

Unfolding the next growth chapter in the Middle East

How Tech Leaders drive business performance with next gen 5G networks, digital technologies, and innovation



 **accenture**

 **Microsoft**

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Introduction

A major transformation is unfolding across the Middle East, with enterprises investing in digital technologies and next-generation networks. These new technologies hold huge promise for supercharging business outcomes—but only if they are harnessed in the right way.

End-to-end digital transformation will come about through the convergence of 5G and key technologies: cloud, edge computing, artificial intelligence (AI) and Internet of Things (IoT). To realize the full benefits of advances in network connectivity and digital technologies, companies will not only have to invest in a suite of new convergent technology solutions. They will also need to carry out organizational and cultural change, elevate the next-gen connectivity and technology agenda on the C-suite radar, and develop the internal skills needed to put these solutions at the base of innovation and company growth.

This will not be easy, and companies may have concerns over the complexity of associated technology integration, extracting return on investment (ROI), and choosing the appropriate partner ecosystem and platform for solutioning.

But it is possible to rise above these challenges. In new research, we have identified a group of leading companies called Tech Leaders who point a way for others seeking to take advantage of the game-changing convergence opportunity.

The trail being blazed by Tech Leaders offers a beacon for others looking to light their own path to transformation and innovation. In this report, we explore the outlook and impact of 5G and converging technologies across the Middle East—examining detailed use cases from key industries—to illustrate how enterprises can prepare for the far-reaching shifts that technology convergence will unleash.

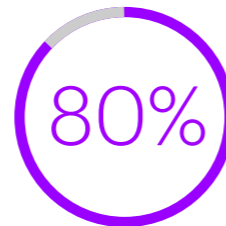
The time is now

Digital technologies and advanced connectivity have become the foundation for future enterprises aiming to be hyper-connected, agile, secure, resilient, and innovative.

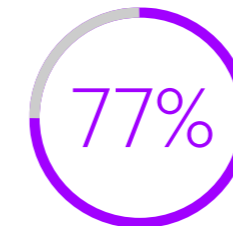
We see that companies across different industries in the Middle East are eager to seize the game-changing power of this new technology landscape.

The Middle East is a fertile ground for enterprises to reap the benefits of next-gen networks and technologies. The region has emerged as a global forerunner in advanced connectivity, with Qatar, Saudi Arabia, and the UAE among the first countries in the world to deploy 5G networks.

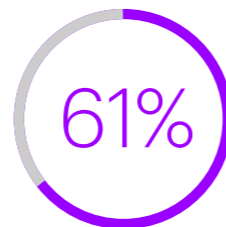
Governments are focusing extensively on deployment of digital technologies as part of their economic diversification strategies, which are focused on harnessing knowledge-based digital economies with a thriving private sector.



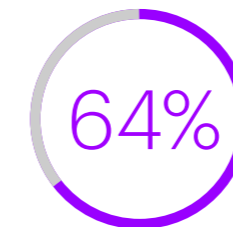
of companies are at various stages of adopting digital technologies, ranging from wide adoption to partial implementation to piloting



say they are planning to invest an incremental 3-10% of their ICT budget on advanced networks like 5G in the next three years



of respondents are planning to invest in 5G-enabled campus networks



of organizations from the oil & gas industry (and 45% from manufacturing) show a strong appetite for near-term investment in 5G campus networks

The time is now

Across the region, business leaders are doubling down on 5G and digital technology solution deployments. Driving these investments are three key developments:

1 The new post-pandemic way of working: The pandemic harshly reminded enterprises of the importance of keeping business hyper-connected and having robust digital infrastructure in place, and the future budgets reflect that reality. According to Gartner, 70% of global organizations using cloud services today plan to increase their cloud spending in the wake of the disruption caused by COVID-19.¹ It also found that 66% of enterprises globally increased or maintained their AI investments since the onset of COVID-19 and 75% will continue or start new AI initiatives over 2021.² Companies are also investing significantly in their networks. Nearly 45 percent of worldwide and U.S. respondents to IDC's Future Enterprise Resiliency & Spending Survey plan to increase spending on 4G/5G wireless/cellular connectivity in 2021.³

2 The push for accelerating digital transformation: True digital transformation can only happen when next generation technologies (cloud, edge, AI) and networks (5G) come together. As per IDC spending on digital transformation is set to gather even more pace in the post-pandemic period, increasing from 25% of total IT spending in 2020 to 37% in 2024.⁴ Digital transformation is also the key objective of government plans in the region with major economies making massive investments in AI, IoT and other such technologies as a part of national strategies like Saudi Arabia's Vision 2030, UAE's Vision 2021, and Qatar's National Vision 2030 development plan.

3 The need to explore innovation and disruptive opportunities: Organizations are looking to accelerate innovation to support business and operating model reinvention, fast-tracking transformation programs to future proof their businesses. Accenture's Innovation Maturity Index, which measures the maturity of companies' innovation capabilities, found the overall innovation maturity index scores for the Middle East to be 59 (out of 100) in 2021, a marginal uptick from the previous year's results. Companies in the Middle East are supported by ambitious national digital transformation strategies, but apart from the Innovation Champions, most businesses are behind the curve in investing in the various elements required to innovate. The Covid-19 pandemic has only exacerbated the reality that companies in the region need to intensify their innovation investments.^{5,6}



