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The Thailand Digital
Transformation Survey
Report 2020



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Executive summary

Digital disruption has grown to become a major force across a broad number of industries worldwide. Thus, the vast majority of global executives admit that their industries will be disrupted to a major or transformative extent. In Thailand, it is interesting to discover what Thai executives' perspectives are on digital disruption and how companies develop and implement digital transformation in the era of digital disruption.

In October 2019, Deloitte Thailand conducted The Thailand Digital Transformation Survey among 91 executives from several industries. This was to gain insights into the digital transformation phenomenon in a business context in Thailand, how and what way businesses adopt it, as well as the key challenges or obstacles faced. In the report, we categorized topics into Digital Disruption Awareness, Digital Transformation Initiative, Talent Gap, Technology and Public Policy. The following are some key insights from the survey.

Most Thai businesses especially in Technology, Media and Telecommunication and Financial services are aware that digital disruption is happening. However, they are still optimistic about the impact of digital disruption to their companies. We suggest that Thai companies should speed up their digital transformation readiness to deal with major to transformative digital disruption impact as it is likely to happen within the next five years. Moreover, COVID-19 crisis will accelerate digital transformation.

Digital transformation has been on the agenda of some organizations for years, which enables these companies to transform themselves to be a digital organizations and becoming market leaders. While those that do not make the shift, will struggle to survive. In Thailand, Technology, Media and Telecommunications and Financial services are among the leading industries in moving towards digital transformation. We found that key purposes for digital transformation are enhancing end-user experience, transforming business processes and better utilizing data. Unfortunately, the results of the company's effort were not fully realized. In fact, most results were partially successful in improving business performance through digital transformation initiatives. Among several challenges that business are facing, people issues are the most critical. To overcome these challenges, businesses might consider the following suggestions; breaking down functional silos and focusing on cross-functional collaboration or cross-functional teams, which are considered crucial to success in digital environments.

Data analysts and scientists are digital roles that are considered the most important and challenging for companies in terms of recruitment in Thailand. However, the perception on the importance and challenges of these skill sets varies across industries. Another important note from the survey is that AI and Machine learning specialists will become more influential in the near future. In closing these digital skill gaps, we follow the "Buy-Build-Borrow" model and the result shows that more than half of the respondents chose "Borrow" as their main strategy. Key business imperatives for digital transformation initiatives will require more investing in human capital and collaborating with other stakeholders on workforce strategy.

For nearly half a century, technology has been playing a vital role. However, most of the time, the less complex technology is, the higher chance it will get adopted and deployed enterprise-wide. Web technology, mobile application and cloud technologies are relatively matured and less complicated when comparing to other technologies. Data analytics is in a unique position and it will be increasingly implemented within a year. However, Blockchain, Artificial Intelligence (AI) and Internet of Things (IoT) are not well adopted owing to investment required and lack of employee skills. Businesses with high innovative and progressive cultures often subdue the importance of Return on Investment (ROI) by thinking big and bold but starting with smaller initiatives to scale up in the longer term.

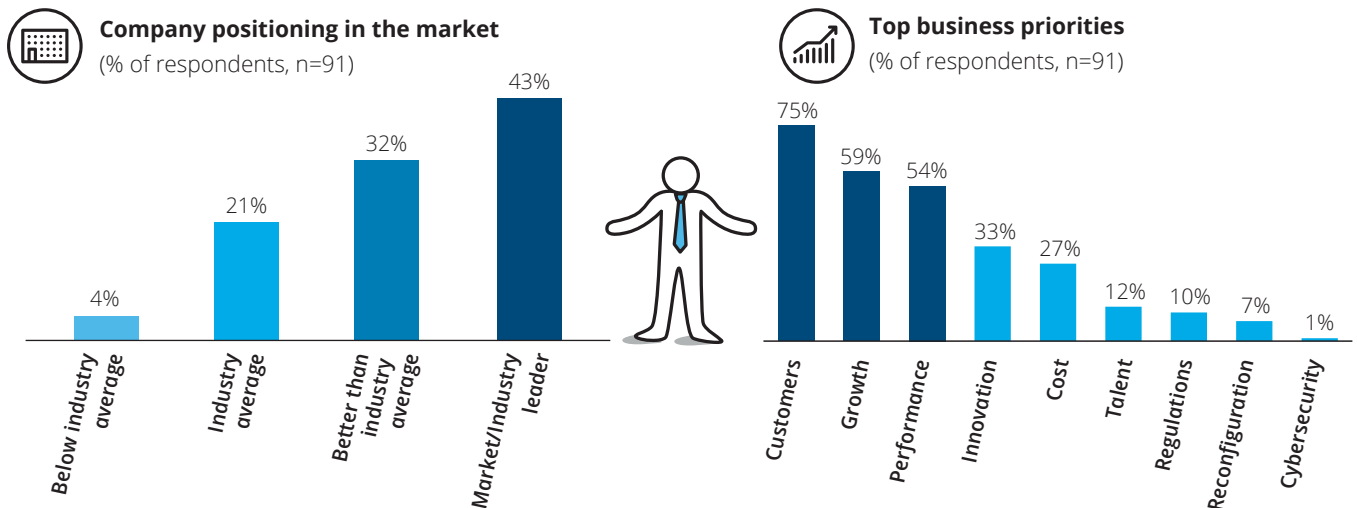
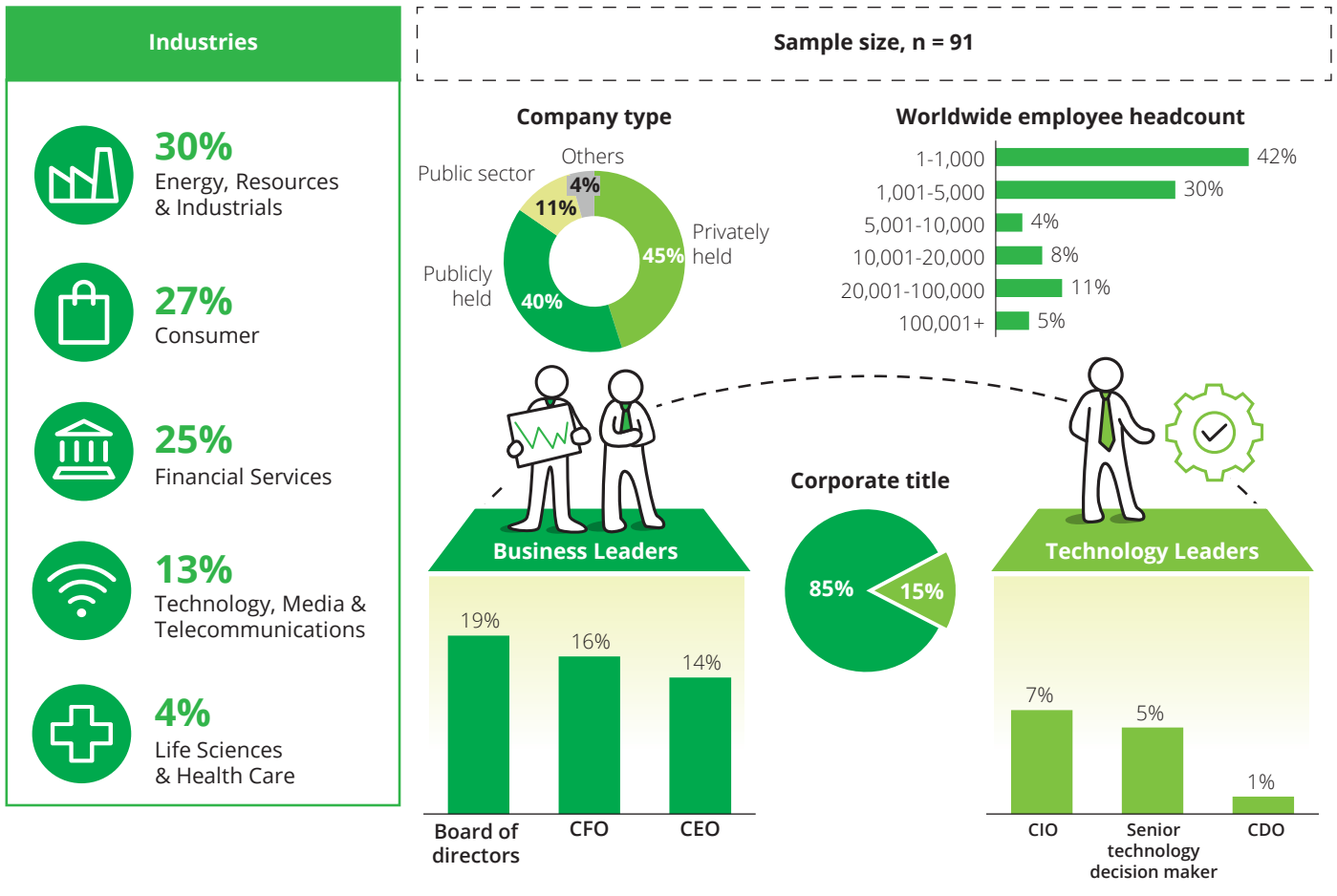
Tax incentives, easing regulations and well-established infrastructure are the most popular demands companies wish they had from the government. Hence, the Thai government should improve the digital business environment in Thailand by focusing on these issues, reforming education systems and emphasizing the importance of data science skills.

We hope that this report will provide you with some insights into the digital transformation phenomenon in a business context in Thailand, as well as our recommendation that will help you to thrive in a digital disruption era.

The Thailand Digital Transformation Survey

Methodology

The Thailand Digital Transformation Survey is the study that polled 91 executives from several industries in Thailand. The key research objective is to gain insights into the digital transformation phenomenon in a business context in Thailand, how and what way businesses adopt it as well as the key challenges or obstacles faced. The survey was conducted in October 2019, using an online survey.



Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

Exploring the age of digital disruption

Digital disruption has grown to become a major force across a broad number of industries worldwide. Digital disruption is a change that occurs when new digital technologies and business models affect the value proposition of existing goods and services. According to The Digital Vortex 2019 study conducted by the Global Center for Digital Business Transformation (DBT Center), an IMD and Cisco initiative, Media and Entertainment, Technology Products and Services, Telecommunications, Retail and Financial Services are among top 5 from 14 industries highly impacted from digital disruption. They share few characteristics that make them particularly susceptible to digital disruption. Moreover, the report found that incumbents in Media & Entertainment and Telecommunications are now seriously facing the pressure from new market entrants, such as Amazon and Facebook, along with other emerging giants like Netflix, who have taken their market share.

Furthermore, during the last 5 years, companies in other industries had faced more pressure as from emerges of the super apps that offer multiple goods & services across industries in one application. For instance, WeChat has become the app for everything in life as there are all services from hailing a taxi to playing games.

Vast majority of global executives admit that their industries will be disrupted to a major or transformative extent.

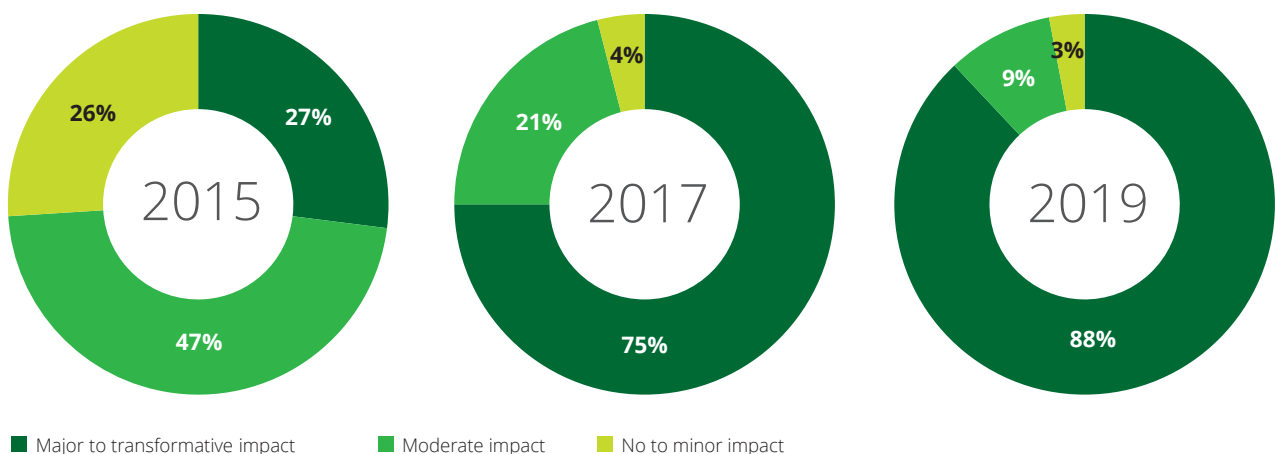
According to The Digital Vortex 2019 study, 88% of total respondents across the globe report that digital disruption will have a major or transformative impact on their companies whereas only 3% believes that digital technology will not disrupt their businesses... There is a significant rise in the impact of digital disruption in which executives are increasingly recognizing a severe impact of digital disruption since only 27% of total respondents in The Digital Vortex 2015 study believed that digital disruption made a major or transformative impact on their companies. Moreover, this number grew to 75% and eventually at 88% on 2017 and 2019 respectively (See Figure 1).

The report also reveals that executives believe that more than one-third of the top ten incumbents in their industries will be displaced by digital disruption in the next five years. In the past ten years alone, the largest enterprises globally by market capitalization has been already shifted to be all digital companies such as Apple, Alphabet, Microsoft, Amazon and Facebook where the old traditional business such as Exxon, Petro China, Shell and ICBC were left behind. Companies drop off for a variety of reasons. They can be overtaken by a faster-growing company, fall below the market capitalization size threshold or enter into a merger or acquisition. In the current environment, it is estimated that nearly 50% of the S&P 500 will be replaced over the next 10 years.

Figure 1: The vast majority of global executives admit that their industries will be disrupted to a major or transformative extent.

Global perspective on the impact of digital disruption

(% of respondents, n=1,200)

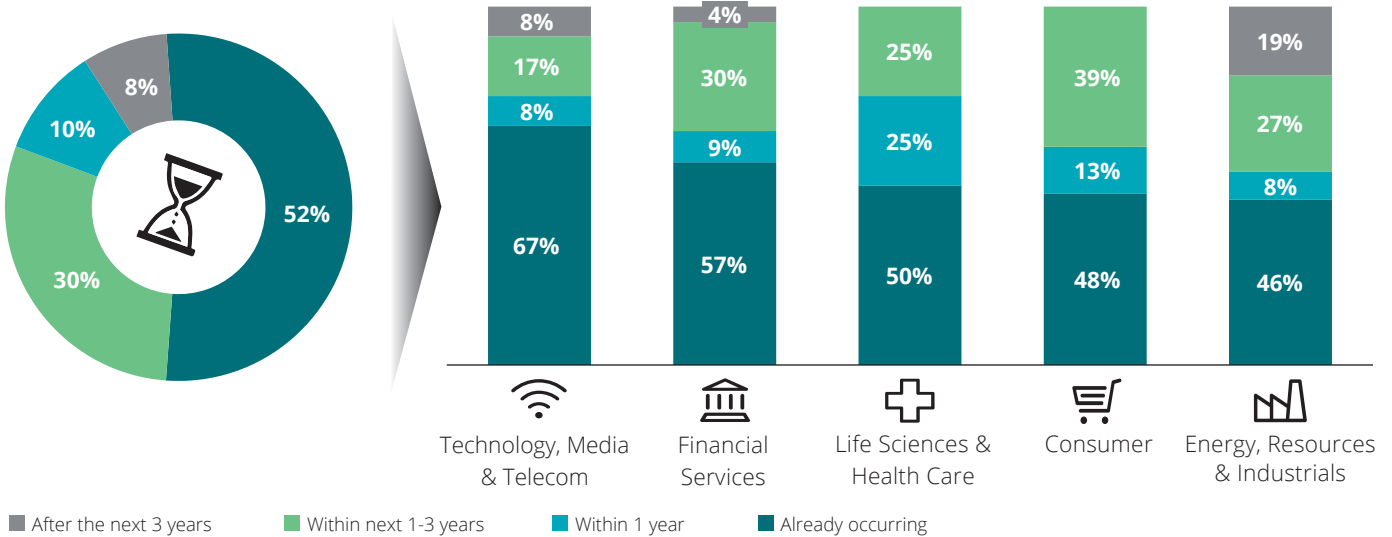


Source: Digital Vortex 2019

Most Thai businesses especially in Technology, Media and Telecommunication and Financial services know digital disruption is happening. It can obviously be seen that organizations in service clusters believe that digital disruption happens faster than in manufacturing clusters. More than half of total respondents admit that they are now facing digital disruption especially in Technology, Media and Telecommunication and Financial services of which 67% and 57% of respondents in the respective industries agree on this. By contrast, almost half of total respondents in Consumer and Energy, Resources and Industrials believe that it will take more than one year to impact their companies. In addition, 19% of total respondents in energy, resources and industrials sees that it will occur in the next three years (See Figure 2).

