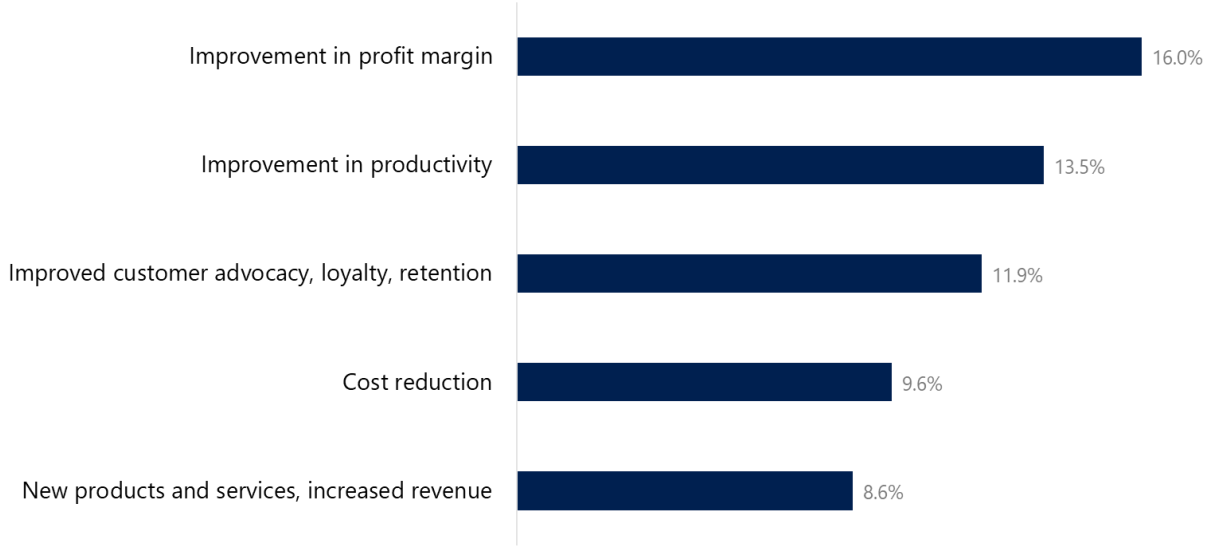
The number 1 priority for DX in 2018 is improving productivity and profitability. The results of the study (see Figure 3) are in line with other IDC research which show that organizations are focused on getting more with less. This trend of increasing investment in DX technologies, particularly those that help with “intelligent automation” like AI, cognitive and robotics, is notably in manufacturing and retail (which represent a high proportion of 39% and 15% of respondents, respectively) which focus on inventory, order management, fulfilment, and just-in-time production.

Organizations also experienced material improvements in generating revenues from new products and services, as well as customer loyalty and retention. These lay down a solid foundation for longer-term growth.

FIGURE 3

Top Benefits of DX

Q: What are the top 3 benefits that your organization has observed from its current DX initiatives? Please indicate the degree of improvement for these three.



All respondents (n=1315), excluding those who indicated "no strategy but plans to build one"

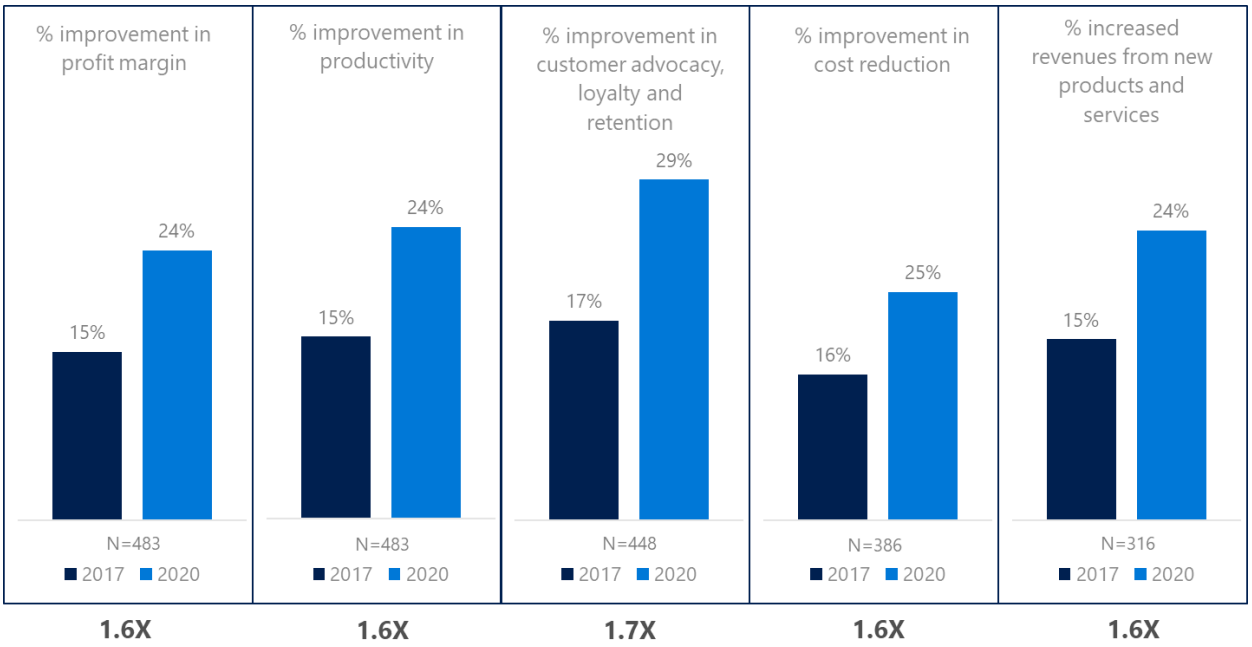
Source: IDC, 2018

In 2017, all organizations that have already embarked on their DX journeys experienced tangible improvements from their DX initiatives in the range of 15% to 17%. These benefits will grow by 50% or more in three years (see Figure 4).

FIGURE 4

Top 5 Benefits: Improvements Now and by 2020

Q: *What are the top 3 benefits that your organization has observed from its current DX initiatives? Please indicate the degree of improvement for these three.*



Base: Respondent counts vary across all options as this is a top 3 question, so not all benefits are chosen by all respondents.

Source: IDC, 2018

Digital Leaders Reap the Highest DX Improvements

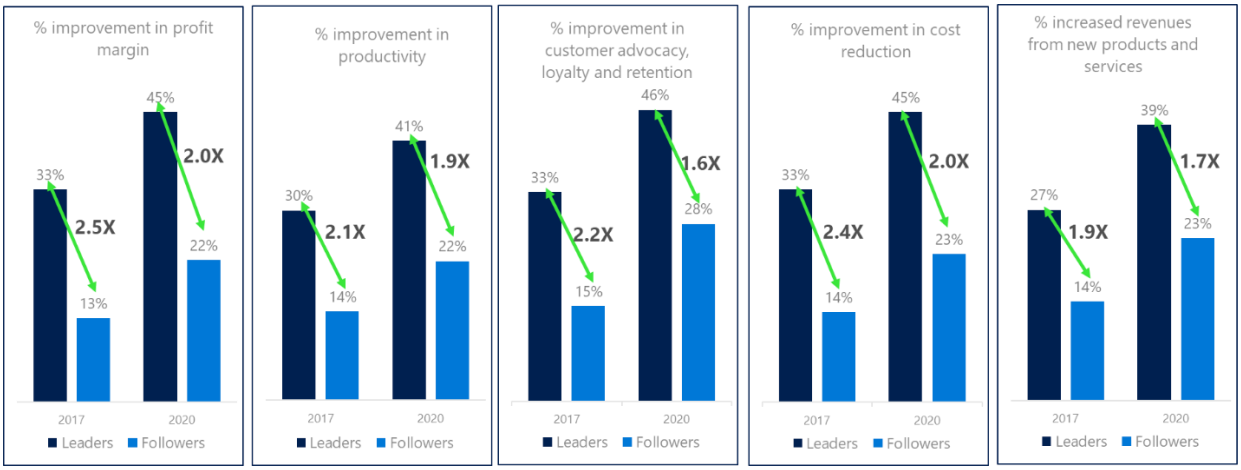
IDC defines two groups of organizations according to their DX journeys – Digital Leaders and Digital Followers. Seven percent of organizations surveyed are classified as Digital Leaders. These are organizations that have a full or progressing strategy, which on average generate one-third of their income from digital and have experienced 20-30% improvement in their business processes. While Digital Followers have progressing, limited, or no DX strategy in place, they have on average derived less than one-fifth of their income from digital and about 15-20% improvements from DX.