Harnessing the power of convergence

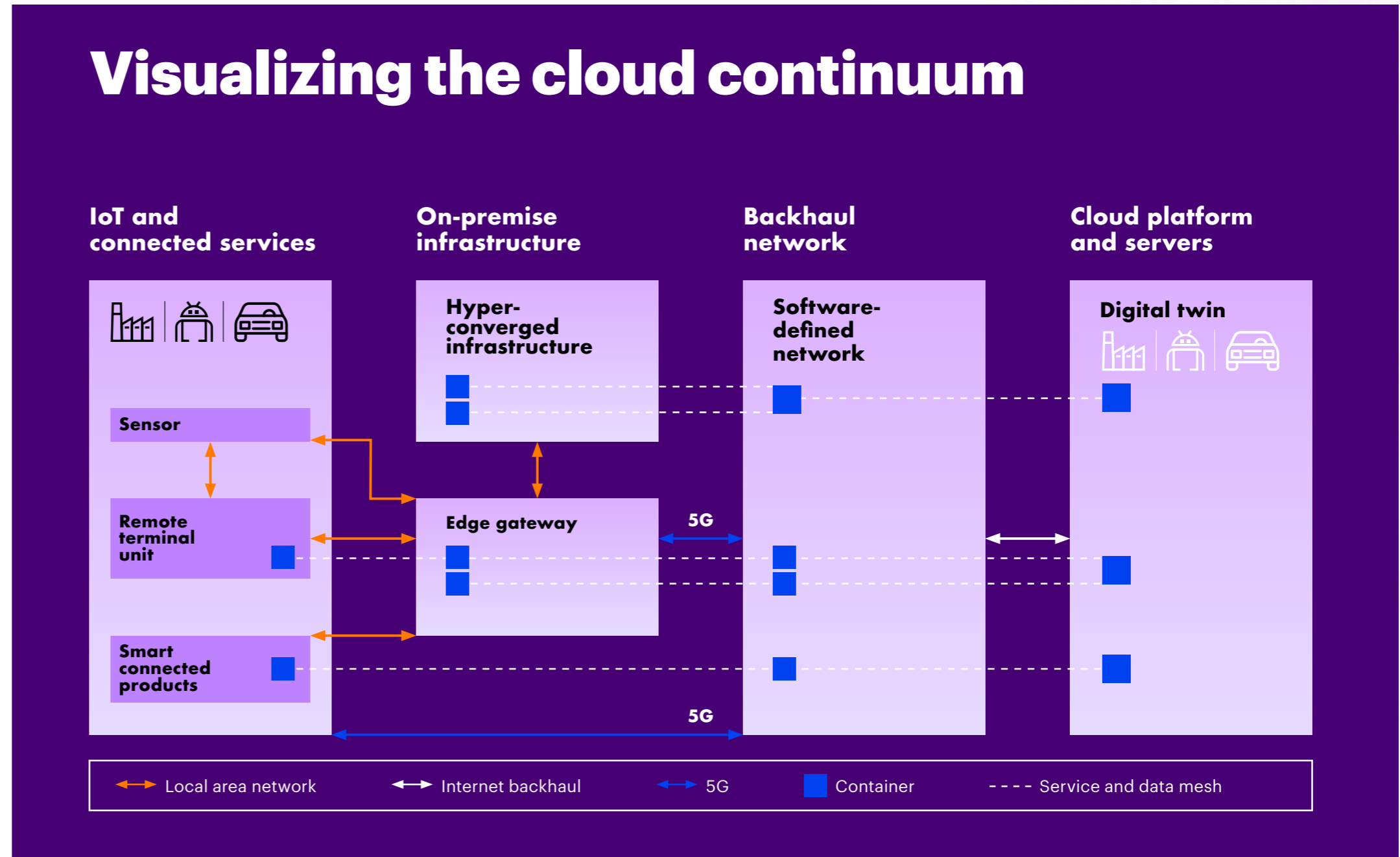
Advanced networks such as 5G have the potential to unlock unprecedented opportunities for business transformation and growth. However, 5G alone will not create the revolution.

Next-gen networks must be paired with complementary digital capabilities to best serve business needs—now and in the future. End-to-end digital transformation will come about through the convergence of 5G and key technologies: cloud, edge computing, AI and IoT.

Companies are already seizing on cloud as a key enabler for digital transformation. In the cloud continuum, the cloud sits at the center and the edge complements it, as it radiates out toward the “ends” of a network. Cloud will integrate with data and computed insights from the edge, and spur new apps that will be deployed at the edge—making edge an extension of cloud.⁷ 5G connectivity makes the division of computing resources along the cloud-network-edge continuum possible, and its ultra-reliable low-latency capabilities make the shorter connection between the device and the edge even more efficient.⁸

Harnessing the power of convergence

Likewise, the combination of 5G, cloud and edge computing will have a massive impact on the development of AI and IoT technologies. With 10-20x faster speeds and dramatically lower latency, 5G makes it much more feasible to process AI workloads locally at the edge, where data is gathered, rather than the slower and more expensive method of sending it to the cloud or a data center. Billions of IoT devices interconnected through 5G networks will give businesses unprecedented, real-time data to maximize the analytical power of AI for operational decisions.⁹





Barriers to implementation and value extraction

While Middle East enterprises show a clear appetite for new technologies, organizations may find it difficult to unlock value from their investments.

Most companies today are implementing individual technologies and upgrading networks as standalone transformation projects, without tying them into the overall enterprise strategy of digital transformation and innovation, thereby falling short of achieving holistic business value.

Across different industries, we see three common barriers:

- 1. Navigating the complexity associated with deployment and integration of new network and digital technologies**
- 2. Managing financial and people resources while extracting business value**
- 3. Navigating the still-maturing partner and device ecosystem**

1

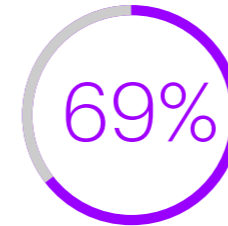
Navigating the complexity associated with deployment and integration of new network and digital technologies

Enterprises are going through a radical change in their digital infrastructure.

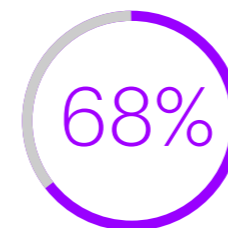
IoT devices and AI applications proliferating across business functions, cloud computing becoming an extension of enterprise infrastructure, and edge solutions starting to see deployments. If rightly done, advanced networks like 5G tie all these digital technologies together by providing the connectivity layer essential for their seamless implementation.

However, enterprises may face challenges due to limited understanding of relationship between 5G and digital technologies. Deploying 5G in a silo will not lead to transformational outcomes, it is only when advanced networks are combined with digital technologies, killer new experiences and business models can be created.

Once enterprises begin to deploy 5G, they are likely to experience a new set of barriers. 5G implementation is an uncharted territory for enterprises and they are likely to face challenges right from network planning stage. Companies also need to think about the network topology – how to construct the network, integrate it securely with legacy systems and finally changing the current operating model to suit the new requirements.¹¹



of respondents highlight limited awareness of 5G's relationship with other digital technologies (edge, cloud, IoT, AI) as a significant barrier



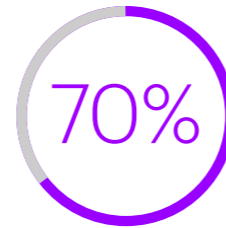
of executives cite complexity in integration with legacy systems as a significant barrier

2

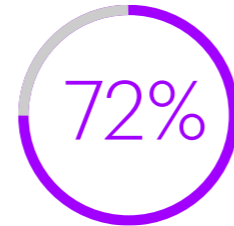
Managing financial and people resources while extracting business value

While significant capital outlay is required in new hardware, technology, and workforce to enable the functioning of solutions powered by 5G and digital technologies, companies are also asking themselves how to extract value from such investments and gain an acceptable rate of return.

Lack of 5G and digital skills is another key impediment for companies in the region. Businesses are experiencing a major spike in demand for more advanced tech capabilities, but their digital transformation aspirations are being held up by shortage of digital skills in the fields of cloud, networking and emerging technologies.¹²



of executives cite lack of funding to support 5G investment as a significant barrier



of respondents cite lack of adequate technology skills and expertise as a significant barrier



3

Navigating the still-maturing partner and device ecosystem

A mature ecosystem of technology and service providers is essential for implementation of 5G and digital technology use cases across industries.

Enterprises can benefit from the ecosystem's experience in deploying 5G networks. However, this ecosystem is still evolving and is likely to take a few years to fully mature.

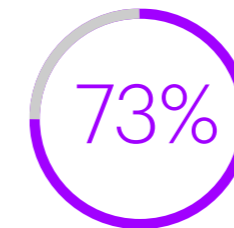
Further, enterprises need to add new and upgrade existing devices before they can deploy use cases. The 5G-enabled device market is still nascent and faces issues on three key accounts: availability, standards, and regulations.