Figure 2: More than half of total respondents admit that they are facing digital disruption especially in Technology, Media and Telecom and Financial services.

Perspective on digital disruption timing by industry
(% of respondents, n=88)



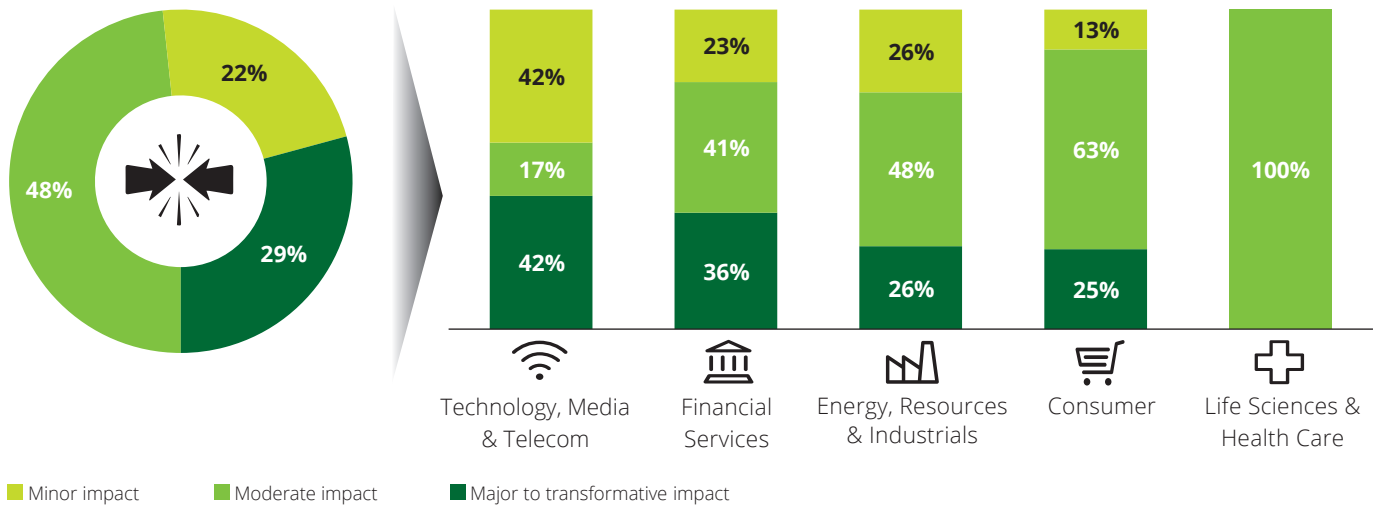
Source: Deloitte analysis based on Digital Transformation and Technology survey in October 2019

Nevertheless, the respondents are optimistic about the impact of digital disruption on their companies. According to The Thailand Digital Transformation Survey, we found that only 29% of total respondents indicate that digital disruption will have major to transformative impact on their companies while 70% of their peers commented that it will impact their companies to a minor or moderate extent. Technology, Media and Telecommunication are the most impacted industries in Thailand, based on executives' opinion since 42% of respondents in the industries see that digital disruption will have a major to transformative impact on their companies, versus merely 29% of all respondents (See Figure 3). There are enormous consequences representing digital disruption that impacts companies in these industries, for example, more advertising budget is changing to online as users increasingly move their attention to online platforms. It is expected that this trend will accelerate with the emergence and strengthen of more online streaming and digital media. Thus, these companies were squeezed out from a once profitable industry by online content producers who will post a greater share of advertising revenue amid the rise of the mobile internet. Eventually, some players will have to shut down permanently.

Figure 3: Most of Thai businesses were more optimistic about the impact of digital disruption on their companies.

Perspective on level of digital disruption impact by industry

(% of respondents, n=89)



Source: Deloitte analysis based on survey in October 2019

Thai companies should speed up their digital transformation readiness to meet challenges head-on with major to transformative digital disruption impact as it is likely to happen within the next 5 years. From The Thailand Digital Transformation survey, 29% of total respondents in Thailand cited that they are now facing major to transformative digital disruption impact which is close to the survey result from The Digital Vortex 2015 study. While in The Digital Vortex 2019 study found that almost 90% of total respondents admit that their industries will be disrupted to a major or transformative extent. Therefore, we might be able to infer that digital disruption situation in Thailand lags behind global by almost five years and Thai companies might face the major or transformative impact within five years.



Unlocking success in digital transformations

When will company implement digital transformation initiatives?

(% of respondents, n=91)

52%
Already Implemented

27%
Within next 1-3 years



14%
Within 1 year

2%
After the next 3 years

Main purposes

(% of respondents, n=87)



62%
Enhancing the digital customer and end-user experience



62%
Transforming business processes



60%
Better utilising data

What were successful results from digital transformation initiatives?

(% of respondents, n=87)



59%
Improved customer experience



38%
Reduced cost



43%
Increased employee productivity



25%
Increased revenue

Challenges to achieve digital transformation implementation

(% of respondents, n=87)



49%
Lack of internal and external expertise



45%
Immature digital culture



37%
Organisational silos

To overcome these challenges businesses should consider the following suggestions.



Breaking down functional silos and focusing on cross-functional collaboration or cross-functional team is considered crucial to success in digital environments.



Build digital mindset by shifting cultural mindsets to learn cheap, learn fast and fail fast.



Technology is not the only most important element for conducting digital transformation but also talents.

Digital transformation is not only an integration of digital technology into all areas of a business but also demands a fundamental change in corporate culture.

Digital transformation does not just mean upgrading your legacy paper record system to a modern database, or moving to cloud, as successful digital transformation demands a fundamental change in corporate culture, requiring employees at all levels to change their mindset. Beyond that, it's a cultural change that requires organizations to continually challenge the status quo, experiment often, and get comfortable with failure. This sometimes means walking away from long-standing business processes that companies were built upon in favor of relatively new practices that are still being defined.

Digital transformation has been on the agenda of some organizations for years, which enable these companies transforming itself to becoming a digital organizations and market leaders. While those that do not strive the shift, will struggle to survive.

The digital transformation has already shown what it can do for businesses e.g. Amazon and Uber. These businesses have taken traditional business concepts, like retail sales and transit, and applied innovative digital technologies and left the competition behind as they surged ahead. Brick and mortar store versus online shops' performance represents great example in Thailand, CAGR of Robinson, The Mall Group and Siam Piwat in 2015-2018 were 5%, 3% and 14%, respectively. Whereas online stores like Lazada and Shopee experienced higher revenue growth same period which were 37% and 2,560%, respectively. This is the result of the rise of technology and internet connectivity that gives people the freedom to buy whatever they want via e-commerce platforms through mobile devices. Furthermore, super-app giants like Grab and Get will join the market as demand for same-day delivery of e-commerce products keeps rising. If traditional logistic companies in Thailand do not implement digital transformation, they will not survive under fierce competition.

In Thailand, Technology, Media and Telecommunications and Financial services are among leading industries that move towards digital transformation.

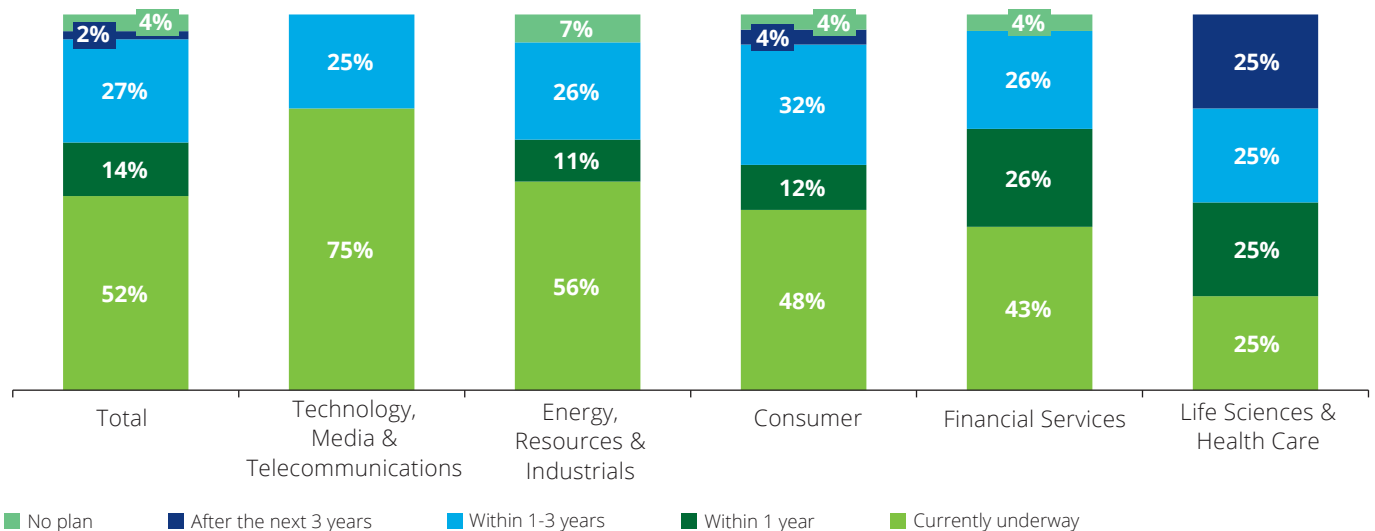
Out of 91 respondents, 96% indicated that they have plans to implement digital transformation initiatives. Moreover, most of them have already implemented, supporting the notion that all industries are embracing digital transformation. By industry, Technology, Media and Telecommunications and Financial services companies are the most advanced, with 75% of Technology, Media and Telecommunications companies and 70% of Financial services companies responding that they have implemented and planned to implement within 1 year.

Only 4% of respondents across all industries said they do not expect to implement digital transformation in the future. Their top reason is a lack of a coherent digital strategy and vision. Other reasons are no expertise, feeling unprepared, immature digital culture and no budget. Comparing with the findings from a survey of MIT Sloan Management Review and Deloitte Digital, the survey data shows related reasons for this lack of action — that some executives did not think digital business was important for their future while digital disruption might affect an industry (See Figure 4).

Figure 4: The vast majority of total respondents indicated that they have plan to implement digital transformation initiatives. Only 4% of respondents across all industries said they do not expect to implement digital transformation in the future.

Digital transformation initiative implement breakdown by industry

(% of respondents, n=91)



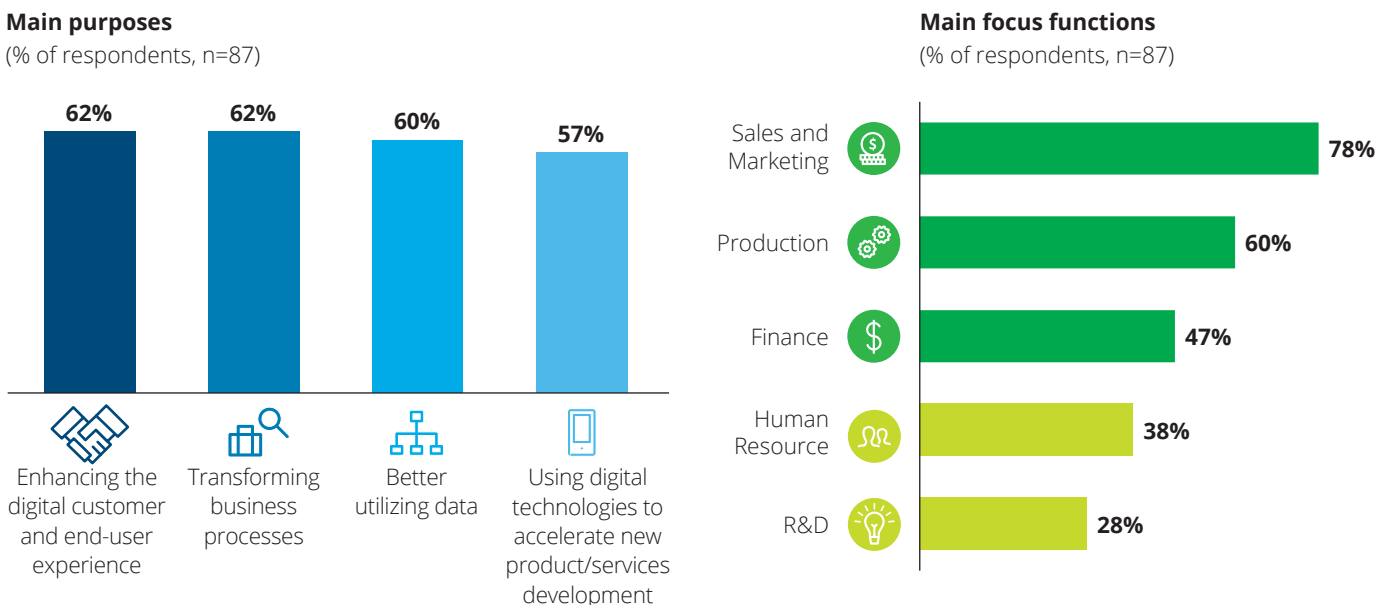
Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

Enhancing end-user experience, transforming business processes and better utilizing data play a major role as key purposes in digital transformation; however, each industry has its main purposes. Thai businesses in financial services highly focus on enhancing end-user experience, while, those who are in Technology, Media and Telecommunications concentrate on using digital technologies to accelerate new product or service development. The essential purpose of the digital transformation within the life sciences and health care is to provide agility that will enhance and refine operational processes, and improve the patient experience while saving lives. Thus, transforming business processes became the most important main purpose in life sciences and health care. There are various businesses connected with end customers, especially in consumer product and retail industries, thus it is unsurprising that they would like to better utilize data since they have acquired customer data which can help gaining customer insights (See Figure 5).

Thai companies highly concentrate on both frontend and backend functions, especially sales and marketing as well as production and finance when implementing digital transformation. Sale and marketing function is cited by 78% of total respondents as the main focus function of their companies' digital transformation initiatives. Thai businesses can reach new-generation customers and enhance user experience by implementing digital technology, particularly augmented reality, virtual reality and artificial intelligence. Production function is in the second place as it is highly focused by 60% of total respondents. Artificial intelligence will revolutionize the manufacturing sector due to several benefits of AI on manufacturing, for instance refine Root Cause Analysis (RCA), improve production defect detection, and streamline predictive maintenance. Finance function is following with 47% of total respondents who accept that this is one of main functions for the transformation (See Figure 5).

Almost all industries, especially consumer and financial services agree that sales and marketing function is their main focus area; however, energy, resources and industrials have different opinions as 68% of respondents in these industries prioritize production function, versus 60% of all survey respondents.

Figure 5: In general, enhancing end-user experience, transforming business processes and better utilizing data are key purposes. In terms of function, sales and marketing as well as production are key focused areas.