Based on this classification, we observed that **Digital Leaders experience double the benefits of Digital Followers**, and these improvements will be more pronounced by 2020 (see Figure 5). While their priorities, challenges and metrics may be similar, they obtain better returns from their efforts. Leaders have a clearer holistic vision, a full/progressing strategy and achieve higher returns from their DX projects. Leaders are also able to track and measure their DX progress better as they are more likely to use DX-related KPIs or a balanced scorecard, and their enhanced visibility into their ecosystem.

FIGURE 5

Digital Leaders Experience Double the Benefits of Followers

Q: What are the top 3 benefits that your organization has observed from its current DX initiatives? Please indicate the degree of improvement for these three.



Base: respondent counts vary across all options as this is a top 3 question, so not all benefits are chosen by all respondents.

Source: IDC, 2018

DX Leaders Capitalize More on Data

Leaders are ahead when it comes to data capitalization efforts. The amount of data that is available for organizations to harness is huge and growing. For organizations to win in the digital economy, they must be able to harness data in an agile and strategic manner. Broadly, this is a three-step process which ultimately points to the transformation of the business:

- **Step 1: Data analytics to improve decision making**. Putting in place a data strategy to manage structured and unstructured data, and harnessing BDA for informed and relevant decisions.
- **Step 2: Optimization of existing products and services**. Leveraging data, organizations can optimize their processes that lead into improved experiences, as well as create better products and services.
- **Step 3: Creation of new business models**. Ultimately, data should be used to create new value chains, and products and services that differ fundamentally in how value is delivered and monetized today.

Leaders are ahead in using data as a capital asset and tracking their progress by the corresponding KPI. As shown in Figure 7, advanced organizations are better equipped to capitalize on its data assets. Organizations are increasing their focus on "all things data", and KPIs around this are being set to both justify investments in tools and track DX progress. Leaders are also more focused on data capitalization to drive their top line. Many of these organizations have already achieved the efficiencies required and are now focused on growth. On the other hand, Followers, are more focused on leveraging data to drive process efficiencies and improve bottom line.

From an investment perspective, Leaders are prioritizing their investments in BDA, AI/cognitive and robotics technologies. Organizations are becoming more comfortable with BDA and plan to use it to improve decision making and augment their visibility across customers, partners, and suppliers. Furthermore, as organizations develop their BDA capabilities, we expect investments in AI/cognitive to

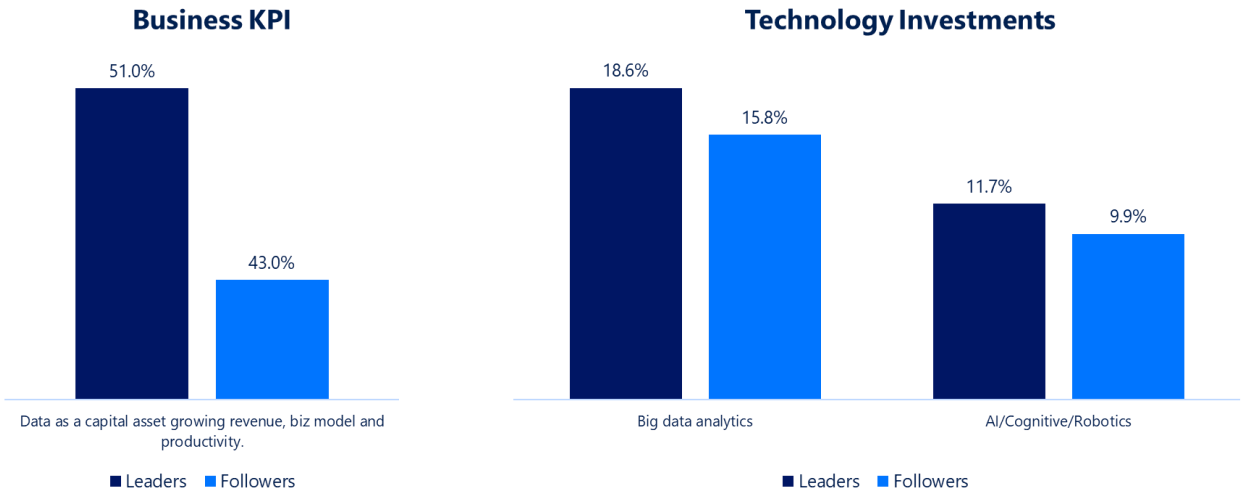
pick up as suggested by the 3-step process. So, we expect wider adoption of AI/cognitive technologies in the form of embedded capabilities within applications/systems to drive optimization in processes, products and services.

FIGURE 7

DX Leaders Capitalize More on Data

Q1. When measuring overall DX journey success, which of the following key performance indicators/metrics (KPIs) are you using? Please select all that apply.

Q2. Relating to the use of technology for your DX initiatives, which of the following digital technologies are your organization going to heavily invest on in 2018?



Base: All respondents (n=1560)

Note: Q1 relates to business KPIs. Q2 relates to DX technology investments.

Source: IDC, 2018

SOCIETAL BENEFITS OF DX

According to the business leaders surveyed, DX will bring about these top benefits to society:

- Smarter, safer and more efficient cities (14%).
- Creation of more higher value jobs (13%).
- Potential increment to personal income through freelance and digital work (12%).
- Increased educational and training opportunities (11%).

Acceleration of DX is also affecting the labor market as the nature of jobs will change. The study shows that 85% of jobs will be transformed in the next three years due to DX. Out of this, 59% of jobs will be redeployed to a new position and/or retrained and upskilled in support of organizations' DX efforts. While the remaining 27% of jobs are expected to be outsourced or automated, these will be mitigated by 26% of new jobs created.

HOW INDUSTRIES ARE CAPITALIZING ON THE DX OPPORTUNITIES

DX is about reimagining how organizations bring together people, data, and processes to create value for their customers, and maintain a competitive advantage in the digital economy. Technology is at the center of this transformation. Regardless of industries, every company must become a technology company. It is no longer just about procuring one solution and deploying it. It is about operating like a digital organization.

In this section, we look at how industries are adopting DX technologies, capitalizing on data, and embarking on transforming their business models.

Manufacturing

With every industrial revolution, the manufacturing sector has always been one of the industries to be impacted by change, and this time is no different. The segment is at a pivotal point in history challenged by escalating cost and intensifying competition, driving the need for manufacturing organizations to differentiate with new value propositions through business model innovations.

The IDC study finds that escalating costs of operations is the top concern among 15.5% of manufacturing C-suite executives. At the same time, 14% of respondents are concerned with developing new business models to grow the business, and 11.7% see the need to counter the growing number of competitors in the market.