Firstly, devices supporting innovations that leverage the 3rd Generation Partnership Project (3GPP) Release 16 features will take some time to launch and will probably be addressed initially through retrofitting.¹³ The manufacturing industry, for example, will require new 5G-enabled machinery, robots, vehicles, and other assets. Built-in 5G

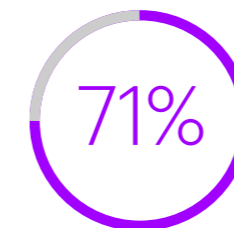
communication modules in factory equipment will still take some time to launch, and the pace of adoption will be slow for heavy assets.¹⁴

Further, regulatory authorities across geographies have defined more than 40 different variations of 5G frequency allocations within three 3GPP bands. This lack of standardization can potentially impact the device market and slow deployments.¹⁵

Lastly, securing regulatory approval for 5G-enabled devices can be a long and time-consuming process. In highly regulated industries like healthcare, niche 5G-enabled devices are likely to be delayed due to rigorous approval processes by regulators.



of respondents cite immaturity of the 5G partner ecosystem as a significant barrier



of executives cite lack of availability of 5G-enabled devices, sensors, etc. as a significant barrier

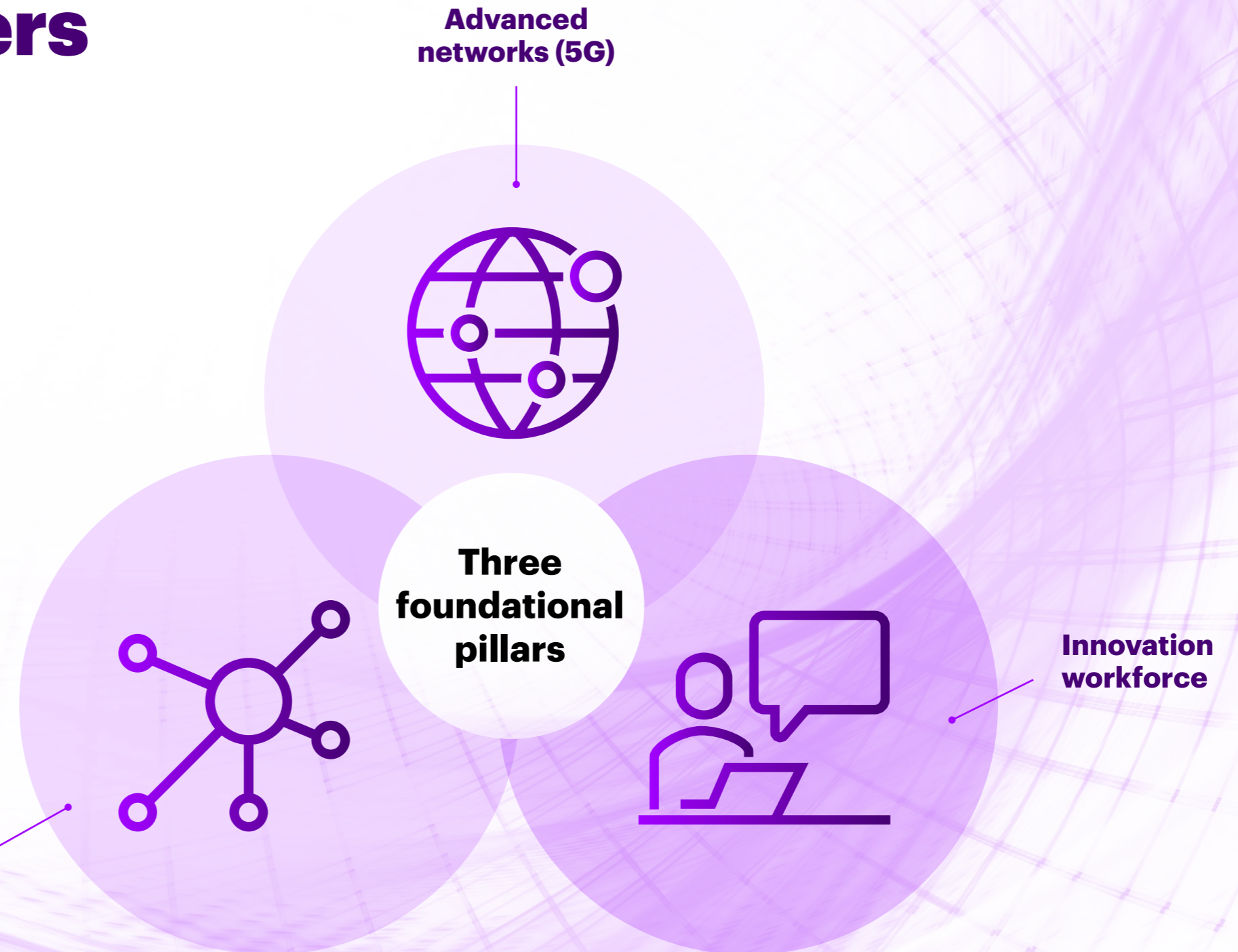
The rise of the Tech Leaders

Amid the complexities and challenges, we have seen a small group of companies rise above these obstacles to unleash transformation and grow far ahead of their peers. We call these companies “Tech Leaders”. These companies have been able to tap into the convergent power of next-gen networks and digital technologies with remarkable success.

What sets Tech Leaders apart?

Our research, which includes a study of 257 senior executives of Middle East enterprises, reveals that a small number of high-performing companies are on track to deliver more value than their peers in the next 3 years. They distinguish themselves by investing in advanced networks, such as 5G, as a strategic asset, alongside other digital capabilities like cloud, edge, AI, and IoT, and boosting innovation capabilities.

Next generation digital technologies (edge compute, cloud, AI, IoT)



Compared to peers, Tech Leaders are more likely to have invested higher in:

1

Advanced networks such as 5G

Tech Leaders expect to invest an incremental 9.3% of their information and communication technology (ICT) budget on 5G and next-generation network in the next 3 years compared to incremental 5.7% by their peers.

2

Innovation capabilities and workforce:

Tech Leaders understand innovation is a critical enabler for their overall transformation, which will help them grow and thrive in the post-pandemic world. They expect to dedicate an incremental 9.6% of their ICT budget on innovation in the next 3 years compared to incremental 5.9% by their peers. 62% of Tech Leaders dedicate more than 20% of their workforce to innovation, compared to just 14% of their peers.