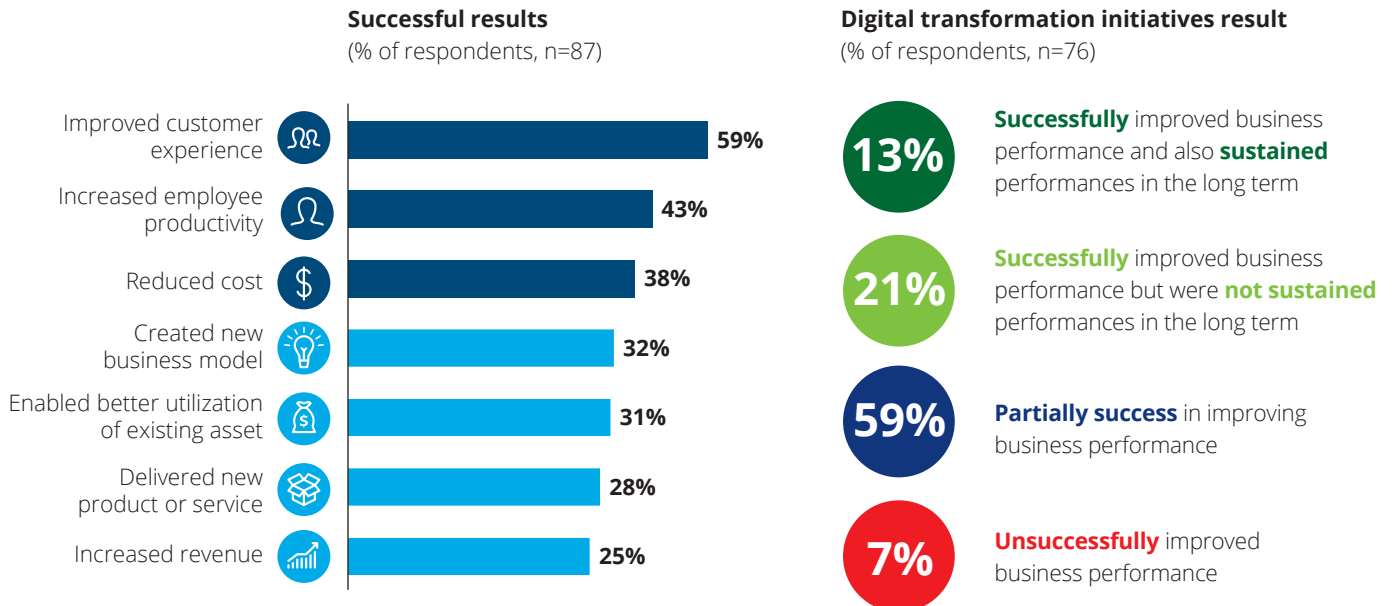


Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

Digital transformation initiatives mostly result in improving customer experience, increasing employee productivity and reducing cost but not a payoff. Asked where Thai companies are achieving significant benefits from their digital transformation initiatives, survey respondents most commonly cite an improving customer experience, increasing employee productivity and reducing cost (See Figure 6). An improving customer experience is the most cited by all industries except consumer and energy, resources and industrials, increased employee productivity and enabled better utilization of existing asset are among most mentioned respectively. Meanwhile, the area where results have been weakest includes some where one would hope to be seeing a payoff from improved customer experiences. In particular, it is an increased revenue which is one of the most important business performances. Only a quarter of total respondents report a success in this area. However, Technology, Media and Telecommunications and Life Sciences and Health Care cite that more than half of total respondents in these industries experience successful result of an increased revenue. For another benefit like delivered new product or service, it is clearly visible that Financial Services and Technology, Media and Telecommunications are most satisfying with this result as half of all respondents in these industries experience the success.

The majority respondents acknowledge that they are partially successful in improving business performance through digital transformation initiatives. When asked about their companies' digital transformation initiatives result, only 13% of total respondents reveal that their companies successfully improve business performance and also sustain in the long term. Most of them are in Financial Services and Technology, Media and Telecommunications. While 7% of total respondents face an unsuccessfully improved business performance, particularly Life Sciences and Health Care. Moreover, almost 60% of total respondents cite that they are partially successful in improving business performance, in line with the successful result in which only one-fourth of total respondents can generate increased revenue (See Figure 6).

Figure 6: Successful results, mostly are in improving customer experience, increasing employee productivity and reducing cost. However, only few respondents cite that business performance is successfully improved and sustained in the long term.



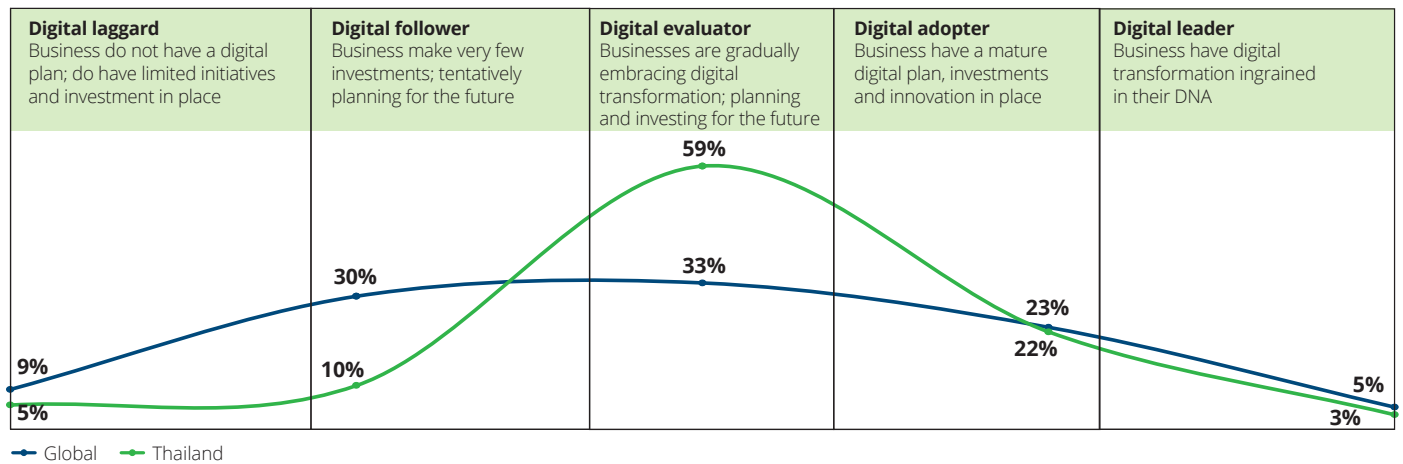
Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

Thailand still lags behind peers in terms of progress as there are fewer digital leaders and adopters. When asked about their companies' response to the pace of digital disruption, their companies are gradually embracing digital transformation; planning and investing for the future, categorized as a digital evaluators. In comparison, Technology, Media and Telecommunications outpace peers report that their companies have a mature digital plan, investments and innovation in place, as a result they can be grouped in a digital adopter. Despite that, when compared with global survey result by Dell technology, Thai companies still lags behind as 23% and 5% of global respondents were grouped that they are digital adopter and digital leader, versus 22% and 3% of Thai respondents, respectively (See Figure 7).

Figure 7: Thailand lags behind peers in terms of progress as there are fewer digital leaders and adopters.

Measuring transformation in Global and Thailand

(% of respondents, n=91)



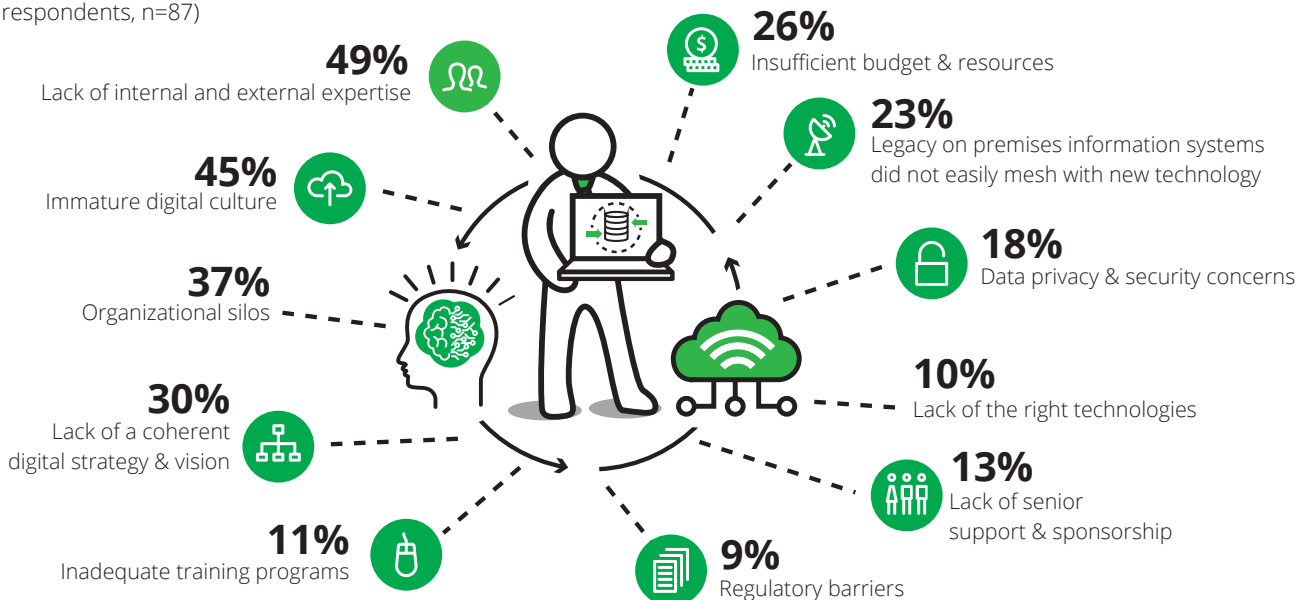
Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019 and Dell Technology

Surprisingly, Technology is not a top challenge for achieving digital transformation implementation, but instead people issues are. Digital transformation implementation is not that simple but rather complex. It requires developing digital capabilities in which a company's activities, people, culture, and structure are in sync and aligned toward a set of organizational goals. Thai corporates also reveal that they are facing three key challenges. What is remarkable here is that the top three challenges have almost nothing to do with technology itself, instead are centered-around people issues which are talent gap, digital culture and organization silo (See Figure 8).

Figure 8: Talent gap, immature digital culture and organizational silos are key challenge to achieve digital transformation implementation.

Challenges to achieve digital transformation implementation

(% of respondents, n=87)



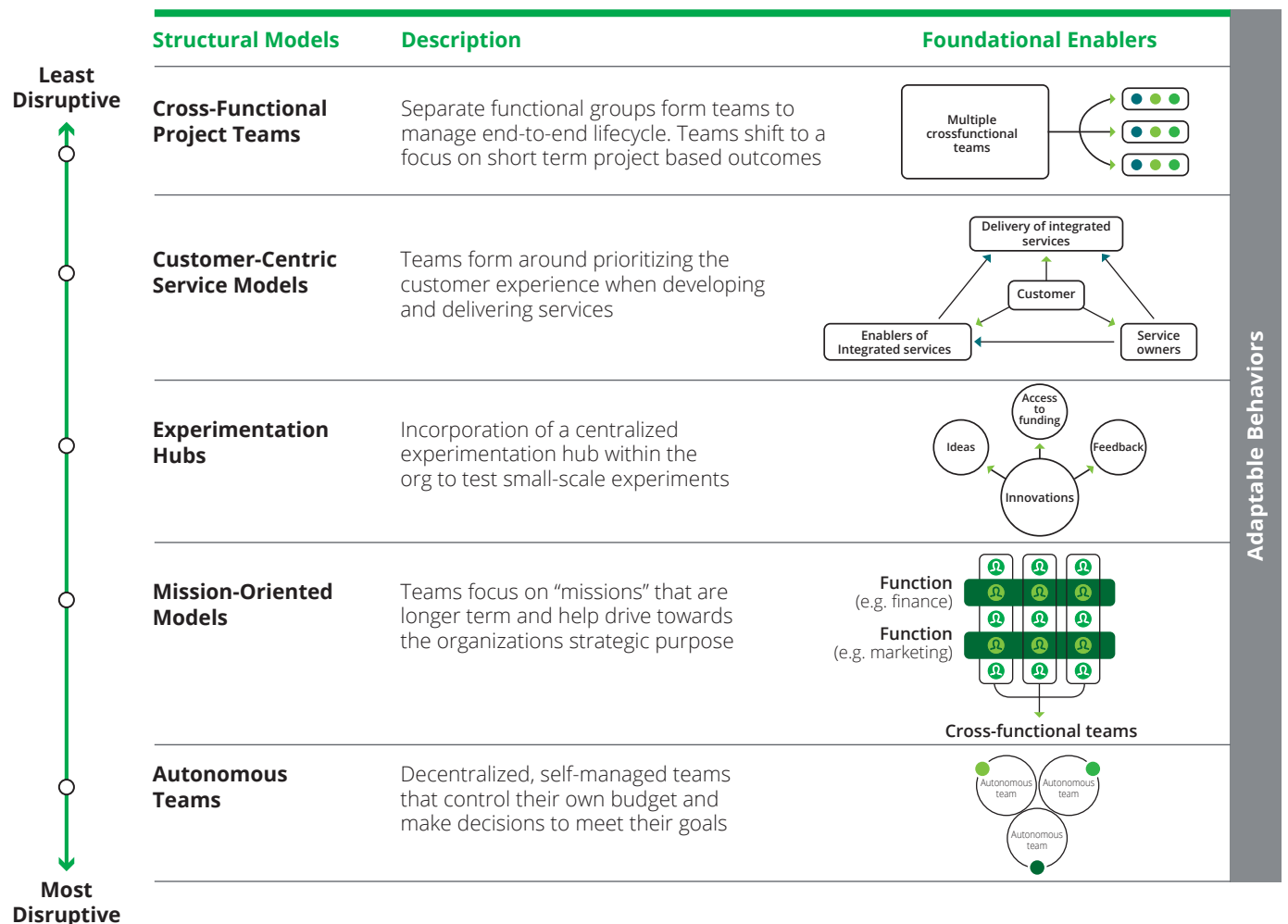
Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

To overcome these challenges businesses should consider the following suggestions.

Breaking down functional silos and focusing on cross-functional collaboration or cross-functional team is considered crucial to success in digital environments. The answer to the inefficiencies of those functional silos is to move people from silos to cross-functional teams. Research by MIT Sloan Management Review and Deloitte suggested that a cross-functional team starts with people from multiple departments and might be accountable to a project manager or a corporate innovation executive. A successful cross-functional team should be offered greater autonomy, evaluated as a unit, and given a more supportive environment for success. Moreover, a team that consists of members from different departments should work together on shared goals e.g. company or products goals. Thus, it can result in increasing companies' abilities to respond quickly to changes in a competitive environment. The benefits of cross-functional teams are enhanced access to resources, such as diverse perspectives, broader skill sets, and new ideas .

However, there is no one-size-fits-all organization structure model for innovation. Thus, companies should determine which model best fits their needs. According to The evaluation of business innovation report conducted by Deloitte, companies first need an understanding of their organization's current potentials and limitations, including a willingness to embrace new organizational models when and where the need arises and then identify the areas in which increased innovation can most effectively help them succeed (See Figure 9).

Figure 9: Structural model options for innovation vary in the level of disruption they cause to an organization, but all are underpinned by the same agile-like operations and behaviors.