A Balanced Approach Toward Sustainable Transformation

For Asian manufacturers, DX means moving the focus from process automation, optimization and productivity improvement efforts into "intelligent automation" and developing new business models to stay competitive. Looking at the top DX benefits now and in three years provides a picture of how manufacturing organizations are balancing between near- and long-term performance. Along with traditional manufacturing lean processes, three of the top 5 benefits relate to process optimization. These deliver immediate impact to bottom line performance driven by prior years' DX effort in process automation:

- Improvements in productivity: 15% improvements in 2017; expected to grow 1.4 times to 21% improvements by 2020.
- Improvements in profit margins: 13% improvements in 2017; expected to grow 1.6 times to 21% improvements by 2020.
- Improvements in cost reduction: 13% improvements in 2017; expected to grow 1.6 times to 21% by 2020.

While organizations have benefitted in productivity and cost reduction measures, there is a limit to these improvements without fundamental changes to the business. Two other top benefits show that organizations in this industry have started making strides in long-term transformation initiatives aimed at sustaining success:

- Increased revenues from new products and services: 16% improvements in 2017; expected to grow 1.4 times to 23% by 2020.
- Improvement in customer advocacy, loyalty and retention: 17% improvements in 2017; expected to grow 1.6 times to 28% by 2020.

Data Capitalization for Product and Business Model Innovations

Process efficiency and product/service innovation continue to be key priorities for most of manufacturing organizations, as the manufacturing sector is one that relies heavily on time-to-market strategies for first-mover advantage. However, as manufacturing organizations realize the value of data in the long term, they are likely to unlock the potential of DX in helping them create new business models. For example, data about equipment or vehicle usage, and real-time conditions can be used to drive predictive maintenance aiming for zero breakdowns. Further to this, AI application through autonomous vehicles such as pallet drones and forklifts can greatly increase accuracy and efficiency in warehouse, manufacturing plant and transportation operations.

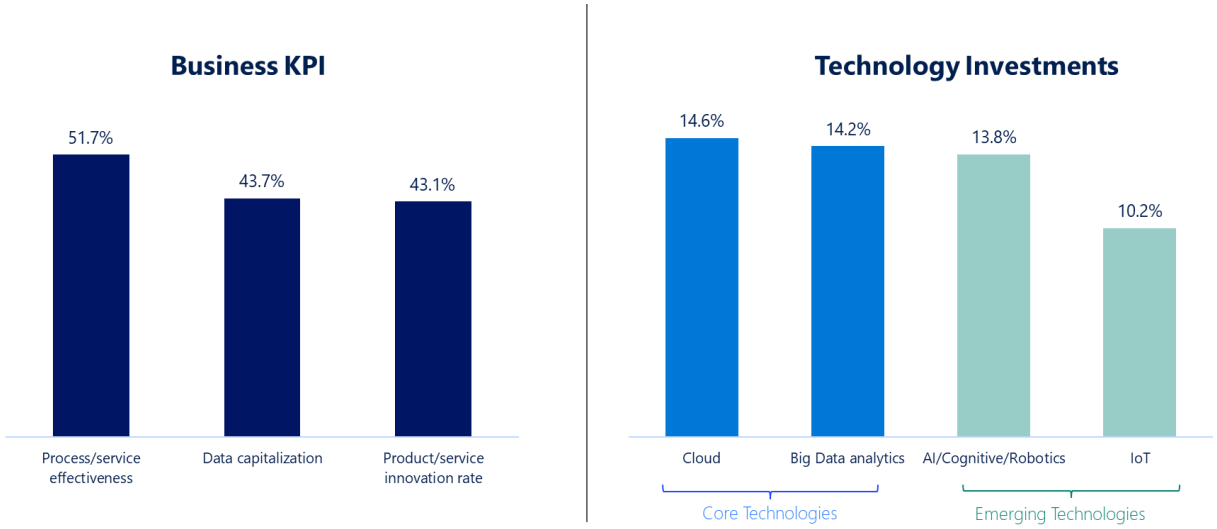
New KPIs such as data capitalization are also showing up, suggesting growing recognition of data as a capital asset (see Figure 8). This view is further supported by manufacturers' top core technology investments, with cloud and BDA. In emerging technologies, these organizations focus on building the foundation for AI/cognitive/robotics implementation, so it is no surprise that AI/cognitive/robotics and IoT are the leading areas in emerging technology space in terms of manufacturing organizations' technology investments in 2018.

FIGURE 8

How Manufacturing Is Using Data to Unlock DX Potential

Q1. When measuring overall DX journey success, which of the following key performance indicators/metrics (KPIs) are you using? Please select all that apply.

Q2. Relating to the use of technology for your DX initiatives, which of the following digital technologies are your organizations going to heavily invest on in 2018?



Base: All respondents (n=615)

Note: Q1 relates to business KPIs. Q2 relates to DX technology investments.

Source: IDC, 2018

DX to Develop New Business Models

To achieve lasting competitive advantage, the manufacturing sector must hasten its pace in DX to develop new business models. In comparing manufacturing leaders against the Digital Leaders from other industries, the sector lags in traits such as having a dedicated DX budget and a lower maturity in enterprise-wide collaboration and agility.

Manufacturers are also shifting their focus from process automation toward holistic enterprise-wide DX, aiming for "intelligent automation". Following the above-mentioned three-step process in leveraging data, manufacturers must mine data to ultimately create new business models. By doing the same thing differently, manufacturers can address escalating cost and differentiate themselves with new value propositions through business model innovations.

Retail

The retail industry is undergoing seismic shifts stoked by swift and unprecedented technology innovation. Disruptive shifts like the explosion of online and mobile shopping have thrust retailers, now competing in a global omnichannel marketplace, into a fierce battle for the ever-fragmenting wallet share — and mindshare — of consumers. This change presents both a challenge and an opportunity for retailers as they adapt to a shopping landscape being upended by a US$1.45 trillion Asia Pacific ecommerce market, growing at 27% per annum from 2013 to 2017.

Today, 46% of consumers are using retail mobile apps on a weekly basis; 60% of device interactions are passive, i.e., consumers accept information surfaced from intelligent systems and machine learning. By 2020, consumers are expected to interact with approximately 150 sensors-enabled devices. These shifts in how consumers interact digitally is rapidly changing how retailers sell. With information and price parity at consumers' fingertips, retailers must focus on customer-centricity — from selling goods, retailers must deliver new personalized shopping experiences — and data is the fuel to drive individualized experiences at scale. IDC estimates that retailers see an average of 30% more spend from an omnichannel shopper than a single channel one.

The fast-evolving retail landscape continues to pressure retailers with many forced to undergo store consolidations or closure. In fact, retailers' top business concerns relate to shifting consumer buying patterns and the growing number of competitors entering the market.

With cross-border ecommerce, competition is no longer just local, and one should not overlook ongoing global shifts in the retail landscape. For example, China benefits not only from the largest customer base, but also from the availability of precious data sets which allows much faster adoption of leading-edge AI technologies versus other geographical regions. Concurrently, European Union (EU)'s Global Data Privacy Regulation (GDPR) forces retailers doing business in EU to comply with strict guidelines related to data localization and portability. Coupled with increasing episodes of high-profile data leakages, these raise consumer awareness to privacy concerns and their rights to it — even in countries not protected by similar legislations. Against these macro trends, retailers must present value in exchange for consumer information at every stage of the customer journey, or risk having them drop off.

Retailers’ way forward lies with creating unique, and personalized shopping experiences whether online or new in-store experiences, as well as provide omnichannel touchpoints for their customer, whether the Internet, mobile, physical or virtual. A seamless and coherent omnichannel experience across touchpoints and channels is the first step toward personalized experiences.