3

Converging technologies like cloud, edge, AI, and IoT:

Tech Leaders recognize the relevance of convergence of 5G with digital technologies and see convergent technology platforms as critical enablers of transitioning from piece-meal approach to a more holistic end-to-end digital transformation. Compared to peers, Tech Leaders are:

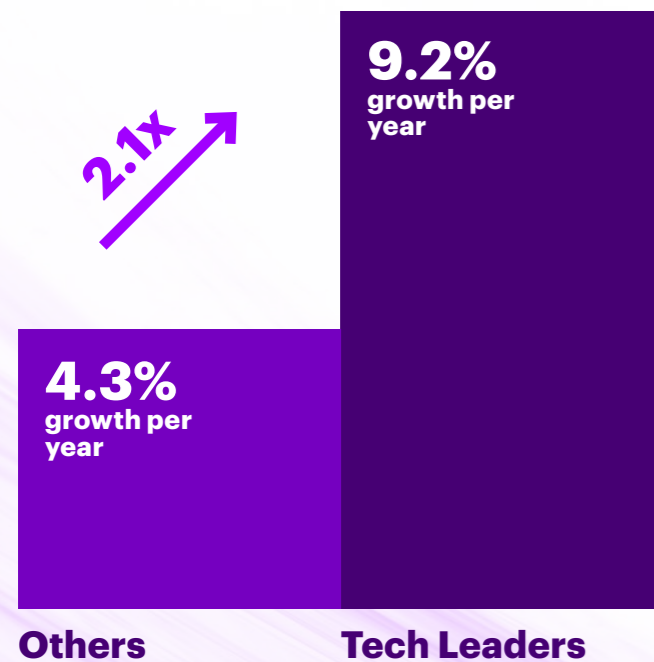
- **27%** more likely to have partially/fully implemented **cloud**
- **32%** more likely to have partially/fully implemented **edge**
- **33%** more likely to have partially/fully implemented **IoT**
- **41%** more likely to have partially/fully implemented **artificial intelligence and machine learning AI/ML**



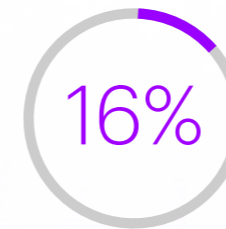
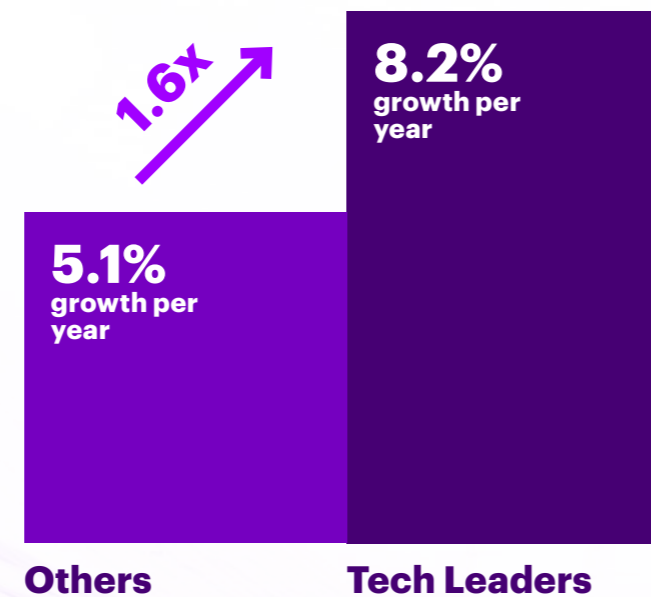
The rise of the Tech Leaders

Tech Leaders are set to deliver more value than their peers in the next 3 years. Thanks to their forward-looking strategy, the Tech Leaders:

Expect revenue to grow 2.1x faster than peers over the next 3 years



Expect margin to grow 1.6x higher than peers over next 3 years



more likely than peers to see their 5G and network investments result in new product and service innovations



Laying a foundation for the next-generation enterprise

What is the secret of these 'Tech Leaders'? And how can others emulate their winning ways?

In analyzing these leading companies, we see that they prioritize four key imperatives to create the basis for a next-generation enterprise.

- 1. Elevate the business case for next gen technology solutions**
- 2. Plan for workforce and cultural transformation**
- 3. Build security into every step of the process**
- 4. Identify the right partners and platform for solutioning**

1

Elevate the business case for next gen technology solutions

Why does it matter?

A strong C-level focus, deep understanding of technology convergence across the organization and resource commitment is required to position solutions enabled by advanced networks like 5G and digital technologies like cloud, edge, IoT, and AI as a part of a broader transformation and innovation agenda with the ultimate objective of achieving holistic value creation for the enterprise. Any persuasive business case must clearly classify the far-reaching, innovative outcomes emerging from these solutions. Those include the creation of new products and services, creating new revenue streams that wouldn't have been possible without the advanced technology solutions.



What steps should the C-suite take?

Place 5G solutions at the center of enterprise transformation:

Companies must position network strategy and investment as an engine of holistic value creation, rather than a siloed driver of performance. This is achieved by establishing the role of 5G solutions in the wider digital transformation and innovation agenda, supported by a carefully orchestrated migration plan.

Lead the charge through early adoption and investment: Companies should seize first-mover advantage, investing in and adopting new technologies quickly, and scale them to maximize value. They must raise their level of investment in solutions powered by advanced technologies and 5G networks across the business to develop new products and services, creating new revenue streams for organizations.

Develop a carefully orchestrated business value assessment plan:

Our research found many executives have a hard time in elevating the business case of next gen technology solutions in the C-level agenda. Before budget endorsement, C-Suite leaders must first be convinced that the benefits of such projects far outweigh their costs and risks. So, it is critical to take a measured ROI driven approach to investment and create a business value assessment plan.

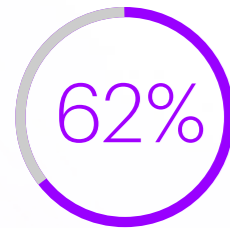
Companies must construct a step-by-step process to:

- 1 Understand the business context, pain points and expected outcomes
- 2 Evaluate how 5G and other digital technologies can support business outcomes
- 3 Create a long-term capex/opex plan that is dedicated and flexible
- 4 Identify specific use cases, as well as associated drivers and business benefits
- 5 Develop an aggregated business value model by evaluating opportunities at each use case level
- 6 Run measurable pilots to evaluate impact and analyze additional investment required to scale

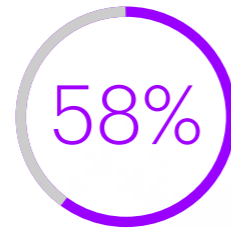
How do Tech Leaders take the leap?

Choose partners who monitor ROI and assist in strategic use case

development: For Tech Leaders, the ability to track and measure ROI and strategically support use cases are the top selection criteria for 5G solution deployment partners.



of Tech Leaders consider the ability to track and measure return on investment from 5G as an important criterion for partner selection



of Tech Leaders say strategic support in defining and developing use cases as an important criterion for partner selection

“ To introduce any new technology there needs to be buy-in from the CEO and the board – especially for game-changing technologies. The Board doesn’t care about the technology, they care about what benefits and impacts the technology can deliver and the cost associated with delivering it.”

Group CIO for a leading construction and manufacturing company in Middle East.

2

Plan for workforce and cultural transformation

Why does it matter?

Technology transformation does not happen in a vacuum: much of its success depends on ability to unlock people's potential. Companies need to prepare their talent for the future and foster a culture of continuous learning, innovation, and experimentation. Technology and ingenuity go hand in hand. Adoption of 5G and digital technologies will generate new sets of workforce expectations and is likely to require entirely new skill sets. It is therefore important for companies to infuse a "learner" mindset,

focusing on skills in emerging fields such as machine learning, robotics, edge, network architecture, augmented reality/virtual reality (AR/VR) etc. to realize benefits from these deployments.



of survey respondents believe there is a lack of necessary workforce skills to deploy advanced network solutions



What steps should the C-suite take?

Identify workforce strategy: What will it take to align your organization to future ways of working? What skills are necessary to leverage 5G and digital technologies, and how far away is your organization from that goal? Assess your organizational structure and measure your existing skillset in emerging fields, including machine learning, robotics, automation, edge, and orchestration. Companies must build a talent base with this skill set using a combination of hiring and reskilling internal workforce, as well as relying on third-party providers for select functions.