Source: The evolution of business innovation



Build digital mindset by shifting cultural mindsets to learn cheap, learn fast and fail fast. As being mentioned in *Pivoting to digital maturity*, Deloitte Insights. Digital mindset is a soft factor which encourages digital behaviors that can help translate transformation effort into impact as it is the habit of looking at old problems and processes through new eyes and approaching them in new ways. Companies can help cultivate a digital mindset by encouraging a culture of experimentation and enabling people throughout the organization to both challenge and improve upon best practices. For example, companies can conduct 2-week sprints so it is easier for teams to conduct various experiments without adding significant risks to business.

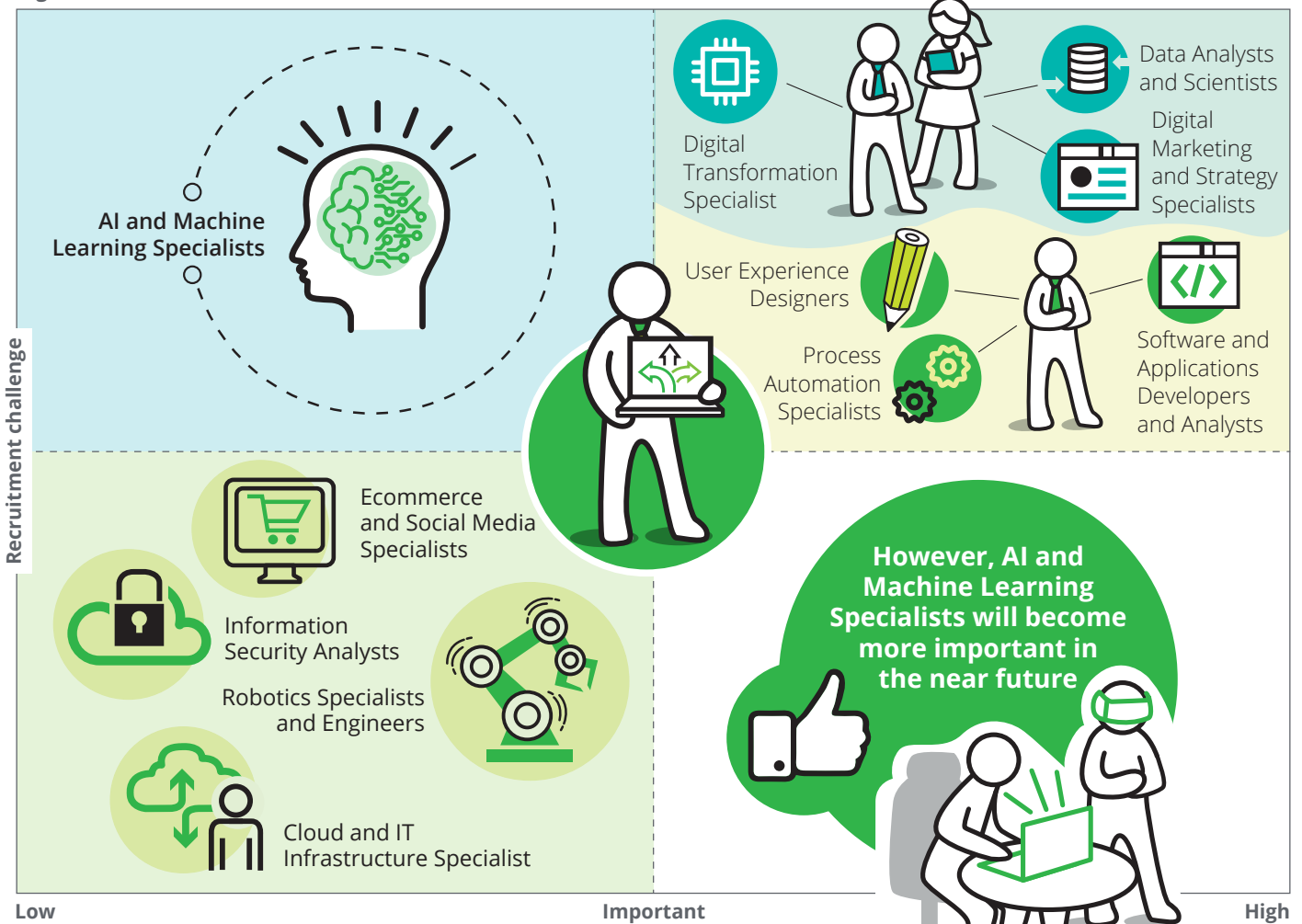
Technology is not the only most important element for conducting digital transformation but also talents. There is a danger in making technology synonymous with innovation, as technology without the right people behind it, is unlikely to prepare a company to compete in a digital future. Research by Harvard Business Review discovered how companies that had robust talent pipelines built them to thrive in digital era. Those companies do a combination of four things including 1) look for potentials, not credentials; the clock on technical expertise quickly runs out, therefore stronger candidate should be someone curious, adaptable, and quick to learn 2) value soft skills as much as technical ones; nowadays, IT experts are not only required to write a spec and coding it, but it is more about finding problems and creating solutions, so soft skills have become more important that companies need to measure person's motivation, and skills such as critical thinking, creativity, and collaboration as well 3) think about teams, not individuals; when companies evaluate candidates, their ability to play as a team member is one of the most important things they look for and 4) incentivize employees to grow; companies tend to reward higher skill levels with better compensation, benefits and responsibility.²

Bridging the digital transformation skills gap

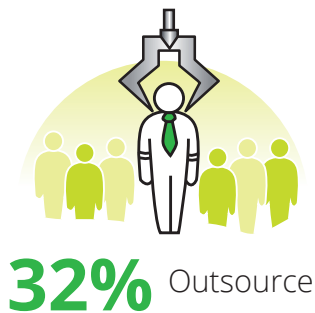
Digital skills

Data Analysts and Scientists are most important and most difficult to recruit in Thailand.

High



Top three solutions for closing digital skills gap in Thailand



Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

As the future of work is now approaching, organizations are facing challenges from the acceleration of cognitive technologies, the pressure to adapt and to transform digitally.

The “Future of work” defined by Deloitte as result of many forces of change affecting three dimensions of an organization including work (what will the work look like?), the workforce (who can do the work?), and the workplace (where is the work done?)³. The 2019 Deloitte Global Human Capital Trends report suggested that vast majority of today’s organizations expect to increase their use of AI, cognitive technologies, robotic process automation, and robotics over the next few years. The nature of work is hence changing. Unarguably, technology can and will replace some jobs, but they also create new fields and occupations. Robots will take over most of repetitive work, while leaving the more challenging and interesting work for humans. We can use technology to our advantage to create more meaningful work as future of work requires you to use your head rather than your hands⁴. Organizations need to reinvent themselves around a human focus. They will need to rethink the appropriate way to redesign jobs, manage, and transform the workforce as automation becomes more prevalent in the workplace⁵.

As the redesigning job continues, one thing to be anticipated will be the job configuration to leverage unique human skills such as empathy, social, emotional intelligence, and the ability to set and define business context and problems.

It is the interpersonal and creative skills of human embedded in the work of the hands and the head. In this view, employers should become much more focused on exploring opportunities to create work that takes advantage of distinctively human capabilities such as curiosity, imagination, creativity, and social and emotional intelligence. Research suggests that more than 30 percent of high-paying new jobs will be social and “essentially human” in nature. Increasing diversity in the workforce will likely enhance the shift from routine tasks to more creative work, and we will see the emergence of hybrid jobs that increasingly integrate technical, design, and project management skills. The specific skills will likely come from diverse domains and evolve rapidly, increasing the need to accelerate learning for both individuals and employers to stay ahead of the game. Organizations can significantly augment the value of other tasks by leveraging technology capabilities and the increased ability to access deep specialization. Workers will need to have the appropriate skills enabling them to thrive in the workplace of the future and the ability to continue to retrain throughout their lives.

Global key soft skills demand trend that continue to grow include analytical thinking and innovation as well as active learning and learning strategies.

Forward-looking views of the talent market focus on the change in industry structure and occupational structure over time. These trends are crucial to understanding what types of tasks will be done, and which industries will be employing them. As jobs in the future are expected to be more machine-powered and data-driven than in the past, what skills do organizations need their people to have? According to the survey from World Economic Forum, skills that are most in demand in the global trend and continues to grow includes analytical thinking and innovation, active learning and learning strategies, and creativity, originality and initiative. Interestingly, you can see the shift from manual works in the past to more of human works. With the digital disruption came advance technology and automation process, the future of work then requires the combination of human skills and advanced expertise in order to stay ahead and thrive in businesses (See Figure 10).

Figure 10: Analytical thinking and innovation skills are the most required soft skills in the global level.

Present	Trending in short-term future
<ul style="list-style-type: none"> • Analytical thinking and innovation • Complex problem-solving • Critical thinking and analysis • Active learning and learning strategies • Creativity, originality and initiative • Attention to detail, trustworthiness • Emotional intelligence • Reasoning, problem-solving and ideation • Leadership and social influence • Coordination and time management 	<ul style="list-style-type: none"> • Analytical thinking and innovation • Active learning and learning strategies • Creativity, originality and initiative • Technology design and programming • Critical thinking and analysis • Complex problem-solving and ideation • Leadership and social influence • Emotional intelligence • Reasoning, problem-solving and ideation • Systems analysis and evaluation

Source: Future of Jobs Survey 2018, World Economic Forum

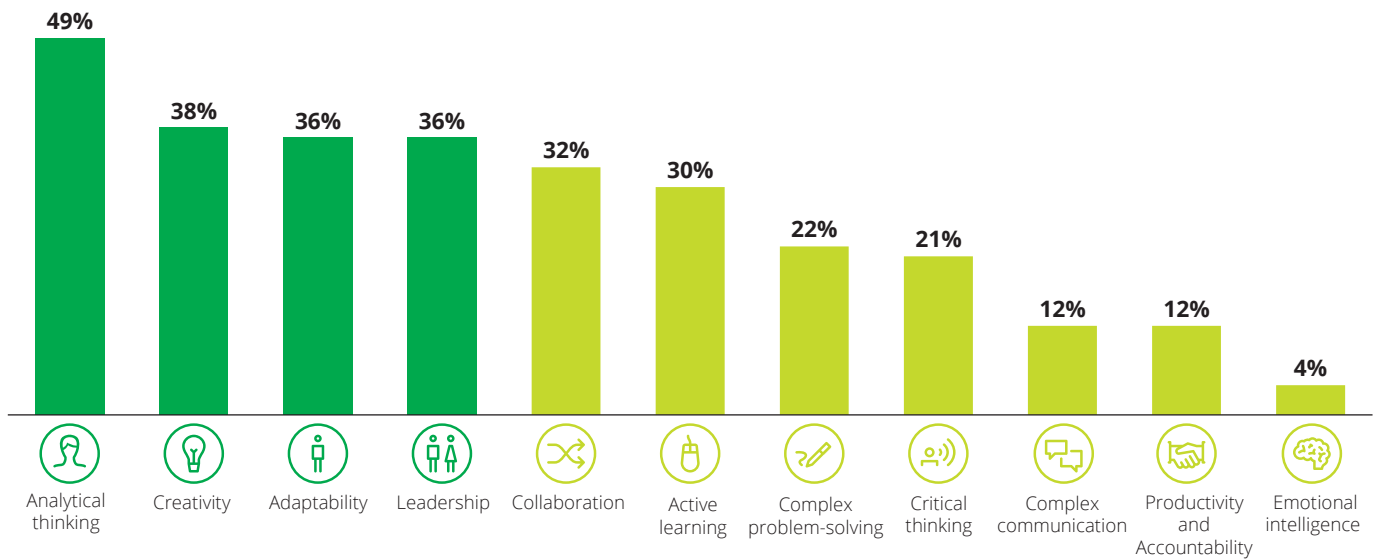
The result from The Thailand Digital Transformation Survey shows similar direction for in-demand soft skills in Thailand market. Respondents were asked to rank top three soft skills they feel required for digital transformation initiatives. Skill counted highest and far beyond the second rank with 49 percent is analytical thinking, which aligns with the global trend. As technology-driven trend approaches, most of us will be sharing our workplace with artificial intelligences and bots in order to stay ahead of the game, we need to focus on adopting a commitment to lifelong learning in order to acquire the skills needed to succeed in the future workplace. People with analytical thinking skill can analyze information and use logic to address work-related issues and problems⁶. They can innovate solutions and ideas.

Another top three skills include creativity, adaptability, and leadership. This set of the new requirements highlights the growing demand for human skills such as critical thinking, complex problem solving, and emotional intelligence, which is another alignment with the global trend. Companies will need to pursue a range of organizational strategies in order to stay competitive in the face of rapidly changing workforce skills requirements. To do this, leaders and the human resources function will also need to evolve in order to lead the transformation successfully.⁷ What does this mean for talent? As the key to the future of work demands human skills, talent can take the advantage and seize the opportunities to up their skills accordingly. They must also evolve quickly to serve the need in the talent market. They must think differently on how to do things and be able to adapt quickly in the changing environment. They must also have the confidence to take the lead in driving the change. The faster you can adapt, the earlier you are in riding the new wave of the changing market⁸ (See Figure 11).

Figure 11: Analytical thinking, creativity, adaptability and leadership are the most required soft skills for digital transformation in Thailand.

Soft skills requirement

(% of respondents, n=77)

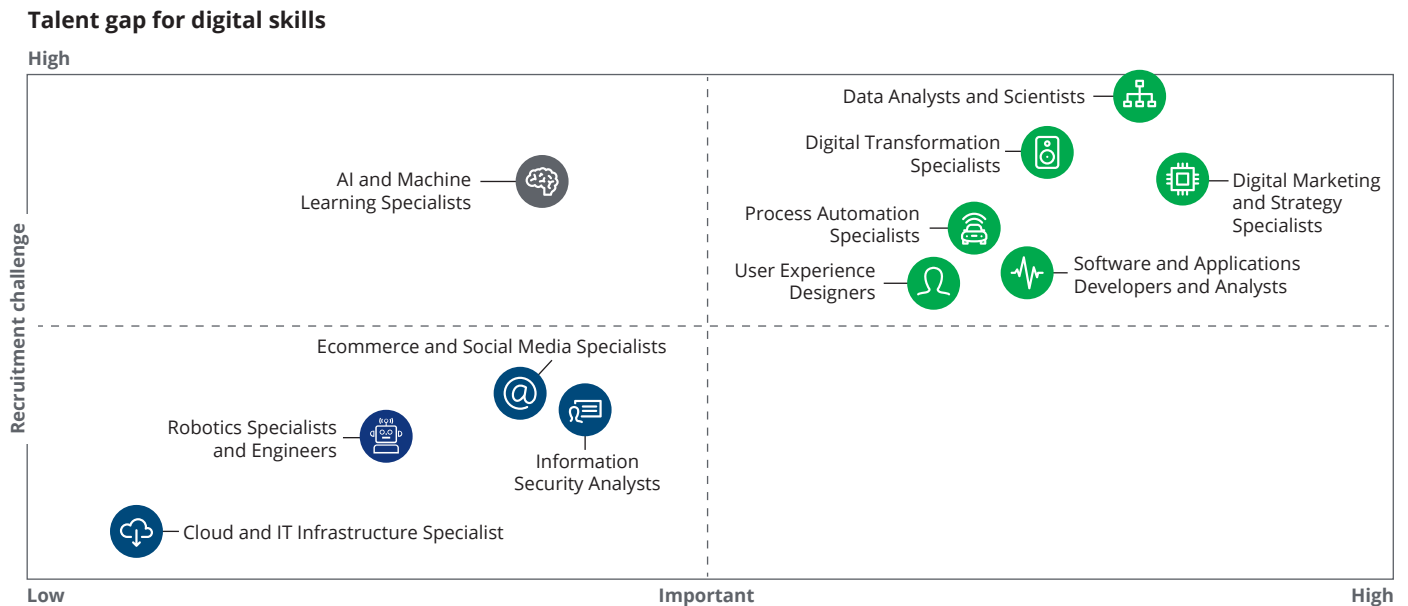


Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

As the adoption of new technologies shifted the nature of work, it also results in the shift of hard or digital skills to demand industry-specific adaptation toward the new jobs. At the global level, the World Economic Forum reports the set of emerging in-demand roles that are significantly based on and enhanced by the use of technology. These include Data Analysts and Scientists, Software and Applications Developers, and Ecommerce and Social Media Specialists. The report further stated the growing demand for roles that leverage human skills such as Customer Service Workers, Sales and Marketing Professionals, Training and Development, People and Culture, and Organizational Development Specialists as well as Innovation Managers. Moreover, evidence shows the accelerating demand for a variety of new specialist roles related to understanding and leveraging the latest emerging technologies: AI and Machine Learning Specialists, Big Data Specialists, Process Automation Experts, Information Security Analysts, User Experience and Human-Machine Interaction Designers, Robotics Engineers, and Blockchain Specialists. Individuals will need to take action on their own to enhance their potential for success. They must accelerate their learning in order to keep their skills up to date and to evolve in ways aligned with the shifting nature of work.