Improving Customer Experience in the Near Term, but Sights Set on Customer Advocacy

As digital and physical shopping experiences continue to converge, retailers are focused on transforming their customer-facing operations. To this end, retailers' DX focus for 2018 reflects efforts to transform business processes in customer service and support (53.8%) and sales (49.6%), and 47.5% of retailers also see the need to focus on IT and data operations as the underlying technology foundation needed to support the business improvements required.

In terms of benefits, DX improves retailers' profits and revenues from new products and services by over 15%. More than one-fifth (21.4%) of retailers see profit margin improvements as one of the top benefits. DX initiatives have driven 16% improvements in profit margins in 2017 and is expected to grow 1.6 times to 26% improvements by 2020. Other benefits include customer advocacy; productivity and revenue from existing products and services. In 2017, these top 5 benefits saw improvements of between 11% and 16%.

The greatest improvement is observed in customer advocacy – 10% of retailers have realized 14% improvements in customer advocacy, loyalty and retention through their DX efforts. This is expected to increase by 1.9 times to 27% improvements by 2020. That said, compared to other benefits, customer advocacy metrics will take concerted efforts in the longer term to fully realize. Therefore, retailers must continue to work on improving customer experience from integrated experiences across various touchpoints or channels and creating differentiated shopping experiences driven by individualized customer insights.

Data-Driven Customer-Centricity: From Selling Goods to Personalized Shopping Experiences

Retail organizations hold a vast amount of interaction, transactional and customer data which reside in siloed systems of record, and marketing platforms proliferating within the company. Retailers must integrate all touchpoints and analytics toward a holistic single view of customers in better understanding their consumption preferences. At the same time, retailers must transform their physical stores by augmenting in-store services with customer insights to drive differentiated experiences.

As a result, the top 3 business metrics used by retailers indicates that nearly half of them are focused in this direction. Almost half (49.6%) of retailers are already using data capitalization related metrics, and another 47.1% are using customer advocacy metrics (see Figure 9).

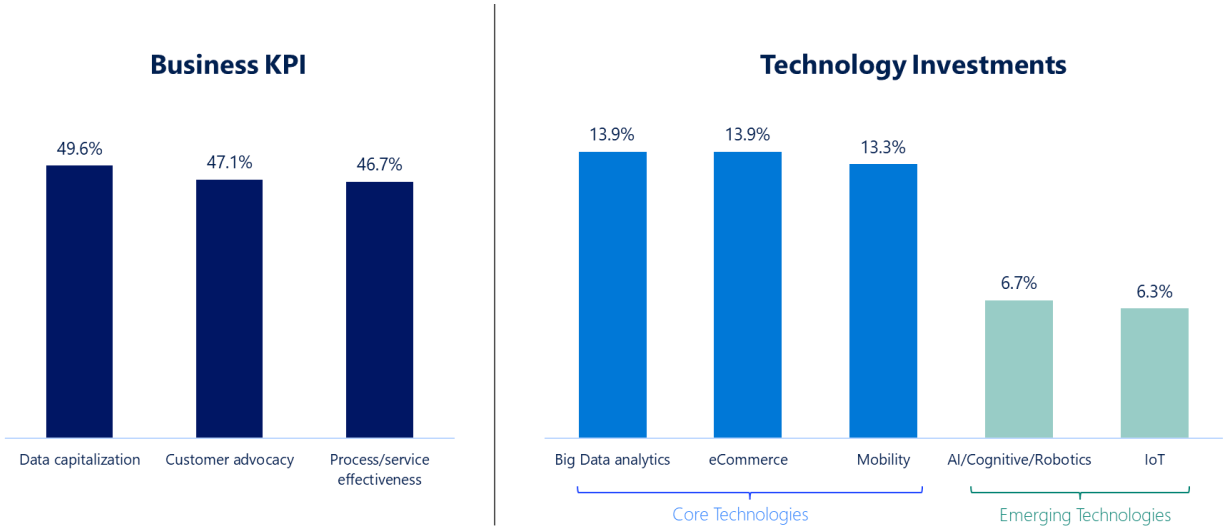
Retailers' main technology investments for 2018 support this direction as well. The top 3 core investment areas for 2018 are ecommerce and mobility for omnichannel enablement and BDA to drive customer insights, followed by AI/cognitive/robotics and IoT.

FIGURE 9

How Retailers Are Using Data to Unlock DX Potential

Q1. When measuring overall DX journey success, which of the following key performance indicators/metrics (KPIs) are you using? Please select all that apply.

Q2. Relating to the use of technology for your DX initiatives, which of the following digital technologies are your organizations going to heavily invest on in 2018?



Base: All respondents (n=240)

Note: Q1 relates to business KPIs. Q2 relates to DX technology investments.

Source: IDC, 2018

DX for Personalized Experiences

To address shifting consumer buying patterns and increasing number of competitors entering their market, retailers must shift their traditional focus from simply selling goods to creating differentiated experiences. In comparing retailers with a full DX strategy, and those with progressing, limited, or planning to rollout DX strategy, we see that 76% of retailers need to increase maturity in organizational behavior, align DX metrics, assign DX leadership and/or teams, and having a dedicated DX budget allocated. Without improvements in these areas, customer experiences and insights will continue to be fragmented – thus making personalized shopping experiences an elusive goal.

To make the leap in the fundamental changes required, retailers must hasten their DX pace and emulate the traits of Digital Leaders. Only through cross-channel collaboration, data-driven customer insights sensed, collected and shared across all touchpoints, can retailers make the goal of personalized shopping experiences at scale a reality – one which holds the potential to lock in customer relationships and build a path toward a sustainable competitive advantage.

Financial Services

As early as 1994, Bill Gates made the provocative statement that in the future, banking would be needed, but banks themselves would not. Today, with disruptive technologies, emerging competitions, and acceleration of the DX economy, the financial services industry (FSI) is hard pressed to balance between optimizing operations and meeting rapid shifts in customer demands. For years, FSI organizations have focused on addressing operational pressures with a view to ensure profitability of the business. With the rise of emerging fintech competitors, along with changing customers' demographics – younger, more mobile, and more connected – customers now have more choices than ever before. FSI organizations can no longer just compete on product offerings or price differentiation alone. Instead, the industry must return to its roots of being a trusted bank or insurer, by building long-term, valued relationships with their customers.

This calls for FSI organizations to shift focus toward creating differentiated customer experiences and solutions. Along with the relevance, speed and agility which customers expect today, a fundamental change in how FSI services are delivered and consumed is required. To this end, organizations must also revise their business models, or even define new ones. FSI organizations' top 3 business concerns are reflective of these dynamics: 14.6% of BFSI firms believe they need to develop new business models, 12.7% states that rising costs of operations is amongst top concerns, while another 11.9% see more competitors as a threat.

Customer-Centricity by Returning to the Roots of Banking — Trust, Value, Relationships

In the banks of the future, most branches will be replaced by convenient apps that allow customers to access services at any time, at any place, and from any device. Routine tasks traditionally executed by banking personnel will be available as a self-service option, supported by AI, BDA and customer relationship management services and tools. The bank will leverage technologies such as blockchain for fast, reliable and trusted transactions. This allows branches and its personnel to return focus back into banking activities such as financial assistance, strategic advisory, and customer relationships.

FSI organizations' DX focus for 2018 reflects their efforts to become more customer-centric. Their top 3 priorities are to track customer advocacy as one of the top KPIs, to transform customer-facing business processes (55%), and marketing (49.8%). Almost half (49.3%) of organizations also see the need to focus on IT and recognize their data operations as the underlying technology foundation needed to support the business improvements required.