Build an evolving roadmap for talent transformation: Next gen technology solutions are expected to enable a wide range of applications, which creates the need to have skills across the spectrum. It is critical to create a roadmap and set timelines for identifying the right technical skills based on various applications, assess the gaps, and build a tailored skill development program.

Continuously measure workforce readiness: 5G and digital technologies are likely to create new roles and jobs, some of which will require skills that do not yet exist. To gain a competitive edge, organizations need to regularly revisit their workforce ambition and structure and reassess gaps.

How do Tech Leaders take the leap?

Cultivate a culture of innovation:

Tech Leaders cultivate a culture of experimentation, testing, and risk-taking, which is critical for the success of new technologies.

- They are **4.5x** more likely than peers to dedicate more than **20%** of their workforce to innovation functions, where innovation is the primary job responsibility

Use partner network to cultivate skills:

Tech Leaders look for partners who can help them build the right workforce skills.

- Tech Leaders are **1.5x** more likely than peers to be influenced by a vendor's willingness to help them build workforce skills when choosing an implementation partner

3

Build security into every step of the process

Why does it matter?

Network security is the number one concern for technology leaders.

Next gen 5G networks presents new features for improving security compared to previous generations. However, those are not adequate to ensure end-to-end security of the enterprise considering the complexity of new network architecture and vulnerability points. For instance, 5G comes with many built-in security controls such as IMSI encryption (International Mobile Subscriber Identity) and SEPP function (Security Edge Protection Proxy). However, the surface area of attack is increased as a greater number of IoT devices are connected with the pervasive connectivity provided by 5G. Moreover, unlike previous generations, 5G is designed with virtualization and cloud-based technology in mind, where the network cloud extends from the core to edge.

This new network architecture enables services such as network slicing and introduces new zones at the edge of the mobile network, which require a fundamental reimagining of security design. Companies need a complete overhaul of their network security strategy and governance, by keeping security-by-design mindset and building trust throughout multivendor ecosystems.



of executives cite security breaches as one of the key challenges they face with current networks



What steps should the C-suite take?

Adopt an end-to-end security strategy to implement a zero-trust model:

Companies need a holistic and completely new approach to security as they adopt digital technologies and advanced networks. The security strategy and solutions must be part of a single security framework rather than a separate, isolated set of tools. This will enable a zero-trust model i.e., "never trust, always verify" policy for users, workloads, networks, and devices, to reduce the risk of potential attacks and enable a more resilient environment.

Set strong security governance in place: 5G networks require rigorous security supervision and governance, which in turn calls for new supervision modes and models, evaluation and authentication systems, and the implementation of a security governance system.

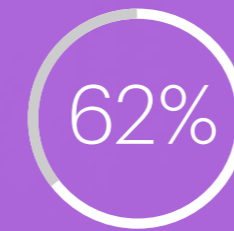
Choose partners with robust, automated security solutions: Companies must rely on solution partners with high security standards, as well as solutions with automated threat mechanisms across key points in the network, allowing for quick identification and rapid resolution of security-related incidents.

Consider private networks as a secure setting: Deployment of private cellular networks can enable full control over network architecture, enhancing security by traffic segregation through network slicing. This adds an additional level of security and segmentation for mission-critical traffic and keeps the data on premises and compliant with data regulations. Companies could consider private networks on a case-by-case implementation specific to a business requirement.

How do Tech Leaders take the leap?

Better management of end-to-end network security:

Tech Leaders better understand the steps to take that will help to manage the end-to-end security of the network.



of Tech Leaders consider high security standards to be the most important criteria when selecting 5G deployment partners

4

Identify the right partners and platform for solutioning

Why does it matter?

To achieve the desired outcomes from 5G and digital technologies, companies need to work with strategic partners – not standalone suppliers – who share their vision of disruptive innovation and growth. Future network and technology architecture and integration is a massive undertaking involving significant capital outlay and cannot be done end-to-end in-house. By jointly investing in the development of new innovative use cases, enterprises can unlock greater value from their tech investments through strong cross-industry plays, improve risk-adjusted returns, and drive monetization.

In the Middle East, CSPs hold a strong position in the ecosystem. They are not only national secure network infrastructure providers to various industries,

but also key partners and enablers of enterprise transformation combining network and digital technologies. CSPs are increasingly occupying a more assertive position in the value chain of various industries by taking the role of X-industry orchestrator, powering intelligent, context-aware industrialization and use case scalability.



of respondents expect external partners to play an important role in enabling different phases of 5G solution deployment



What steps should the C-suite take?

Create a joint vision with partners: Implementing solutions enabled by 5G and other digital technologies involves significant planning and capital outlay. This makes it crucial to work with partners who understand the business context, company ambition, market strategy, and expected business outcomes from deploying digital technologies and networks.

Develop an agile partner strategy: Companies must change the mindset of tethering themselves to standard partnerships. Advanced networks and digital technologies will keep evolving: today its 5G, cloud, and edge, but tomorrow it could be something entirely new. As technology transforms, a company's partner ecosystem also needs to keep adapting and changing.

Partner to innovate: Companies must choose partners who can co-create and co-innovate by working together with them to launch new products and services and enhance the customer and employee experience.

Work with specialized providers with end-to-end solutions: Companies must engage with specialized providers who can help them navigate the complex ecosystem needed for deployment of 5G. These providers will in turn work with an ecosystem of partners to aid an enterprise in end-to-end adoption of 5G solutions along with other digital technologies.

How do Tech Leaders take the leap?

Choose providers with end-to-end solution capabilities: Tech Leaders prefer to leverage end-to-end solutions from providers with strong ecosystem partnerships.

Compared to their peers, Tech Leaders' choice of preferred partner is:

- **2.4x** more likely to be influenced by the vendor's ability to offer end-to-end solution capabilities

- **1.6x** more likely to be influenced by the depth of the vendor's ecosystem partnerships

Work with partners who are ready to co-innovate: Tech Leaders prefer to work with partners who share a common vision and are inclined to co-create new products and services.

- Tech Leaders are **1.6x** more likely to be influenced by partner's ability to co-create new products and services vs peers

"Right now, ecosystems exist to create customized solutions for a particular customer. As a customer, you can do a few of those, but it becomes expensive. Customers want to get to the point of there being a marketplace of end-to-end solutions, requiring minimal customization."

Group CIO of a conglomerate based in UAE with interests predominantly in retail, construction and industrial.