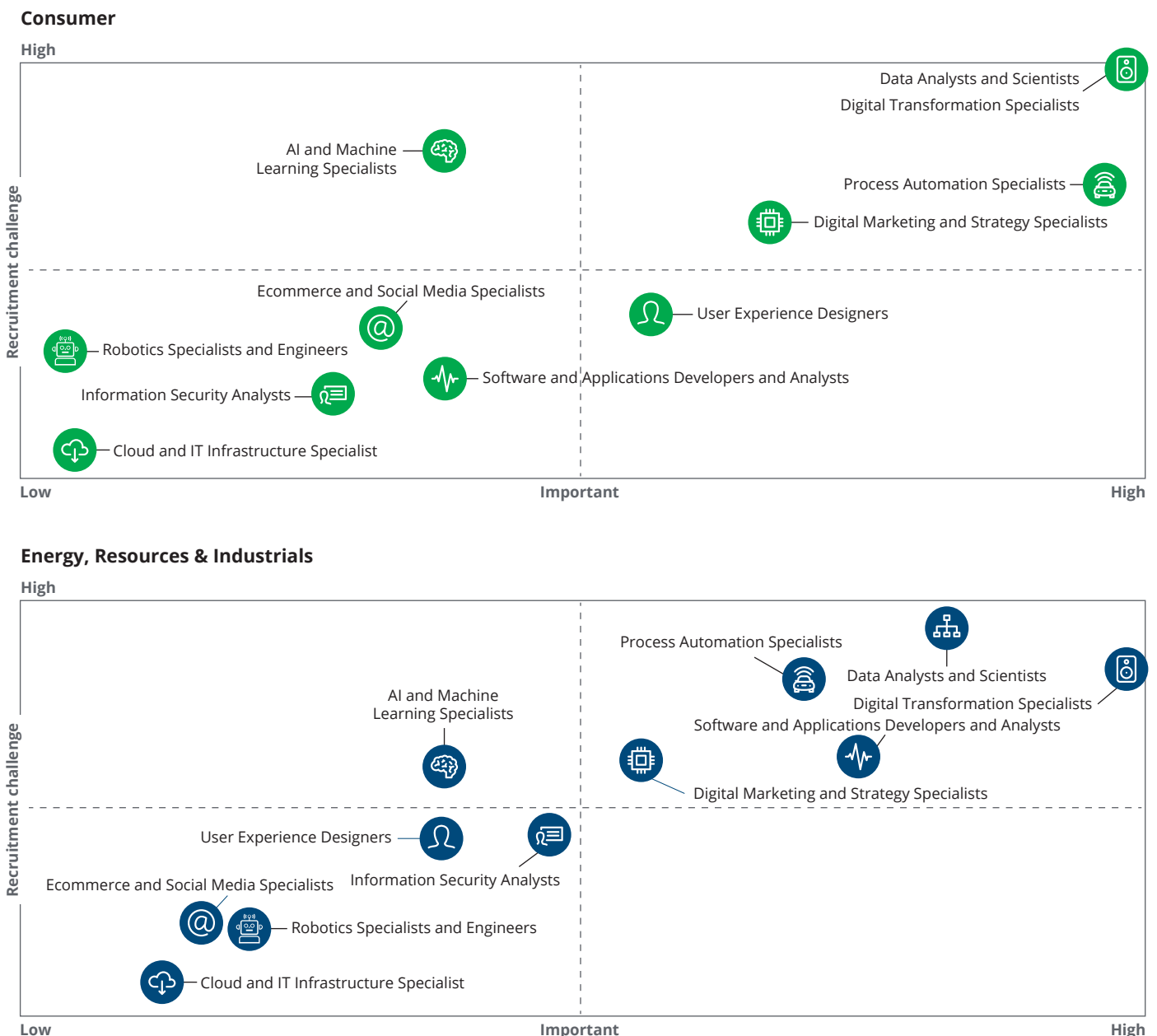
Data analysts and scientists are digital skills that are considered the most important and challenging for companies in terms of recruitment in Thailand. In The Thailand Digital Transformation Survey, respondents were asked to rank digital talent types they see highly important for their companies' digital transformation initiatives and those that will likely incur recruiting challenge. The result suggested that Data Analysts and Scientists are the most important as well as posing the most challenging roles to recruit for company in Thailand. Top right corner of figure 12 shows the talent gap where respondents find most important as well as difficult to recruit. Digital skills falling into this gap can be grouped into two main categories. One that respondents find most important and most difficult to recruit include Data Analysts and Scientists, Digital transformation specialists, and Digital marketing and strategy specialists. Second most important and difficult to recruit are Software and Application Developers and Analysts, Process Automation Specialists, and User experience designers. On the contrary, digital skills in which respondents have no problem recruiting and find them less important are Cloud and IT Infrastructure Specialists. As Cloud has been present in the market for decades, their presence are currently now secured. Talent with these skills set are easier to acquire and recruit, leaving organizations less worried in this area (See Figure 12).

Figure 12: Data Analysts and Scientists are most important and most difficult to recruit in Thailand.

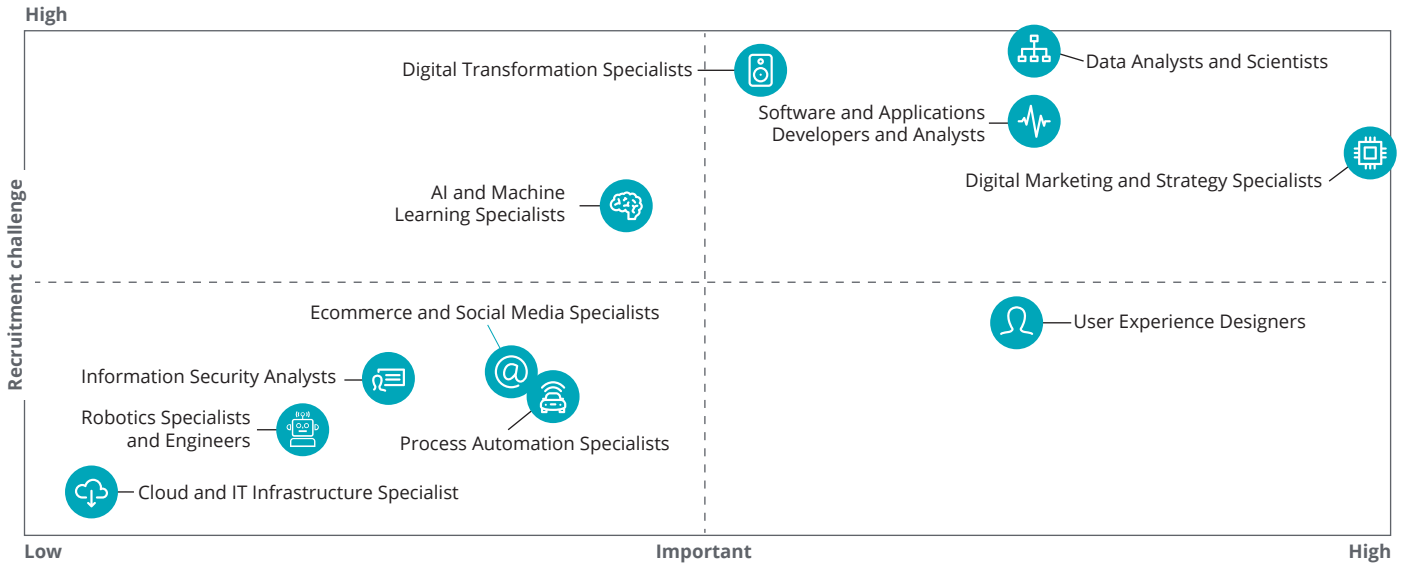


However, the perception on the importance and challenges of these skills set varies among industries. Different industries require different skill sets to thrive in their businesses. The survey also dig down into industry level where we analyze the talent gaps in different industries including Consumer, Energy, Resources and Industrials, Financial Services, and Technology, Media and Telecommunications. The top ranked for its importance and rarity are quite similar in all industries are Data Analysts and Scientists and Digital Marketing and Strategy Specialists. However, there are few other digital skills where each industry sees difference in its importance. In Consumer and Financial Services, User experience designers are perceived as very important while in Technology, Media and Telecommunications, Software and application developer and analysts are seen as very important. The nature of Consumer and Financial Services businesses relies mainly on consumer behavior, and the use of mobile application are in the mass. Consumers today live their lives rely heavily on internet and social media. They are exposed to “product offerings” at all time. People perform their financial transaction online through e-banking and mobile applications. That is why they need to focus on user experiences in order to be successful in the market. In Technology, Media and Telecommunications, their product focuses on developing software so their main focus would be on the developing path (See Figure 13).

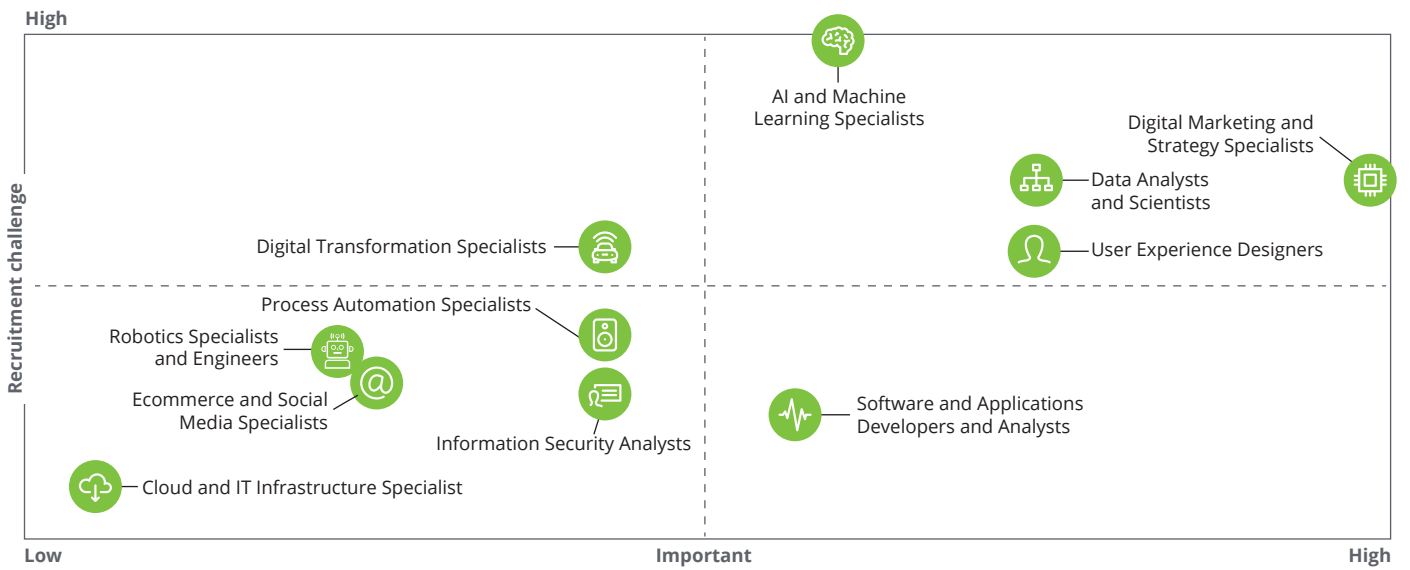
Figure 13: Talent gap in each industries are different as different industries have different perception and need for new skills necessary in their businesses.



Financial Services



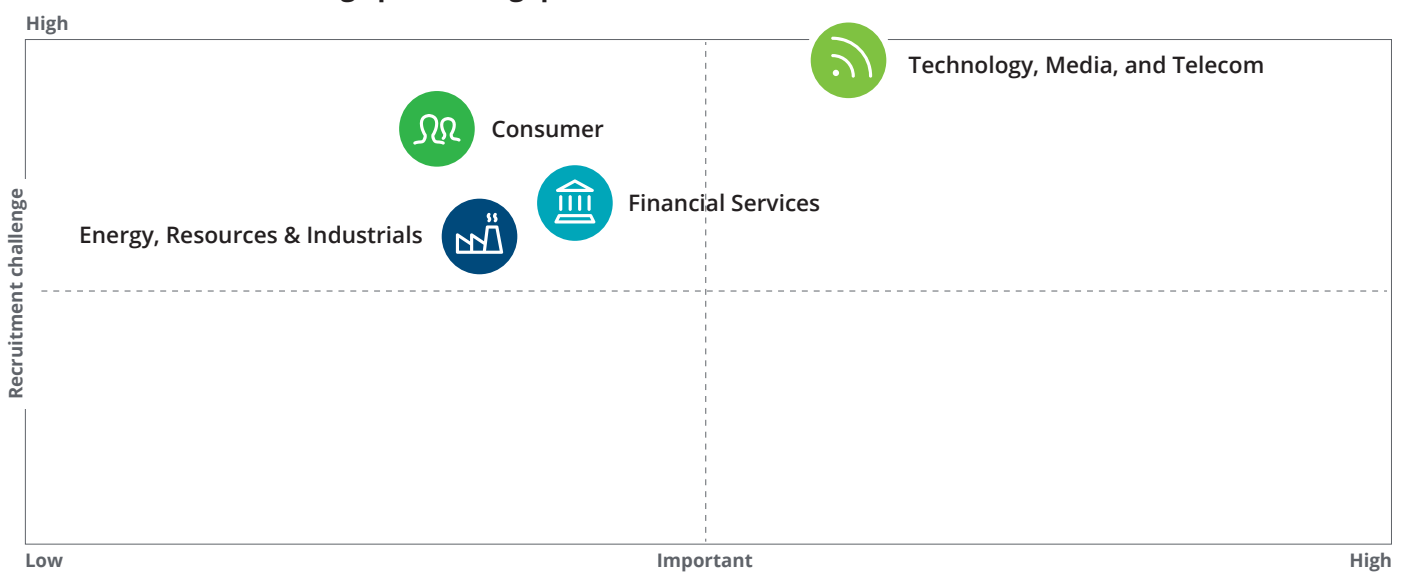
Technology, Media, and Telecom



Another important note from the survey is that AI and Machine Learning Specialists will become more important in the near future. Figure 14 shows AI and Machine Learning Specialists gap in different industries. The leading industry on the top right corner is Technology, Media and Telecommunications. This suggested that Technology, Media and Telecommunications finds this digital skill set as very important and difficult to recruit while another three industries are yet to see its importance. However, the figure shows that Financial Services is moving toward the top right corner. As Technology, Media and Telecommunications was the first to be disrupted followed by financial services, these early-disrupted industries are expected to be the first to adapt. Other industries will need to be aware of this fact and should prepare to avoid being disrupted by the coming of AI in the near future.

Figure 14: The increasing importance of AI and Machine Learning Specialists suggested that all industries should be well prepared for the coming of AI.