Creating digital-first banking experiences for local customers is now an impetus. On the consumer banking side, FSI organizations have launched mobile-based services to broaden customer engagements. Branch services are increasingly accessible via banks' mobile apps. Digital touchpoints and interactions set the stage for leveraging analytics and AI capabilities to spot opportunities for financial product recommendations. Adoption of chatbots and robo-advisory is increasing, creating an expanding wealth of structured and unstructured data for machine-generated insights. This will enable more custom investment proposals and recommendations to high-net-worth individuals.

In many parts of emerging Asia, financial inclusion bears potential for an enlarged economic pie, social and commercial benefits. To this end, leading FSI organizations are experimenting with digitally-enabled products and services to penetrate the unbanked and under-banked segments. For example, Union Bank from the Philippines is looking to lead in the peer-to-peer space with blockchain. This

initiative allows the bank to offer services to customers in the rural areas. The bank aims to reach 500 rural banks which will cover the banking needs of over 80 million unbanked Filipinos.

These first steps toward the banks of the future are already bearing fruits. In 2017, FSI organizations achieved 13-20% improvements in profit margins, productivity, customer advocacy, faster customer acquisition rates and revenue from new products and services. These are the top benefits derived from their organizations' DX initiatives. Especially in customer acquisition improvements, organizations are seeing 17% improvements in 2017, and this is expected to increase by another 70% by 2020. These results underscore the need to embrace DX to achieve better outcomes.

Capitalizing on Data to Increase Higher Value Creation

The top 3 KPIs tracked for DX progress are a mix of traditional and non-traditional metrics. The mix reflects the balancing of the DX impetus, against core industry requirements such as due diligence, regulatory compliance and security. Data capitalization (48.3%) is almost as important as process/service effectiveness (50.7%), as shown in Figure 10.

Business leaders are increasingly looking at how they can capitalize on data to accelerate DX in delivering new experiences and solutions. Their level of technology investments supports this direction. BDA and cloud are the top core technologies that business leaders plan to invest in this year. To unlock the potential of data in accelerating DX activities, organizations need to adopt a cloud strategy that is flexible, scalable and agile to meet the growing data pool. The two priority areas of investments out of emerging technologies are AI and IoT. A few key AI capabilities that companies are exploring include personalization and recommendation engines, robo-advisory, and trading analytics.

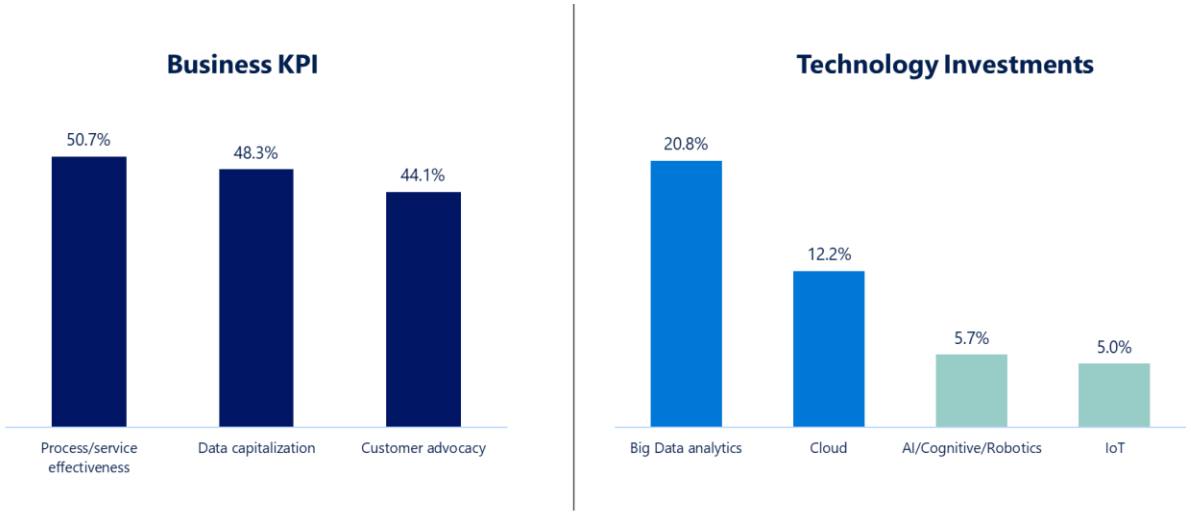
Cybersecurity threats, lack of skills and resources, as well as the lack of knowledge on how to drive DX processes are the top challenges plaguing their transformation efforts. In this highly-regulated industry, FSI organizations need to also ensure that the data they own and manage are supported by trusted, secure and compliant platforms.

FIGURE 10

How FSI Organizations Are Using Data to Unlock DX Potential

Q1. When measuring overall DX journey success, which of the following key performance indicators/metrics (KPIs) are you using? Please select all that apply.

Q2. Relating to the use of technology for your DX initiatives, which of the following digital technologies are your organizations going to heavily invest on in 2018?



Base: All respondents (n=211)

Note: Q1 relates to business KPIs. Q2 relates to DX technology investments.

Source: IDC, 2018

DX toward Digital Financial Services of the Future

As we quickly approach the not-too-distant future, where financial services proliferate with fewer physical branches, FSI organizations must continue to accelerate their DX efforts. In examining the top organizations that have a full DX strategy, 88% have either a key person leading their DX efforts with an independent digital business unit or with digital leads assigned to each line-of-business (LOB) and functional group to drive initiatives. More than two-thirds (68%) have an allocated DX budget as a permanent part of their overall profit and loss to maximize resources, ensure organization-wide alignment, and better governance. Finally, 70% of them display higher maturity in collaboration and agility in change cycle, where departments are more willing to come together to achieve success for the greater good.

Toward pervasive banking, FSI organizations must adopt a customer-centric mindset with the vision of having financial products and services embedded into customers' daily lives and businesses. Emulating the traits of top FSI organizations require laying the path to becoming digitally transformed entities.

Healthcare Services

The healthcare industry is facing macro demographic, economic and technological forces which are driving a fundamental shift toward the intelligent healthcare continuum, including preventive care, diagnosis and treatment, home and elderly care, as well as value-based care. The goal is delivering better health outcomes, while improving the efficiency of care. Healthcare leaders can no longer afford to just focus on operational optimization but are driven to go beyond and transform the entire business holistically.

According to UNESCO, Asia Pacific's population above 60 years old will constitute more than 25% of the total population – or 1.3 billion people – by 2050. At the same time, patient expectations are also increasing as they seek shorter waiting times and lower out-of-pocket expenses. Against these increasing demands, the industry is also facing a shortage of workers to keep up in healthcare services. The emergence of digital health players, offering accessible digital services, also add a layer of competitive challenges to incumbents. The study shows that healthcare organization's top 3 business concerns include entry of more competitors, developing new business models to grow the business, and information security/data privacy as organizations embarked on electronic medical record initiatives.

From Operational Optimization Toward the Continuum of Healthcare

Such transformation is only possible with a new mindset which extends "health" beyond the confines of hospital services. Patient care must be extended to include wellness through healthy living, preventive care, home care and elderly care. The adage, "prevention is better than cure", holds the key to sustainable healthcare amidst these industry challenges. To this end, the future of healthcare must be rooted in a continuum of healthcare in which lifestyle, prevention, treatment, recovery and aging are viewed as contiguous life choices, events and stages.

Rapidly emerging technologies are taking the continuum healthcare vision toward reality.