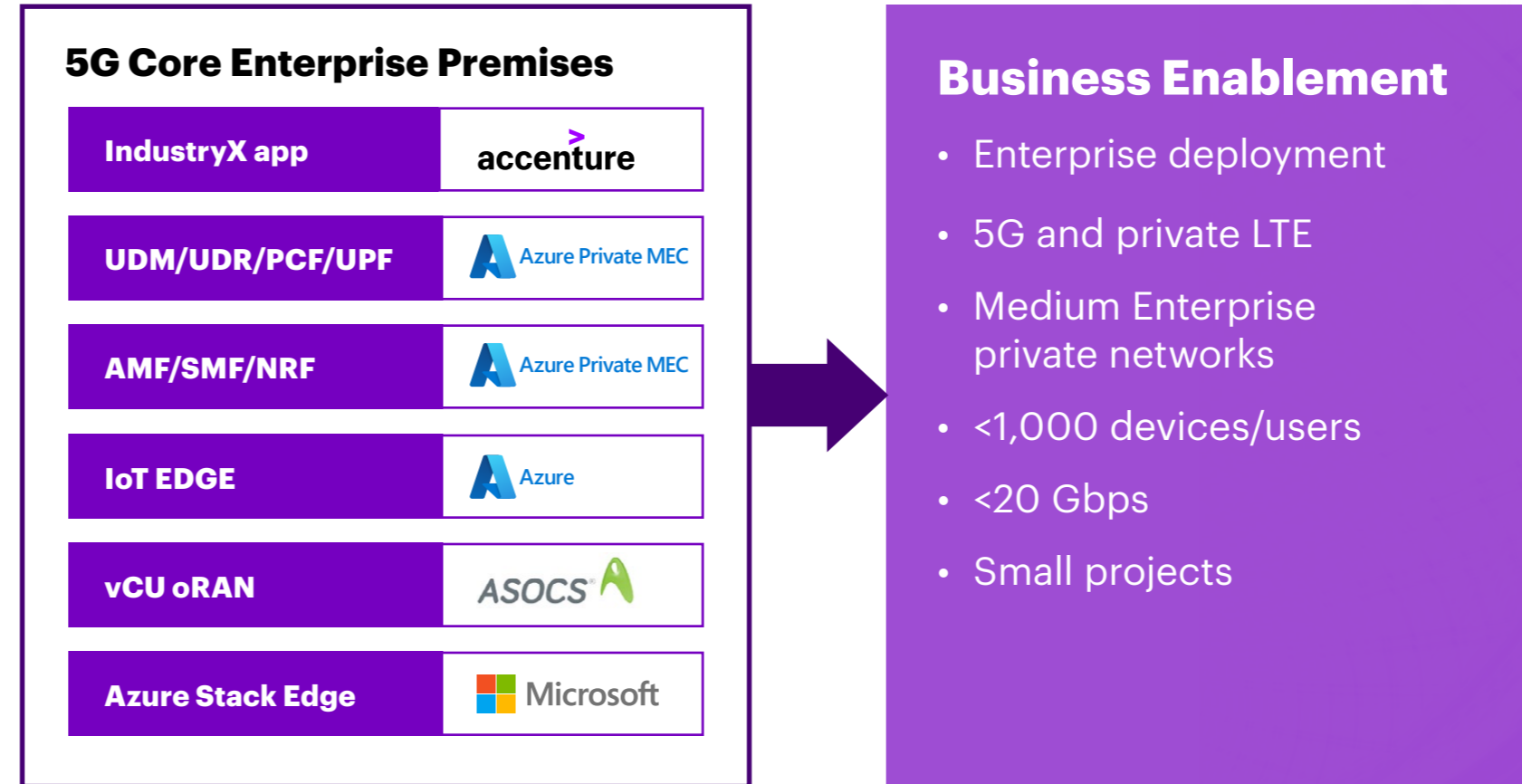
Accenture-Microsoft joint solution

Accenture and Microsoft are collaborating to help enterprises maximize the value of their network and technology investments well into the future.

Accenture and Microsoft have partnered to jointly develop a pre-engineered Enterprise 5G Cloud Box.

It leverages the core 5G SA products of Microsoft, Azure Private MEC, along with Accenture's Cloud Native Automation System (CNAS) to enable automation and data intelligence on network operations. Azure Private MEC is the evolution of the Affirmed and Metaswitch assets into an Azure first party product with enhanced integration to the Azure platform for security and lifecycle management.

This is a product for enterprise clients who need 5G connectivity in their premises and want a quick setup with a simple to use solution for managing the use cases enabled by 5G network slicing capabilities, thereby deriving a unique joint value proposition for our clients. The Edge Box has been developed in Accenture's



Lab in Rome where the teams are jointly developing use cases to take to the market. Deployment of the 5G industry use cases on the Edge box have commenced in Accenture's Lab in Bangalore, operating on mid-band spectrum to design and validate the business relevant use cases of our clients.

View from the industries

5G-enabled technology solutions have potential to unlock entirely new use cases and business models across industry verticals.

These solutions will drastically change how enterprises across different industries operate—but impact and adoption will vary from one to another.

To understand the potential effects more closely, in addition to the survey we interviewed experts across six key industries: manufacturing, oil and gas, government/smart cities, healthcare, retail, and financial services. Here, we explore their insights on the benefits that will be driven by 5G and converging technologies, current barriers to widespread adoption, and how different industries will be impacted through specific use cases.



Manufacturing



Oil & gas



Government



Healthcare



Retail



Financial Services

Manufacturing

In line with the vision of economic diversification, governments across the Middle East are seeking to promote manufacturing by applying Industry 4.0 technologies, enhancing workforce capabilities, and helping factories compete at a global level.

In 2019, the Saudi Arabian government announced plans to promote 100 factories in the country using industry 4.0 principles to drive digital transformation.¹⁶ In 2021, the UAE launched 'Operation 300bn', a 10-year comprehensive national strategy to increase the industrial sector's contribution to GDP from AED133 billion to AED300 billion.¹⁷

Construction is a key sector within the manufacturing industry in the Middle East. The sector is driven by the development of smart cities, growing urbanization, and global events like the Expo 2020 Dubai. Governments in the region spend heavily on infrastructure; for instance, 41% of UAE's \$15.5 billion federal budget for 2021 has been allocated for infrastructure development.¹⁸

Our study highlights that executives in the region see 5G is a part of a wider digital transformational agenda rather than a standalone initiative. Demand for campus networks is particularly high in the region, with 89% of manufacturing industry respondents planning significant investments to establish new campus networks and modernize existing ones.

5G-enabled uses cases for manufacturing show sizeable potential, with over one fourth of respondents already piloting use cases. Manufacturing companies in the Middle East will start seeing deployment of simple use cases in 1-2 years, with complex 5G use cases taking off in the longer 3-5-year horizon. Lack of supporting hardware (sensors, chips, etc.) as well as

gateways and architectures pose a key challenge for manufacturers. Companies in the industry cite that having an attractive solution from the ecosystem, which is tailored for their industry, has demonstrated benefits, and proven ROI, will help accelerate deployment of their 5G use cases.

The Red Sea project, one of the largest construction zones in Saudi Arabia is already deploying 5G at their site.¹⁹ The construction site has also deployed an extensive IoT safety solution for its workforce and fleet of vehicles. The solution addresses four key considerations for Red Sea – site security, worker safety, access control, and process efficiency for 36,000 construction workers and up to 3,000 vehicles.²⁰

In the next

1–3 years

close to half of the respondents cite their plans to spend an additional 3-6% of existing ICT budget on 5G-enabled solutions

In the next

4–6 years

this spend profile is expected to move upwards to an additional 7-10% of existing ICT budget

Oil & Gas

Oil exports have been a key contributor to the region's growth for decades.