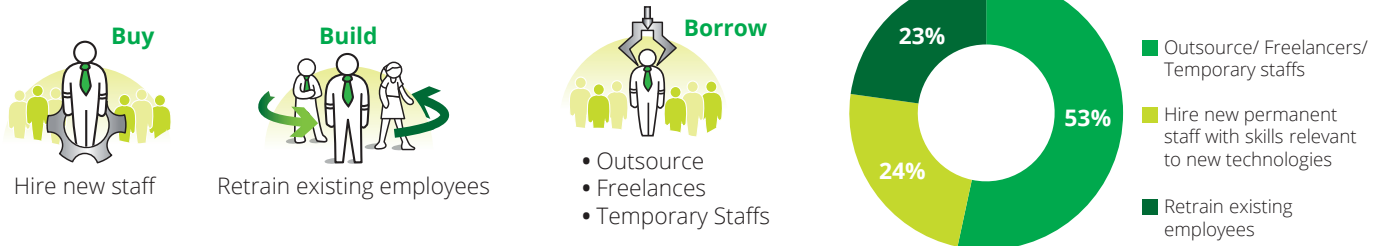
AI and Machine Learning Specialists gap in different industries



For the solution in closing these digital skills gap, we follow the “Buy-Build-Borrow” model and the result shows that more than half of respondents choose “Borrow” as their main strategy. In managing skills gap widened by the adoption of new technologies, we try to look at the solution strategies from different perspectives. We grouped the results into three main strategies including “Buy”, hiring new permanent staff already possessing skills relevant to new technologies, “Build”, retrain existing employees, and “Borrow”, turn to external contractors, temporary staff and freelancers to address their skills gaps. Figure 15 shows more than half of respondents choose to borrow rather than buy or build. This result shows an alignment with the global talent market where more than half are likely to turn to external contractors, temporary staff and freelancers to address their skills gaps, followed by hiring new staff and retrain existing employees, respectively. With the digital disruption comes new jobs and these new jobs require new and different skill sets. Talents possessing these new qualifications are very rare in the talent market, which makes it challenging and expensive for HR to recruit. Also, if companies choose to retrain their existing employees, with new skills set required to take on the new role, it might take too long before their talents are able to perform their new roles. Another important observation is that the future of work shows the growth of alternative work arrangements. The relationship between employer and worker is shifting. Where once most workers were full-time, on-balance-sheet employees with benefits and defined salaries, they are now engaged in alternative work arrangements, from freelancing to contract based work⁹. This gives organization opportunities for more options to find best talents (See Figure 15).

Figure 15: Considering HR challenges from the “Buy-Build-Borrow” model, companies tend to rely most on “Borrow” as solution for closing the digital skills gap.

Solution for closing digital skills gap (% of respondents, n=77)



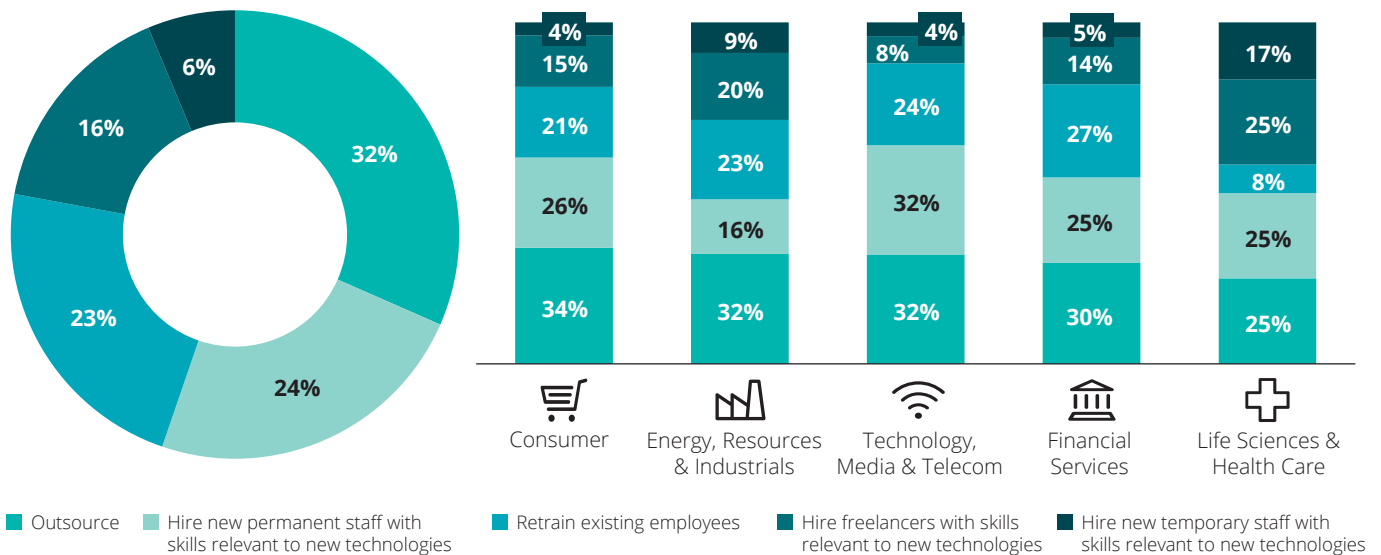
Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

To break into more details on the ranking, top ranked solutions for Thailand is outsourcing, followed by hiring new staff and retrain existing employees, respectively. When the respondents were asked what they would do to close the digital skills gap in their organization, most choose outsourcing, followed by hiring new permanent staff with skills relevant to new technologies and retrain their existing employees accordingly. Turning to freelancers or hiring new temporary staff are not so much in concerns for most industries at the moment. Again, the solutions for this HR challenge are different across different industries. For example, while Outsourcing is number one solution in all industries, their second and third priorities differ. In Energy, Resources and Industrials and Financial Services, organizations prefer to retrain their existing employees rather than hiring new permanent staffs. (See Figure 16).

Figure 16: Top three solutions for closing digital skills gap in Thailand are outsourcing, hiring new staffs and retrain existing employees, respectively.

Solution for closing digital skills gap

(% of respondents, n=77)

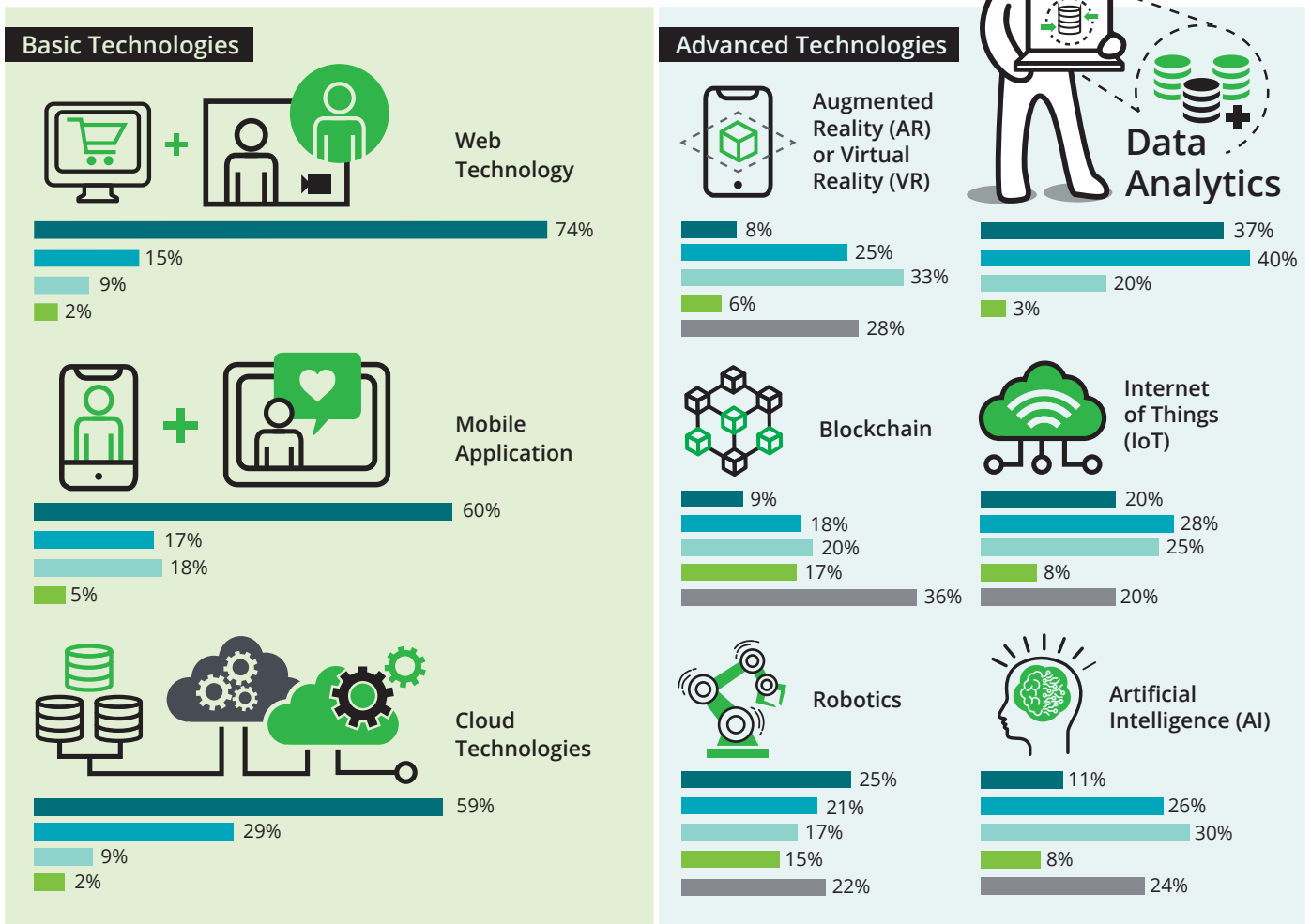


Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

Key business imperatives for digital transformation initiatives would be to invest in human capital and collaborating with other stakeholders on workforce strategy. In order to triumph, organizations need to understand that shifts in skills set, job, and alternative work arrangements are all interrelated. Changes in one dimension can have significant impacts on both workers and employers. They will need to redesign work, and the workplace in a way that generate valuable benefits while taking advantage of the opportunities for efficiency we have at hand¹⁰. Reskilling based on how the human workforce will interact with machines and make changes to job definitions should be embedded in organizations’ plans for digital transformation. Regardless of the solution taken, the focus should remain on a renewed human focus in a world where talent trumps technology.

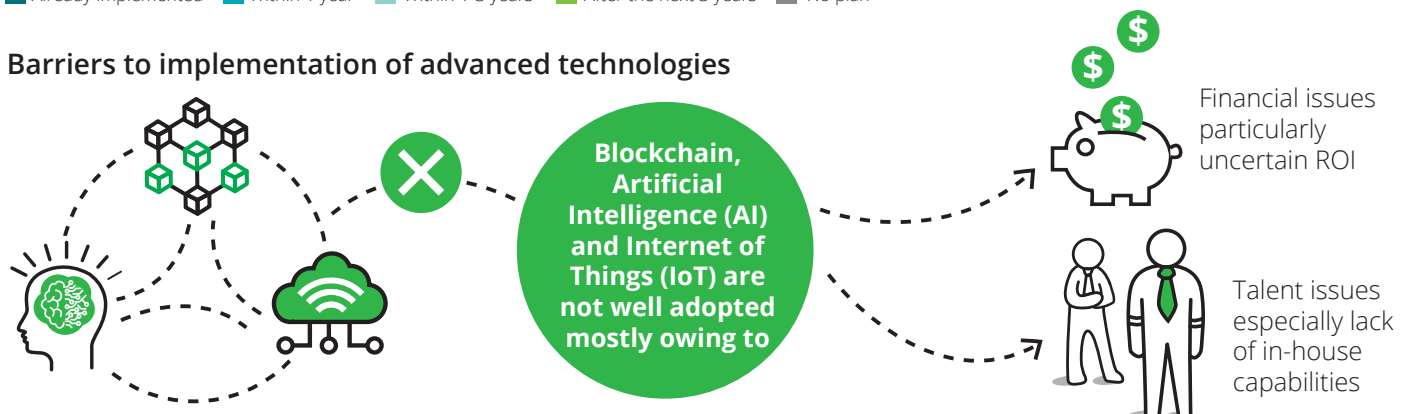
Embracing Digital Transformation through key technologies

Basic Technologies have already been widely deployed while advanced technologies are indeed still in immature phase of development. Data analytics is in a unique position. Businesses are shifting its focus more on business intelligence and value of data.



Legend: ■ Already implemented ■ Within 1 year ■ Within 1-3 years ■ After the next 3 years ■ No plan

Barriers to implementation of advanced technologies



Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

For nearly half a century, technology has been playing a vital role in business from facilitating, streamlining business processes through enhancing customer experience activities. It has underpinned critical business operations from backend to frontend facing with customers. We all agree that technology nowadays plays a role, not only defensive but rather leading role. Either business or digital transformation initiative for any organization is required the right technology, people and process to realize and drive successfully.

As always, strategic technologies have significant potentials to drive as well as to respond to disruption and to power both transformation and optimization initiatives. How your business integrates the adoption of emerging technologies with business strategy, is a big question needed to be carefully considered.

Most of the time, the less complex technology is, the higher chance it will get adopted and deployed enterprise-wide as we have seen from our survey result. Web technology, mobile application and cloud technologies are relatively matured and less complicated when comparing to other technologies. Hence, it is not surprising that these are widely implemented (See Figure 17).

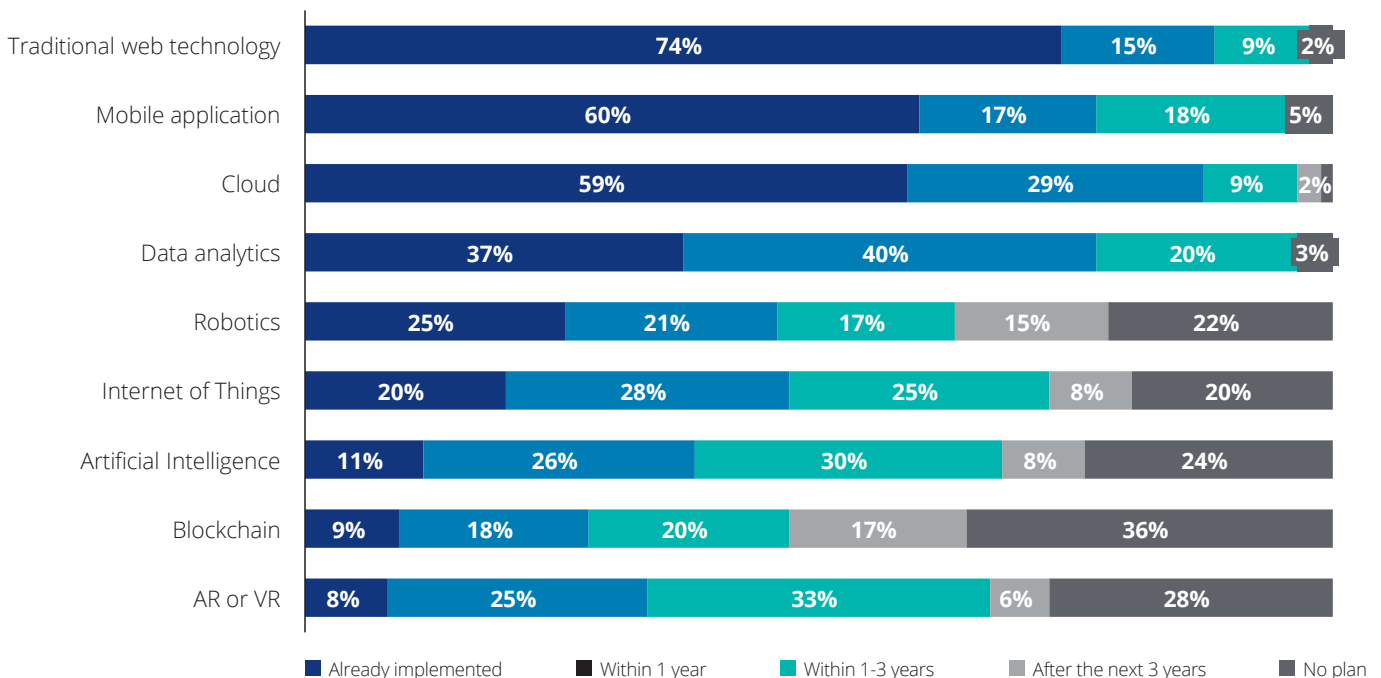
Data analytics is in a unique position when comparing to the rest, about one-third of respondents already implemented while another one-third has plans to do so within a year. This shows that businesses are shifting its focus more on business intelligence and value of data. As nowadays the world’s most valuable resource is no longer oil, but data.