- In healthy living and preventive care, wearables and portable diagnostic devices are making wellness tracking, and early-stage detection a possibility. The emergence of an "intelligent wellness network", a combination of cloud, analytics, mobile, robotics, IoT and cognitive AI couple with smart medical devices, will provide intelligence to enable healthy lifestyle, perform intelligent sensing and facilitate wellness analytics.
- In diagnosis and treatment, analytics are used to develop ailment-specific models and risk-scores customized to specific demographics. Machine learning and AI are also employed in medical devices for surgical precision, helping doctors to predict possible ailments and developing patient health plans to address these possibilities.
- In home and elderly care, similar technologies are enabling mobile and remote health enabled warning systems. Cloud and mobile are also empowering extended care giver network.

Today, healthcare organizations are taking the first steps toward this vision.

IDC's study shows that healthcare organizations in the region are heavily focused on patients' healthcare journeys. They have identified three patient-related metrics as their top DX KPIs – process and service effectiveness, patient advocacy and data capitalization.

In their DX efforts for 2018, 53% of organizations are focusing on transformation of IT and data operations, 52% in patient service and support, and 43% in admissions and patient records management. These initiatives are aimed at optimizing operations, but they also lay critical foundations for the healthcare continuum. Through increased data storage and analysis, digitized

patient records, and more timely patient engagements, organizations can increase efficiency, scale reach of healthcare service and improve patient outcomes.

One example is Apollo Hospital of India, which has been steadily investing in model technologies. Focusing on "biology, bytes, and bandwidth", the hospital has developed a platform that has a more accurate cardio-vascular health profile of the patient, which they call the "Cardiac Score". With deeper clinical insights through analytics, AI can in turn point to the coronary risk factors that the patient might face in the next 10 to 20 years. Digitalization in other areas of operations is also set to expand quality care further. For example, to more than 300 million Indians through telemedicine coverage to remote areas.

Early results toward the future of healthcare are encouraging. In 2017, healthcare organizations achieved 14–21% improvements in patient outcome/disease prevention, patient experience and retention, integrated care coordination, cost reduction and higher rate of care team innovation. These are the top benefits brought by organizations' DX initiatives. Particularly in-patient outcomes, experience and integrated care, these three benefits have direct impact to integrated patient care continuum. According to the IDC study, DX could potentially double the improvements of integrated care coordination by 2020. These results underscore the need to embrace DX to achieve better outcomes.

Data Capitalization for Better Patient Outcomes and Process Efficiency

In measuring their DX progress, 50% of healthcare organizations track process/service effectiveness, 44% measure patient advocacy, and 43% use data capitalization (see Figure 11). While operational efficiency remains an important success measure, leading healthcare organizations have realized the importance of data; specifically, the role which patient data plays in evolving healthcare business models and delivering improved patient outcomes.

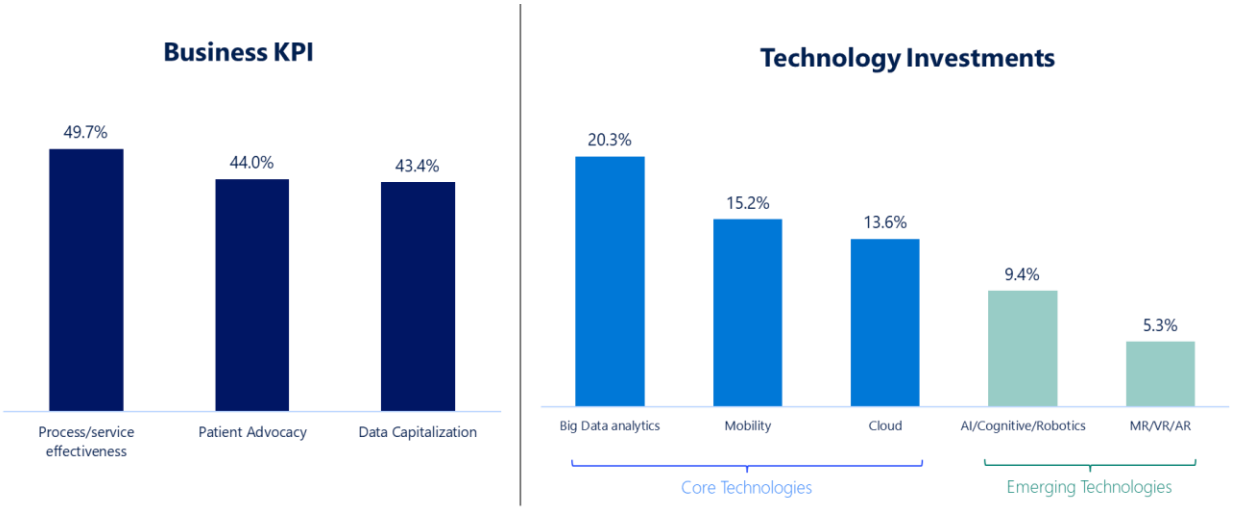
To this end, organizations are investing in core technologies such as BDA, mobility and cloud. The amount of patient data available today is huge. However, these are often locked within siloed healthcare organizations, departments and teams (both public and private). Progressing requires greater data collaboration across practitioners and teams through data sharing in a depersonalized and secure way and generating patient insights. Using the vast amounts of data hospital have about patients, they can share customized suggestions and useful offers, rather than only engage with customers through utilitarian interactions. This opens an entirely different type of patient engagement. Core technologies such as BDA, mobility and cloud will form the foundation for AI and IoT adoption and deployment toward these goals. AI/robotics and mixed reality/virtual reality/augmented reality (MR/VR/AR) are the main investment areas for 2018 in the emerging technologies space.

FIGURE 11

How Healthcare Organizations Are Using Data to Unlock DX Potential

Q1. When measuring overall DX journey success, which of the following KPIs/metrics are you using? Please select all that apply.

Q2. Relating to the use of technology for your DX initiatives, which of the following digital technologies are your organizations going to heavily invest on in 2018?



Base: All respondents (n=615)

Note: Q1 relates to business KPIs. Q2 relates to DX technology investments

Source: IDC, 2018

DX toward the Future of Healthcare

Healthcare leaders can no longer afford to just focus on basic optimization of operational processes. The industry is at a crossroad. With infinite healthcare needs but finite resources, there is an imminent need for organizations to transform the entire business holistically. The ratio of doctor to patients has been constantly deteriorating. Albert Einstein made the statement that we cannot solve our problems with the same thinking we used when we created them. Medical and healthcare professionals have progressed much in the last decades, but a new form of thinking is required.

Services across the healthcare continuum provides the sustainable approach to meet today and the future's rising needs driven by a growing and aging population, urbanization, and constrained healthcare resources. To this end, organizations must look beyond the confines of traditional healthcare services as we know it today and invest in data technologies to develop new services which improve patient continuum. By doing so, they will be able remain competitive in the future of healthcare.

Education

Asia's projected economic growth needs to be built upon the skills of its people. DX's proliferation will lead to the creation of higher value jobs, positively impacting society; but the accrual of this societal benefit requires citizens to move up in value creation chains. The study shows that by 2020, 85% of jobs will be transformed due to DX. Over 50% of jobs will be redeployed to a new position, retrained and/or upskilled for DX. Every past industrial revolution has transformed jobs permanently, and this time is no different. That said, the accelerating pace of innovation brought about by DX has no historical precedence.

In the education sector, students — and the universities preparing students — are vested with the tumultuous task of addressing skills required for this digital future. Besides expertise in academic subjects such as science, technology, engineering, and math (STEM), tomorrow's innovators must have broad technological appreciation in social, mobile, analytics and cloud (SMAC). In addition, cross-domain and cross-functional collaboration calls for soft skills such as critical thinking, complex problem solving, creativity and people/communication skills to be all embedded within individuals.

While close to three quarters of respondents in the higher education sector (72%) feel that existing curriculum and systems can prepare young professionals with future-ready skills, this is in contrast with overall Asia Pacific sentiment where lack of skills and resources is the number one transformation challenge faced by organizations.