In Saudi Arabia, the oil & gas sector accounts for about 50% of GDP and 70% of export earnings.²¹ In the UAE, it accounts for 30% of GDP²² and 20% of all export revenue.²³

Oil & gas companies can consider looking to bring down their costs and improve efficiency as they continue to face pressures from fluctuating oil prices and renewable sources becoming competitive.

Oil & gas companies are looking to embrace digital technologies like IoT, cloud, AI/ML, and AR/VR, in the next 3–5 years. These technologies when combined with 5G will unlock the full value of use cases like real-time asset performance management solutions, equipment digital twins for monitoring worker health and safety, and VR centers for real-time drilling monitoring.²⁴



81% of oil and gas industry respondents expect 5G-enabled solutions to have transformational-high impact on their business

Oil & Gas

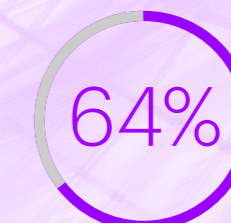
5G will also be a key enabler of digital oil field operations, delivering the scale and speed required for remote management of oil production platforms, wellsite operations management, and critical asset performance management.

Around 10% of oil & gas companies we surveyed are already piloting use cases such as connected site operations, next generation worker safety, environmental monitoring detection, and real-time analytics. A small percentage are also trialing remote monitoring of extraction facilities. Upgrading legacy systems is a significant challenge identified by experts, which is both capital intensive as well as complex process to undertake. In addition, lack of necessary devices and maturity of enabling technologies are other barriers slowing the implementation of 5G-enabled solutions.

In 2021, oil and gas leader Saudi Aramco partnered with ecosystem players for development of 5G and digital technology applications for the industry. In the next few years, the company plans to jointly explore fast deployment of the enterprise 5G dedicated network for the oil and gas industry and study the feasibility of the relevant applications to establish industry digitalization standards. The company plans to use key technologies such as E2E 5G slicing, multi-access edge computing, and massive IoT to deploy this network and support key use cases for upstream, middle and downstream production services.²⁵



of respondents are keen to invest in either new or modernizing existing campus networks



cite high interest to spend on 5G-enabled campus networks, more so than other technologies such as LTE, Wi-Fi, WirelessHART, Low Powered WAN, etc.

Government

Governments across the Middle East are pushing forward with ambitious economic and social reform plans, designed to reduce dependence on natural resources by facilitating the emergence of a robust private sector.

Saudi Arabia's Vision 2030 is a prime example of the region's development objectives, which include improving access to health care services, developing safer and more livable cities, and enhancing environmental sustainability.

Similarly, UAE's Vision 2021 aims to establish first-rate education systems, improve sustainability, and support high-quality healthcare with the overall objective of transforming into a 'competitive knowledge economy'.²⁶

Solutions enabled by 5G and converging technologies have the potential to reinvent government operations, providing access to unprecedented levels of real-time information from any device, anytime and anywhere. 5G's ability to support massive device density allows millions of devices to be connected in cities. 5G, coupled with technologies like IoT, AI, real-time analytics and

edge, will help unlock a whole gamut of smart city use cases like waste management, smart parking, e-governance, education, health, traffic management, and smart buildings.

E-government services and smart cities are top priorities for governments in the region, followed by healthcare and education. Experts cited that for the successful implementation of these solutions, there is a need to elevate awareness of 5G's potential, as well as having better privacy and security governance in place to ensure citizens' sensitive personal information is protected.



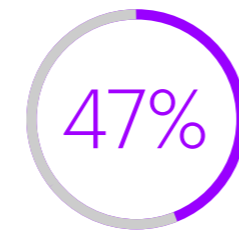
94%

of government/public services leaders expect 5G-enabled technology solutions to have transformational-high impact on their business, the highest amongst all industries

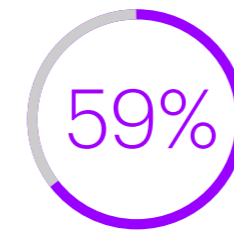


Government

The region is already witnessing early deployments. The Middle East continues to develop a reputation as an increasingly important hub for the development of smart cities and the implementation of smart technologies in urban spaces.²⁷



of respondents cited to spend additional of 3–6% of their ICT budget on 5G enabled solutions in 1–3-year time horizon



of respondents cited to spend an additional of 7–10+% of their ICT budget on 5G enabled solutions in 4–6-year time horizon

Healthcare

Post pandemic, the pace of technology adoption in the region's healthcare industry has accelerated multifold.

Today, more than 50% of hospitals in the UAE use various IoT-based solutions, and approximately 90% of doctors use smartphones and medical apps to provide healthcare.²⁸ Telehealth consultations are on an all-time high – vHealth, a UAE-based telehealth provider, said that the company had witnessed a 500% increase in its mobile application usage between March and September 2020.²⁹

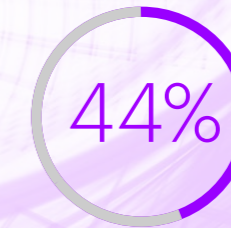
Adoption of digital technologies will not only offer healthcare companies with opportunities to cater to patients innovatively, it will also address healthcare system challenges in the region. Gulf Corporation Council (GCC) is forecast to witness growth in general demand for healthcare

over the next decade as population increases. Further, medical costs in the GCC are high, outpacing general inflation by close to three times.³⁰ Lastly, healthcare is seeing a shift towards consumerization, with patients increasingly playing a more active role in health decisions and demanding more scrutiny in service choice.³¹

Solutions powered by 5G connectivity and digital technologies will support more sophisticated mobile/home care, adding capacity and flexibility within the healthcare system, enabling quick diagnosis and treatment, and increasing the reach and pace at which healthcare services are delivered. 5G is also a critical enabler for Internet of Medical Things applications, providing rapid transmission and processing of high

quality and quantity of medical data. It will also support the transition from in-person physician interactions to remote/home settings.

Healthcare institutions expect to implement simpler use cases, such as virtual consultation and remote patient monitoring, in the next 1-3 years. More complex cases like remote surgeries are expected to be adopted in the longer term. Around one third of respondents cite they are currently piloting various use cases ranging from connected ambulance, smart hospital, healthcare training to remote medicine. Lack of compatible devices and high cost of implementation are two significant barriers in adoption of 5G-enabled technology solutions.



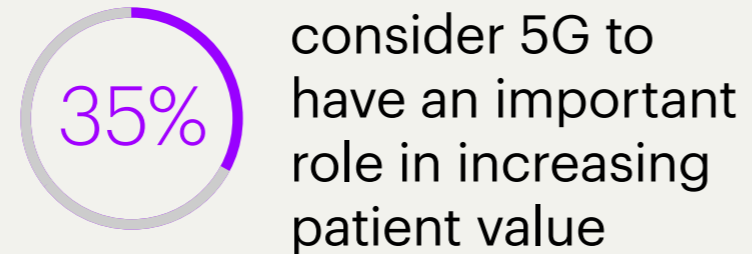
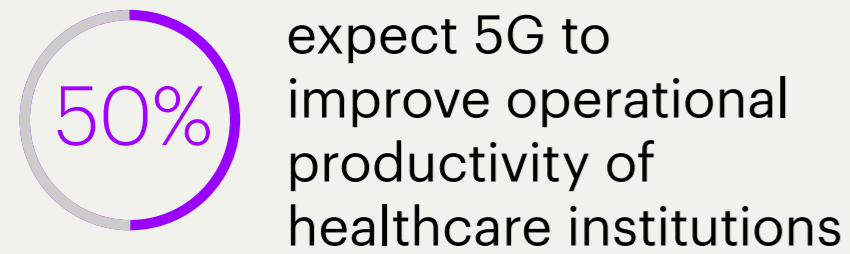
of respondents believe that 5G will improve security and data governance of sensitive patient information



Healthcare

Demonstrating the impact of these solutions, Ooredoo Qatar partnered with Ericsson to perform remote assessment of patient and ultrasound procedure inside an 5G connected ambulance using a special haptic glove controlled by a doctor remotely using a specially designed joystick.³²

This use case provides a glimpse of how doctors could provide remote assistance to treat patients in movable vehicles.