While other more advanced technologies such as robotics and internet of things (IoT) are less adopted, the very advanced technologies i.e., artificial intelligence (AI), blockchain and Augmented Reality (AR) or Virtual Reality (VR) are indeed still in immature phase of development.

Figure 17: Basic Technologies have already been deployed while only few companies have implemented advanced technologies.

Digital technologies implemented or plan to invest

(% of respondents, n=87)



Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

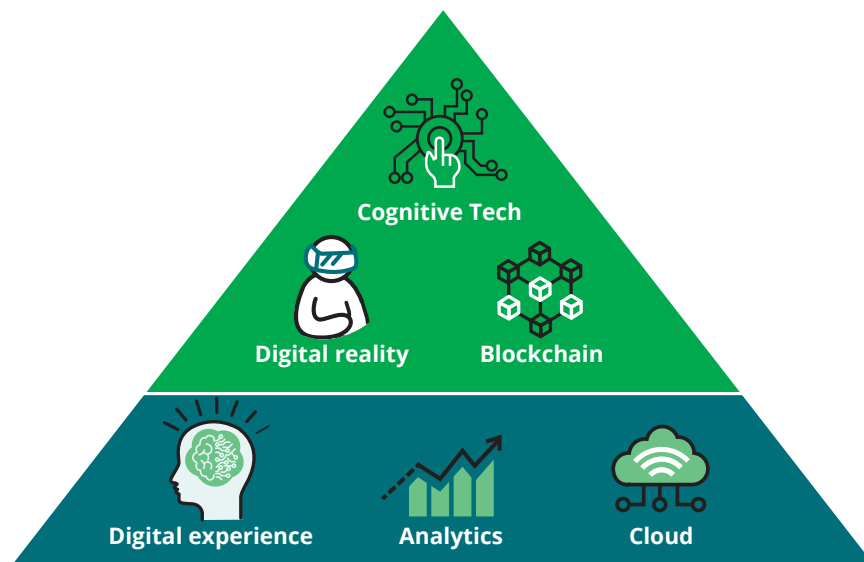
Although some technologies might seem to be aged or highly implemented, some are still evolving into the next phase of technology or business use case. For instance, Cloud computing are entering into a new phase, it is changing itself and getting more adopted through new use cases. In the past or even current typical usage, cloud computing has extensively been implementing simple, non-critical computing workloads such as data storage, HR, payroll and sales force automation. Today's cloud is moving to more complex, core business applications. It evolves from single cloud system into hybrid (cloud work cohesively with on premise system) or multi-cloud systems. Cost saving used to be a key benefit for moving to the cloud, but companies now look at it as an engine of innovation – a way to transform their business and achieve greater agility to help them respond faster to changes in the market.

From the Deloitte Tech Trend 2019, these key six technologies can be categorized into two groups; the foundation are digital experience, analytics and cloud, while the advanced group are digital reality (AR, VR and IoT), cognitive technologies (AI and Robotics) and blockchain. The former group is well-accepted and widely deployed, while the latter is less adopted. Digital experiences, analytics and cloud, three foundation technologies, have been laid out in almost every company. Meanwhile, there are key three newer or more advance trends – digital reality, cognitive technologies and blockchain – are growing rapidly in importance (See Figure 18).

Despite their ubiquity and proven value, these foundation technologies’ full potential remains largely untapped, as discussed in Cloud computing earlier. It still evolves all the time, e.g. Analytic, in the past, we look at canned report then we move to pivot table then visualization. From ‘rearview’ mirror to be more forward looking – predictive or even prescriptive.

Of course, those advanced or new technologies are not easily apprehended, as technology itself still evolved, not mature yet. But as wise man, said, technology is a mean to an end, not the other way around.

Figure 18: Evolve or renew 3 foundations technologies, while explore the new three advanced technologies

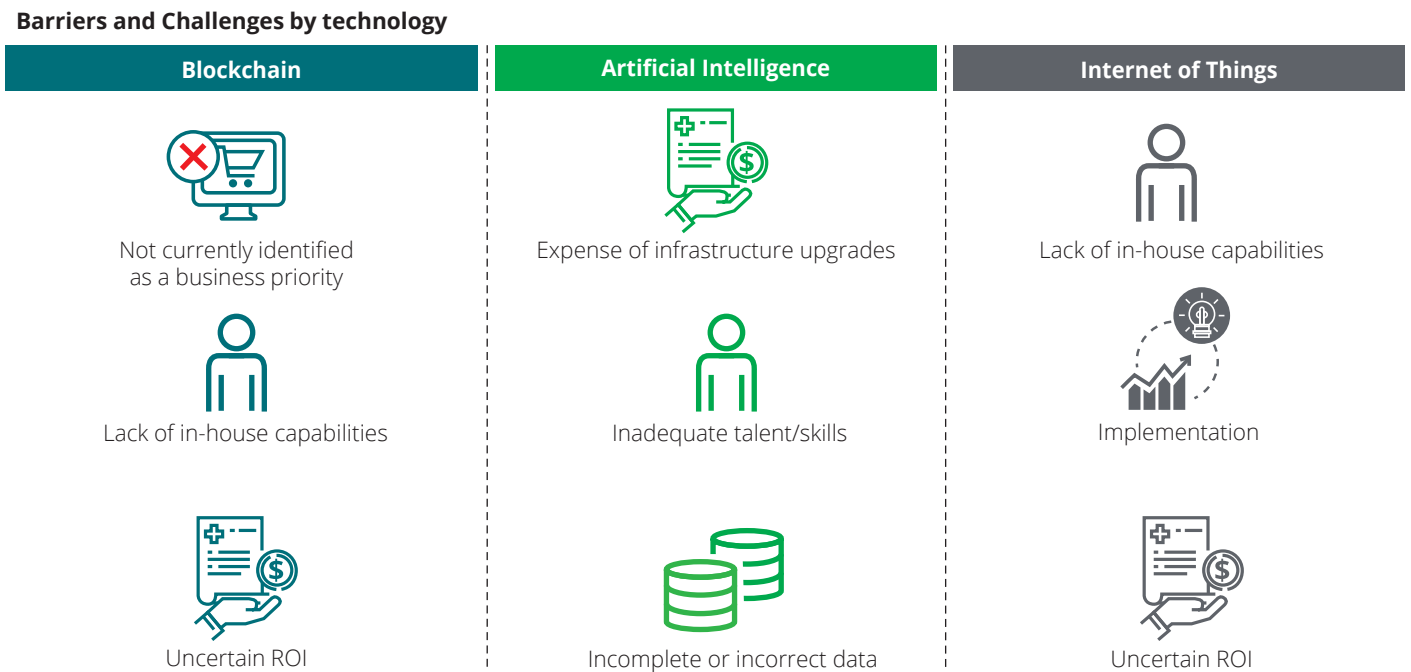


Source: Deloitte Tech Trend 2019

That is why the result from our survey has shown that Blockchain, Artificial Intelligence (AI) and Internet of Things (IoT) are not well adopted owing to financial perspective, such as uncertain ROI, cost associated in upgrading infrastructure as well as talent capability issues. Although these technology stories are still being written, their novelty is already beginning to show off and prove itself. In previous year, it might seem a hype or over-promised, 'seminar hot topic' case but recently as more real business cases and impacts have been started and realized (See Figure 19).

Many barriers or challenges described above are sometimes not a major roadblock to adopt these technologies. In fact, most of them are the result of either half-hearted execution, lack of pre-study or no key executive support. For example, uncertain ROI is quite a classic reason mentioned quite often. In any new novel technology, it has not always been easy or even impracticable to measure the ROI as it is still in infant stage.

Figure 19: Mostly owing to financial issues particularly uncertain ROI and talent issues especially lack of in-house capabilities.



Source: Deloitte analysis based on Digital Transformation and Technology Survey in October 2019

Nonetheless, businesses with high innovative and progressive culture or in the highly advanced industry always subdue the importance of ROI by thinking big and bold but starting something small, quick result and adjust along the journey. It doesn't aim the 100% perfect result at the first try or even a year. Financial services, technology – media – telecommunications are among top adopters in deploying blockchain and AI, while consumer shows more interest in IoT due to the relevant use cases in their businesses (See Figure 20).

Business case is always a key driver of any technology implementation. But sometimes, for the relatively young and still not full-fledged technology is not an easy case. For example, AI is a broad category that includes natural language processing, computer vision, machine learning, and more, all of which can augment back-office, intra-office, and customer-facing systems. If you are hesitating where to start, look to your organization's vertical industry for guidance and inspiration.

Talent issue might be challenging, both in terms of lacking expertise, experience or capacity. Similar to financial issue, this problem can be mitigated by either partnering or even acquiring the small but advanced tech companies or startups. At the same time, businesses might consider setting up a separate team or go further by spinning off to a new company for avoiding any HR restriction from the company. More in-depth discussion will be in the following section.

Initial step of any new technology adoption journey should be setting end goals, which will enable you to draw a further detailed and actionable road map with clearly marked milestones.

Figure 20: However, Technology, Media and Telecommunications and Finance have already implemented advanced technology.

Advanced technology implementation by industry

(% of respondents who have already implement each technology, n=8, n=10 and n= 17 respectively)

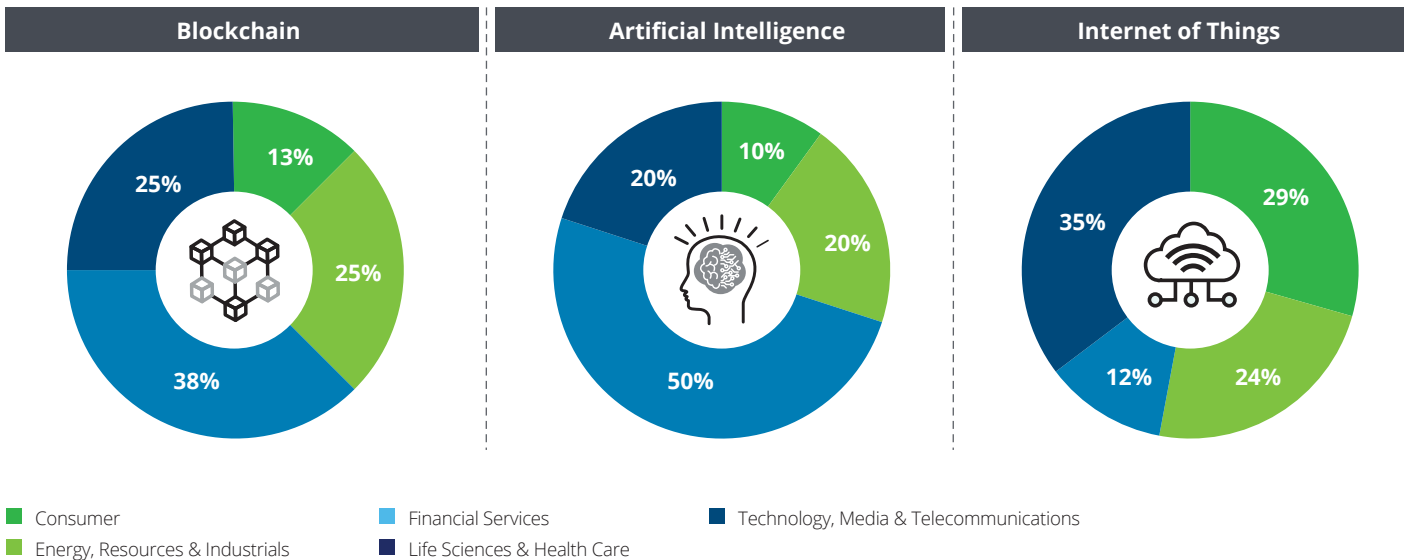
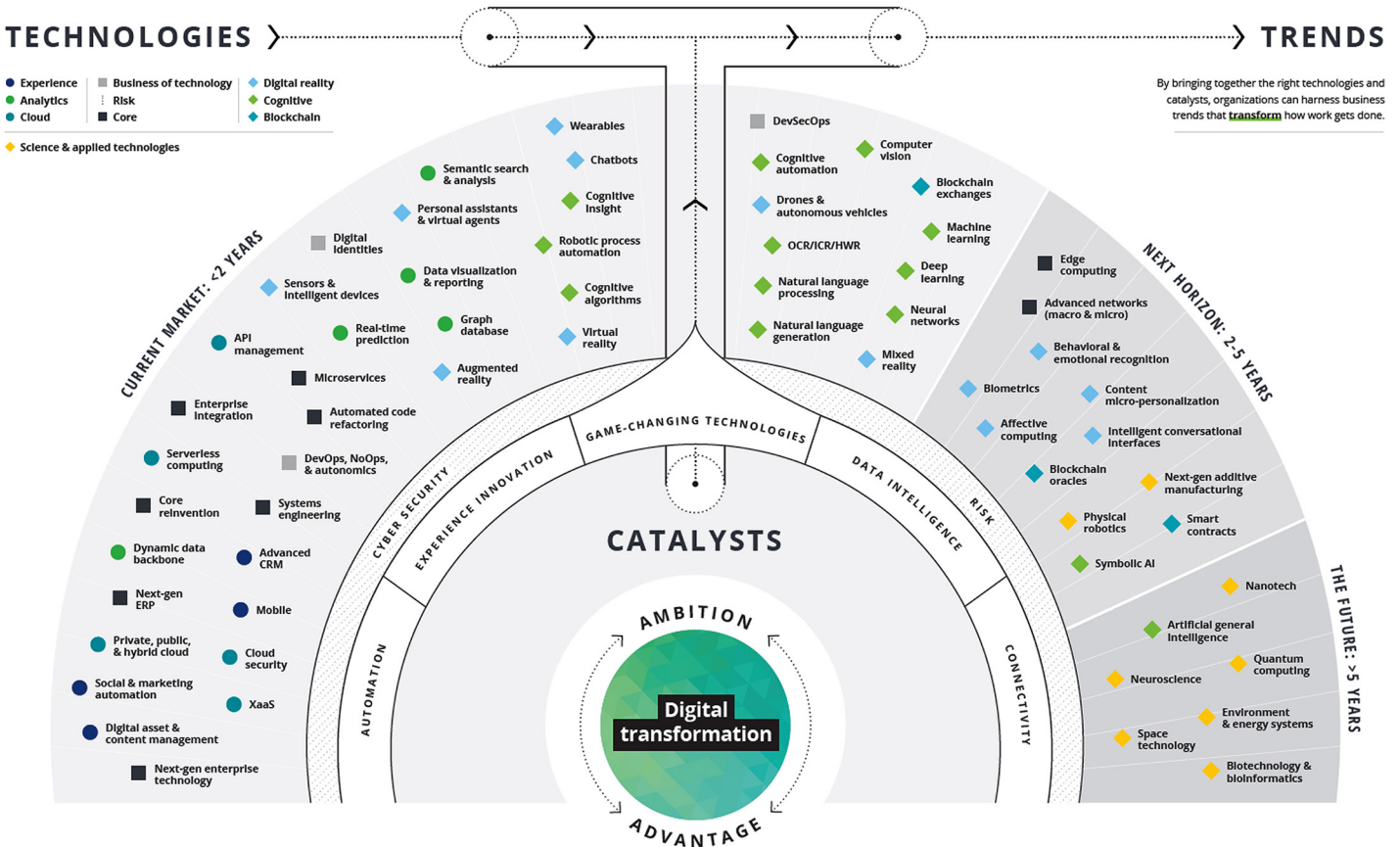


Figure 21: Technology horizon lay out the technologies and opportunities that expect to mature in the next 18 to 24 months in which it is a sweet spot for businesses to study and try these out. While those over 2 years might be interesting, businesses might put in its radar to monitor a far and see what might arise next.