The study shows that higher educational institutions realize the importance of 360-degree transformation to stay competitive. Their top 3 business concerns are improving curriculum quality and relevance, aligning with students' changing technology consumption habits, and staying ahead of disruption from competitors providing new education models.

Digital-first players and alternative options are offering students a broad variety of choices in their learning journey. They believe in multiple paths to expertise and provide content for job/task-specific skills. The ways that students earn and market their credentials has also been transformed. They are attaining micro credentials and nanodegrees. Employers are increasingly recognizing these new credentials when evaluating applicants. To rise to its calling of grooming tomorrow's digital workforce, education leaders and institutions must start by reinventing themselves.

Unlocking the Future of Education

DX is about reimagining how organizations bring together people, data, and processes to create value and maintain a competitive advantage in a digital-first world.

Today, the higher education sector lags other industries in their transformation journeys; only 54% of education institutions have a full and progressing strategy, compared to at least 64% or more within other sectors in Asia.

However, the results from those higher education organizations that have already embarked on their DX journeys are encouraging. In 2017, educational institutions achieved 14–19% improvements in student engagement, utilization of new and existing education products and services, rate of teaching innovation and profit margins. These are the top benefits brought by organizations' DX initiatives. Particularly in student engagement and rate of teaching innovation, these benefits have long-term impacts on learning outcomes and contribute to the future of education. The IDC study shows that education institutions expect to see at least 40% improvement to the top 5 benefits by 2020.

These results underscore the potential that DX creates to help education keep pace with the needs and challenges arising from rapid change. There is a need to establish a holistic vision and integrate tools and data within a single, intelligent system to drive a more streamlined process and transformative outcomes. Such a vision will encompass new approaches to enabling lifelong learning among all students, creating connected experiences both on- and off-campus, unlocking limitless research capabilities, and developing effective institutions that can address fast-changing market demands.

Educators in the region highlighted that the top priority for 2018 would be to develop a culture of innovation and learning. One example is technology industry collaborations with AI Singapore (AISG) to foster a greater artificial intelligence (AI) aptitude among Singapore's workforce, and with National University of Singapore (NUS) aimed at applying AI to enhance research. To bolster its research and innovation capabilities, NUS harnesses a knowledge graph of scholarly publications. The Microsoft Academic Graph provides analytics structured around research publications, authors, author affiliation, venue and field of study. It allows NUS to extract and analyze knowledge embedded in the publications' data, looking at cross citation, references and relationships between research work. In addition, researchers from the NUS School of Computing use the analytics tool to conduct healthcare-related research.

Higher education institutions need to leverage data and technology to drive transformative outcomes and improve learning outcomes.

Institutions must establish learning management systems to modernize how teachers teach and students learn, use collaborative teaching and learning to enhance learning experiences, and eventually enable new knowledge generation. There is a plethora of data generated within the educational systems, which institutions can leverage to enable comprehensive lifecycle management. At a later stage, this also requires redefining what constitutes success for students and institutions beyond academic scores. Together, these initiatives will lay the foundations for developing the intelligent campuses of tomorrow.

Leverage Data to Deliver Anytime, Anywhere Education

Today, education institutions are gaining awareness of the need to embrace transformation. In their top DX priorities for 2018, organizations are focusing on developing a culture of innovation and continuous learning, gaining a holistic view of students, teaching staff and partners, and improving institutional agility to respond quickly. These priorities serve as important guide posts to direct organizations toward the future of education.

In measuring their DX progress, education institutions are using non-traditional metrics. They ensure organizations' DX initiatives are designed to address the needs of their most valued stakeholders. More than half (59.6%) track student advocacy, 43.4% measure employee advocacy, and 39.8% uses market recognition for digital education leadership for self-benchmarking (see Figure 12).

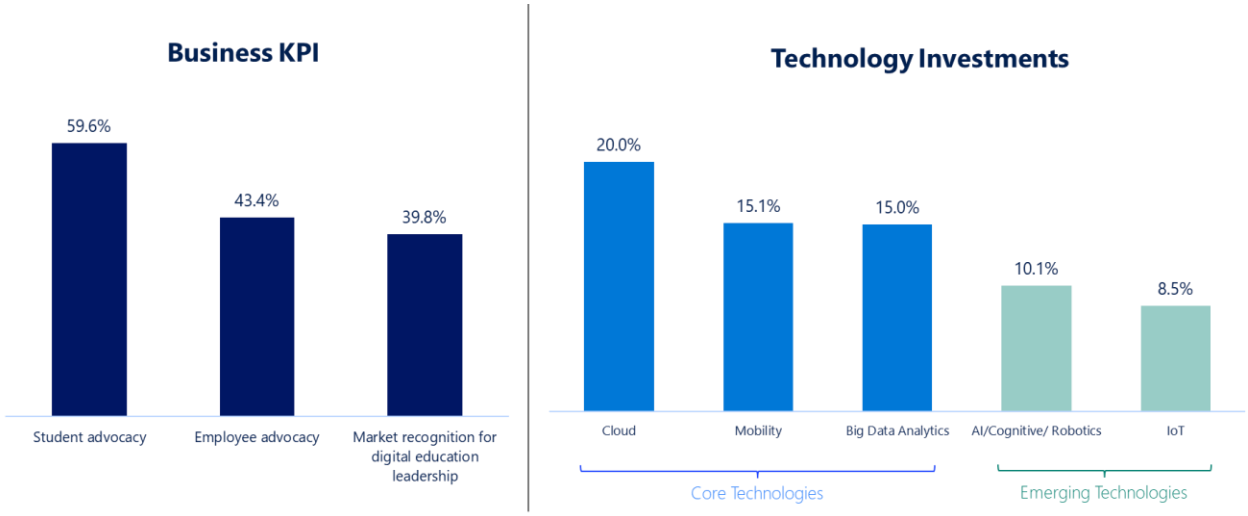
In 2018 Organizations are investing in technologies such as BDA, mobility and cloud. These technologies enable digital delivery for educational content, collaboration and enhanced learning experiences. At the same time, the data collected, and insights generated through core technologies will form the foundation for AI and IoT adoption and deployment toward reinventing education. Data is a critical ingredient for unlocking the digital potential of higher education institutions that can transform infrastructure development and improve learning outcomes.

FIGURE 12

How the Education Sector is Using Data to Unlock DX Potential

Q1. When measuring overall DX journey success, which of the following KPIs/metrics are you using? Please select all that apply.

Q2. Relating to the use of technology for your DX initiatives, which of the following digital technologies are your organizations going to heavily invest on in 2018?



Base: All respondents (n=166)

Note: Q1 relates to business KPIs. Q2 relates to DX technology investments

Source: IDC, 2018

Education Transformation to Develop Future-ready Workforce

Malcolm X made the statement "education is the passport to the future, for tomorrow belongs to those who prepare for it today". There is no greater truism with the DX opportunities Asia faces today. Educated individuals are capable of tremendous innovation, which in turn fuels dynamic economies. Investing in education is an investment in long-term economic growth and an essential part to unlocking the economic impact of DX in Asia.

The education sector plays vital roles in enabling future-ready workforce, but to do so, education itself must go through its own transformation – adopting a new, digital-first approach to achieve transformative outcomes. IDC research shows that the lack of a digital mindset is one of the top challenges that organizations face in making truly transformative changes. Beyond technology, organizations and its workforce must adopt a mindset which includes experimentation, risk-taking, and an aptitude to fail and learn fast. These new mentalities challenge conventional wisdoms that are ingrained from as early as school-days where academic grades alone are deemed as the greatest determinant of success. The industry must walk the talk of DX by developing a digital and lifelong learning culture, capitalizing on data and embracing new technologies to develop new generations of workforce that possess such mental aptitude.