Digital transformation network



Source: Deloitte Tech Trend 2019¹¹

Digital vanguards effectively manage both current and future business needs by balancing investments in foundational and emerging technologies. From the Deloitte global CIO survey 2018¹², the report identified a set of key characteristics of the leading companies who have been seen as market leaders in digital and emerging technologies or 'Digital Vanguards'. There are three common perspectives that set them apart from the rest which are business-IT alignment, talent management and technology strategy.

First, business-IT alignment – the growth mindset that drives innovation investments. Digital vanguards mandate a technology-driven emphasis on strategic business growth and prioritize tech-driven innovation. Business and IT need to collaborate to achieve maximum business result. The role of CIO changed from back-seater or supporter to be a co-pilot, working side-by-side with business leaders and ultimately must own overall company digital strategy in which those strategies are congruent with other business functions priorities as well as balancing with company-wide digital innovation initiatives.

Second, talent management - dynamic culture attracts top talent. Digital vanguards intentionally foster cultures that allow them to hire and retain top technology talent with their reputation as a leader in innovation, opportunities to work with emerging technologies in a creative and inspiring environment. Culture should be inclusive, full array of people at all levels, to drive digital transformation, encourage iterative experiment, and fail early fail fast.

Lastly, technology strategy - well balances in core and emerging technology strategy and investments. Digital vanguards effectively manage both current and future business needs by balancing investments in foundational technologies and emerging technologies. Their IT architectures and infrastructures well support current business needs. It also invests significantly in new technologies, such as artificial intelligence (AI), blockchain, internet of things (IoT) while uncompromised with the safety of the system by putting in place a cybersecurity initiatives comprehensively.

By studying and understanding these three perspectives; business-IT alignment, talent management, and technology strategy, businesses can develop their own strategic direction on digital transformation and innovation. Looking thoroughly at their own business landscape and environment, re-examine business operating models, while internally access the alignment of culture, talent and skills whether it supports the direction or digital transformation initiatives. Any talent needs to be re-train, upskill or acquire unconventional employee, like crowdsourcing. At the end, it comes down to leaders who must have a clear vision to set the path for organization, agile and digital-savvy leadership, forward-looking, ecosystem thinking are critical skill for next-gen leaders.

To capitalize on changing technology forces and become undisruptable, CEOs need to become "masters of disruptive jujitsu." They should identify potential disruptions, organize appropriate component responses, and hijack the trends for their own competitive advantage. To do so, CEOs can work with tech executives and their teams who are identifying emerging technology and operating on the front lines of the digital revolution.

Revolutionizing Public Policy in the Digital Era

Public policy decisions are one of the key determinants in developing the innovation ecosystem in the country. Through its authority and resources, the government plays a significant role in transforming new innovative ideas into reality.

Stakeholders in an innovation ecosystem include universities, government, corporations, startup accelerators, venture capitalists, private investors, foundations, entrepreneurs, mentors, and the media¹³. Each plays a significant role in creating value in the ecosystem by transforming new ideas into reality through access and financial investment. Still, with its rich available resources, the government should play a central role in helping develop the ecosystem¹⁴.

To make digital transformation possible, government leaders should set the right policies, develop the right technologies and ready their workforces as well as infrastructure. It is important for the government to constantly reassess their national competitive advantages and develop strategies in improving the country's competitiveness. It took Silicon Valley years to build the ecosystems they have today. That is why setting a long-term vision and goal is crucial.

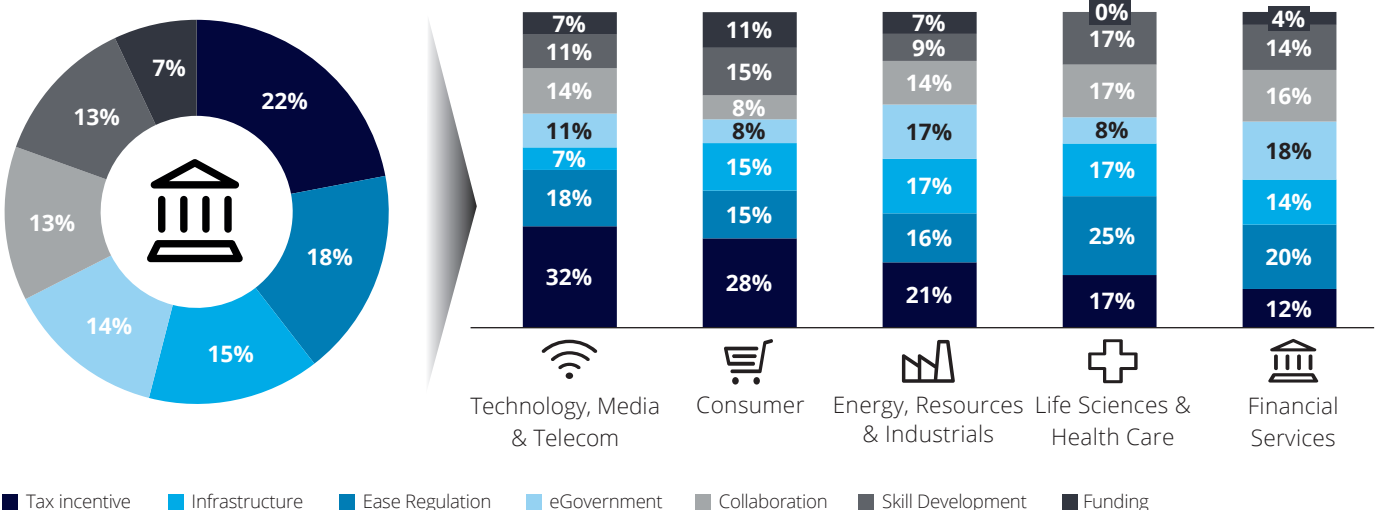
Tax incentives, easing regulations and well-established infrastructure are the most popular demands companies wish they had from the government. According to our survey, of the total respondents regardless of their industries, respondents argued that tax incentives, easing regulations and well-established infrastructure are the demands they wish they had from the government with 22%, 18% and 15% of total respondents, respectively. This implies that the Thai government should take extra efforts in tackling these problems (see Figure 22).

At industry-level, majority of respondents in Technology, Media and Telecom admitted they would like to receive tax incentives. Also, similar story is seen in Consumer and Energy, Resources and Industrials with tax incentives receiving the highest percentage. Meanwhile, Life Science and Health Care and Financial Services prefer easing regulation the most. Hospitals have to deal with administrative activities associated with regulatory compliance on a regular basis¹⁵. Hospitals need to increase price transparency of medical care and drugs to the authority. To protect consumers, the regulation is still unavoidable. As Life Science and Health Care need to devote some of their resources e.g. staff, money and time to meet regulatory requirements, moving to digital may not be as easy as one hopes. For financial institutions, their business model is strictly regulated by policymakers i.e., Ministry of Finance, Bank of Thailand, etc. As a result, unsurprisingly, reducing or easing regulations has become top priority for Financial Services.

Figure 22: Tax incentives, easing regulation and infrastructure improvement are the most popular requirements from companies to government.

Requirement from companies to government

(% of respondents, n=76)



Source: Deloitte analysis based on Digital Transformation and Technology survey in October 2019



To improve the digital business environment in Thailand, here are some policy recommendations for the Thai government.

Tax incentives should be offered to entrepreneurs in order to promote a more competitive tech-led innovation environment in Thailand. Digital transformation alone can be extremely costly. As a result, the government should step in to alleviate the pain. They should offer a special tax exemption to any businesses that invest in activities involving innovation. This is to encourage businesses to continuously invest in innovation to improve their operational efficiency and productivity, which in turn promotes the growth of the company and country as a whole. Thailand has seen some initial movements, for example, the Digital Economy Promotion Agency (depa) aims to make Thailand an IOT hub of Asia and tries to boost digitalization¹⁶. Starting 2020, in addition to computer software, depa plans to offer a 200% tax deduction for the purchase of smart devices, digital services, robotics and Internet of Things (IoT) devices by small and medium-sized enterprises (SMEs). These digital services include cloud-based services, digital architect design services, consultations, fintech, agriculture tech and medical tech¹⁷. These tax privileges will not only help draw investors but also embrace tech environment initiatives. Take Singapore as an example. According to Startup Decisions, The Singapore government implements Productivity and Innovation Credit (PIC) Scheme. The eligible businesses has the option to convert 40% of the amount they spend on the qualifying innovative activities into a cash payout from the government with capped at USD 100,000. Plus, this cash payout is non-taxable. That is why, due to many incentives, Singapore has become extremely successful in digital transformation.

Thai government should ease regulations and shorten paperwork legal process. In addition, intellectual property laws should also be fully addressed and taken seriously. Strict regulations and long legal process in running businesses can disincentive both international and domestic talents from creating high-tech environment in Thailand. The government's restrictions and strict regulations can pose a constraint for companies moving towards digital businesses. According to the Global Competitiveness 2019 Report by World Economic Forum, Thailand ranks at 67th (out of 141st) in terms of legal framework's adaptability to digital business models¹⁸. This indicates that much more could be done by the Thai government.

However, some initiatives have been recognized. The Bank of Thailand has recently put extra efforts into helping financial institutions move towards digital economy and reduced some regulatory burdens. For instance, the BOT has just approved banks to test cross-bank identity verification through the National Digital ID (NDID) platform for opening bank accounts under its regulatory sandbox. The NDID is a blockchain database, which stores information of its users. With digital ID, this will allow customers to open saving accounts with new banks by using the verification and information from accounts which they already have with their existing bank in order to verify their identities using reliable facial recognition technology. This service is convenient and fast as customers neither have to present themselves at bank branches nor fill out many duplicate paper while guaranteeing the security and privacy of personal information¹⁹.

In addition to easing regulation and reducing legal process, intellectual property laws can play an important role in encouraging businesses to produce new ideas, applications or services. There should be efficient regulations to safeguard business interests, trade secrets, and ownership of ideas. These act as a necessary shield for tech businesses, especially the ones that are starting small.

Thai government should establish a strong well-functioning infrastructure and remove impediments to the expansion of digital infrastructure. Because digital players connect through networks, well-maintained infrastructure should contribute to the success of an innovation ecosystem. These networks promote collaboration and help generate ideas and disseminate knowledge among them. So, it is important for a country to have a favorable environment for these players.

According to the World Economic Forum, digital infrastructure include networks, data/protocol, devices and servers/storage²⁰. If the government ensures efficient and well-functioning infrastructure, then it will be beneficial for businesses such as better customer experience, which in turn generates higher demand for products and ultimately translate to higher economic activities. For example, if there is more mobile access in the country, it could also mean more financial access for those unbanked. There would be more opportunities to the mass market and will help businesses in e-commerce expand.

Infrastructural factors should be continuously addressed as they are directly related to difficulty of businesses moving to digital platform. Also, there will be a strong foundation for highly-trained local workforce in the future. On top of that, this will ultimately indicate the overall performance of the tech ecosystem in the country.

Apart from the above three demands from companies to the government, the government should reform education system and emphasize the importance of data science skills.

As growing amount of data become more accessible, the demand for data scientists shows no sign of a decline across industries in the coming years²¹. Although it has just become a rising trend in Thailand, still, it is only among higher-education graduates. The Thai education system needs to adapt and prepare the new generation for a rapidly changing labor market.

Thai government should take significant efforts in placing more emphasis upon educational system and promote more data science talents. The Ministry of Education should revise course syllabus and add data science courses for students since early stage to build strong foundation for the future. The government should also attract more teachers in this area. In addition, teaching quality should also be addressed by constantly improving teachers' skills and professional development and courseware as teaching tools. Yes, this may ridiculously take much time and efforts, but in the long-run, it will be worthwhile. If these are successfully fulfilled, it can ultimately drive innovation and create jobs.

Luckily, in 2020, the Digital Economy Promotion Agency (depa) is planning to provide big data skills training for 1,000 government officers as part of initial efforts to use the technology for the country's development. The officers will be trained by Government Big Data Institute (GBDI)²². The instructors are drawn from government scholarship students, the private sector and university researchers. Also, Thammasat University hosts the Bachelor of Science Program in Data Science and Innovation. Furthermore, the University has collaborated with SkillLane, an online course platform, and opened Data Science for Digital Business Transformation program. The learning is done online. Despite limited number of current available courses, if the Thai government remains consistent in making data science field more recognized, we should see more development in the near future.

The government, together with universities and the private sector should collaborate in Research and Development (R&D) to nurture tech innovation.

The government should take initiatives in helping companies integrate technologies and re-engineer business processes to raise efficiency and enhance their product development at the early stage via investing in R&D. Taking Israel as an example, the state dedicates Israel Innovation Authority to champion research and development in the country. This can be validated by the fact that many large tech companies such as IBM and Intel decided to invest in R&D in Israel to create innovation since 1970. Apple also invests in

Israel startups worth more than USD 400 million as well as sets up a R&D center in the country. Also, Israel works together with their top universities to set up Technology Transfer Organization (TTO) to transfer inventions from lab bench into real-world market²³. Currently, there are now up to 16 TTOs in Israel, each tailored upon specialization of that university. According to the World Bank, Israel spent the most of any nation on R&D with 4.4% of GDP. Whereas in Thailand, there is only 0.8%.

Because of this, more R&D collaboration with universities and private sector is still needed. The Thai government should come up with plans or incentives to attract talents from different sectors to collaborate with the state to produce an economy where innovation is high on the agenda. All players should share information among one another and, most importantly, build bridges facilitating the free transfer of ideas and opportunities between the academic world and the outside world of entrepreneurs, investors, industries and communities altogether. Through high quality scientific research institutions and collaboration on R&D, the entire network is believed to be further strengthened.

The government should open specific funding programs for local initiatives to improve the overall innovation ecosystem in the country.

The government should sponsor specific funding programs with the goal to support and facilitate companies. Singapore is home to unicorns: Grab, the ride-hailing app, and Garena, digital services company. Their government fosters tech companies through various funding bodies, including SPRING Startup Enterprise Development, the Early Stage Venture Fund, Technology Incubation, and the Sector-Specific Accelerator programs. Plus, the Government has worked on improving access to private capital for tech start-ups. For instance, the Monetary Authority of Singapore (MAS) has simplified the regulatory regime for venture capital managers, and launched a USD 5 billion private markets program to encourage global private equity players to deepen their presence here. Thanks to simplified regulations for venture capitalists, startups can access the capital easier. To improve an environment of innovation and entrepreneurship, the Thai government should encourage more financial options as well.

All in all, digital technology and innovation are crucial as it will remain a potential driver of economic growth for many years to come. Of course, it does not happen overnight, but requires active interactions among all relevant players. In conclusion, the hassle-free system and efficient government policies will help support tech ecosystem and stimulate the overall digital industry in Thailand.

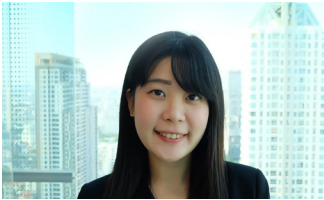
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