UNLOCKING THE FULL ECONOMIC VALUE OF DX

Asia Pacific organizations need to accelerate their DX journey to reap the full benefits of their initiatives and to address the invisible revolution brought about the mass adoption of AI. Organizations need to drive towards a full DX strategy and emulate the traits of Digital Leaders to realize the highest improvements in productivity, profit margin, customer loyalty and revenue growth of up to 30%, as Leaders enjoy today, and close to 50% by 2020, as organizations project.

The shape or form in which DX leadership manifest varies by industries, yet with DX achieving impact of macroeconomic scale, the impetus is the same for all. Organizations must accelerate DX efforts or risk an increasingly shrinking share of the economic pie.

- In manufacturing, manufacturers need to move from process automation to holistic enterprise-wide DX for competitive advantage;
- In retail, retailers must provide personalization of experience – whether online, or offline – to effectively engage with, and meet consumers' shifting buying behaviors;
- In healthcare, organizations need to develop new services to improve the patient care continuum and transform the healthcare business holistically to address the full range of patients' needs as the patient care continuum becomes increasingly important. Transformation should go beyond the confines of the hospitals and not just optimization of operations.
- In banking and financial service, FSI organizations must become financial solutions providers, advising and serving customers with personalized financial guidance, service and offers – the premise of embracing customer-centricity.
- Higher education institutions need to accelerate their DX journeys, leveraging data for infrastructure development and improving learning outcomes, to stay competitive and get young professionals prepared with future-ready skills. Currently, the overall Asia Pacific sentiment is that lack of skills and resources is the number one transformation challenge. IDC recommends organizations to adopt the following strategies to become a Digital Leader in one's respective industry:
- **Develop a digital culture**: An organization needs to build a culture of collaboration across business functions and embraces a vibrant and mature ecosystem of customers and partners. As such, addressing organizational structure shifts is required for DX success. Organizations should move away from siloed projects and focus on driving enterprise-wide transformation through collaboration across business units. At the same time, encourage use of data across all processes and customer touchpoints to develop a customer/patient-centric culture. Data can then be embraced across the organization and functions, in which better decisions can be made and ultimately serving the needs of customers and partners better. Also, critical to a "digital mindset" is the need to **embrace micro-revolutions**. In most cases, DX efforts do not start with widespread change, but a series of micro-revolutions. These are small, quick projects that deliver positive business outcomes and accrue to a bigger and bolder DX initiatives.
- **Capitalize on data**: In a digital world, organizations capture more volumes of data internally and externally. Data is key to unlocking the potential of DX to enhance existing products/services, increase the rate of creating new products and services, and/or innovate new business models. New KPIs are required to track progress and measure performance on DX efforts – data capitalization is one such measure. The key to becoming a Leader is for organizations to be able to convert data into capital assets and enable data sharing and collaboration internally and externally in an open yet trusted manner. In addition, a proper data

strategy will allow organizations to start their AI initiatives to identify connections, insights and trends.

- **Embrace new technologies**: Use BDA to unlock new business or customer/patient insights, scenarios, and service delivery models. Leverage AI to augment DX capabilities, enhance customer/patient experience and intelligently automate process. Deploy IoT and develop a digital supply chain with a fully automated feedback loop for whole of ecosystem visibility, control/coordination and transformation.
- **Develop future-ready skills for individuals and organizations**: Organizations must elevate workforce management to strategic talent management. Focus on rebalancing the workforce by developing a DX-aligned strategy by taking both short- and long-term views. This talent strategy includes measures to not only attract digital talent but to reskill or upgrade the workforce with new skills needed in the next 3 to 5 years. New competencies include AI, BDA, and cloud computing, or the "ABCs" of digital skills or cornerstone capabilities of the DX era. Tomorrow's digital enterprises will require a nimble and agile workforce model which includes freelancers, part-time employees, and even leverages the gig economy.

METHODOLOGY

The results of this study are based on a survey conducted in December 2017 of 1,560 business leaders from 15 economies across the Asia Pacific. The survey was conducted through a mix of online and phone interviews and based on a structured questionnaire of 33 questions. The survey questions focused on understanding the regional impact of DX in four areas:

- The impact of DX on organizations.
- The business areas where DX has the biggest improvements.
- DX enabling technologies.
- Challenges in the DX journey.

Note: All numbers in this document may not be exact due to rounding.

Survey Respondent Segmentation

The 1,560 survey respondents are segmented as detailed in Table 1.

TABLE 1

Survey Respondent Segmentation

Country		Count
	Australia	100
	China	200
	Hongkong	100
	India	200
	Japan	150
	Korea	100
	New Zealand	100
	Singapore	100
	Taiwan	100
	Indonesia	100
	Philippines	100
	Malaysia	100
	Thailand	100
	Vietnam	5

	Sri Lanka	5
Company size (by employees)		
SMEs (Less than 1,000)	250 to 499	358
	500 to 999	386
Large enterprises (1,000 and above)	1,000 to 4,999	430
	5,000 to 19,999	241
	20,000 and above	145
Industry		
Manufacturing	Discrete Manufacturing	235
	Process Manufacturing	380
Banking and Financial Services	Banking	76
	Insurance	59
	Financial Services	76
Retail	Retail	240
Education	Education (Tertiary, Public Institution)	84
	Education (Tertiary, Private Institution)	82
Healthcare	Healthcare & life sciences (Private Company)	76
	Healthcare & life sciences (Public Company)	83
Government	Government	169
Job title		
C-Level	CEO/Chief Executive CIO COO Chancellor/Vice Chancellor Principal/Vice Principal Permanent Secretary Policy Maker CMO CDO – Chief Digital Officer CDO – Chief Data Officer	380

	Chief Medical Officer Chief Medical Information Officer Chief Nursing Officer or Head of Nursing Chief Innovations Officer Chief HR Officer C-Level (Others)	
C-1 Level	Head of Department Managing Director Executive Director SVP / EVP Assistant or Associate VP Senior Director/Group Director Director/Associate Director / Assistant Director	485
C-2 Level	General Manager Senior Manager Senior Consultant	695

Gross Domestic Product (GDP) Modelling

IDC Asia Pacific developed a modelling of the projection based on available economic data from the World Bank, IDC's in-house research data, as well as data from the study where respondents were asked to provide estimation of impact (in %) on their revenue (see Table 2).

- The estimation underscores what organizations undergoing DX today can experience in terms of growth impact today, and in three years.
- The numbers are then extrapolated to the wider economy based on external data, based on percentage of companies experiencing DX now, and forecasted penetration by 2021.

TABLE 2

GDP Projection Methodology

The Math	Input	Source	Assumptions
	Nominal GDP (revenues are based on current price)	World Bank Database Historical indicators (2012 to 2106)	Not applicable
		World Bank Database Forecast indicators (2016 to 2019)	
		World Bank Database Projected GDP from 2019 to 2021	
Multiply by	Percentage of DX organizations to represent portion of GDP impacted by DX	IDC DX research, Study survey results, and DX analyst calculations	Estimated today at 25% to 40% Projected 50% to 70% by 2021
Multiply by	Percentage of DX organizations which are reporting revenue growth	Study survey results	Different rates ranging from 10% to 40% by country
Multiply by	Average revenue growth rate enjoyed by DX companies with growth	Study survey results	Different rates ranging from 10% to 30% improvements per annum
Equal	Additional DX-driven GDP, compounded 2016 to 2021 Projected GDP growth equals additional DX-driven GDP added to Projected GDP in 2021 Incremental GDP growth rate (CAGR) is the difference between from Incremental GDP growth rate and projected GDP growth rate		

Source: IDC, 2018

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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