Retail

We are entering an era of experiential retail where superior customer experience is shaped by understanding each individual consumer and personalizing their entire shopping experience.

Even as retailers envision the future customer experience, they continue to face challenges in terms of shrinkage, damage, and theft and supply chain issues like channel and inventory rationalization.

Further, they also face increasing competition from e-commerce. Spurred by a highly digitized population and a lockdown-induced spike in consumer demand, e-commerce has boomed across the Middle East.³³

Retailers are embracing digital to reinvent themselves. Solutions enabled by 5G and digital technologies will aid retailers in creating the next-generation experience for customers. 5G will unlock retail data with near real-time analytics to improve customer engagement, inventory efficiency, and operational productivity. It will enable marketers to achieve radically personalized, and predictive engagement with customers.

It is expected that large-scale rollout of 5G enabled solutions will take about 3-5 years. Early adopters will see the incremental value realized first and gain competitive advantage. Around 15-20% of respondents mention that their organizations have started piloting with use cases such as intelligent clienteling, frictionless store checkout, digital store consultations, supply chain optimization, and automated surveillance.

A major challenge that retail companies are facing is lack of internal capabilities and navigating the complex ecosystem with several partners. They are looking for end-to-end solutions from the ecosystem, which can help them fast track implementation of use cases.



43%

of respondents expect 5G to improve operational productivity, accelerate decision making and improve security and data governance

Financial Services

The future of the Financial Services industry will depend on the experience they can deliver to customers – just providing products or channel offerings is no longer enough.

Customers expect more efficient and personalized solutions from financial institutions. To meet and exceed their expectations, banks effectively need to become marketplaces for financial services, and those marketplaces need to be digital and mobile rather than branch based.

Internet access, rapid smartphone penetration and a young population in the Middle East has led to traditional banks building digital infrastructure. These banks are now offering online services through their web platforms and apps. They are also increasingly using blockchain, optical character recognition (OCR) and AI to improve their customer service and offerings. The Middle East is seeing a rise of neobanks, whose operations are entirely digital, along with disruptive FinTech startups that are catering to the growing demand for personalized and accessible banking services.

Further, COVID-19 lockdowns are leading to a boom in online services, increasing demand for customized offerings and seamless services.³⁴

These trends will make digital banking a norm, and industry leaders anticipate that this transformation will go hand-in-hand with the advancement of AI, IoT, and 5G.³⁵ These technologies enable personalization of offerings like car insurance premium based on telematics, fraud detection powered by AI, enhanced branch operations, and a vastly improved customer experience.

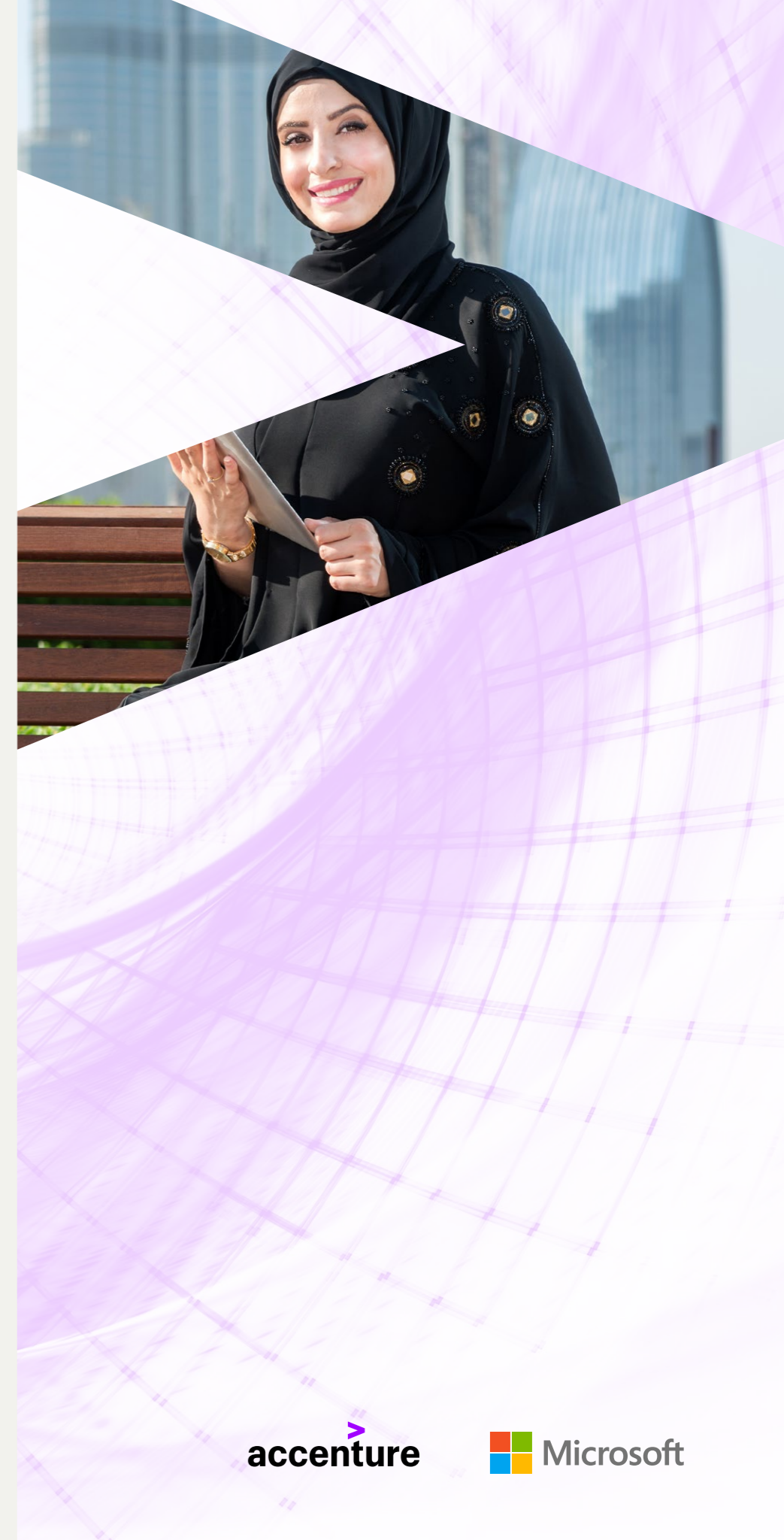
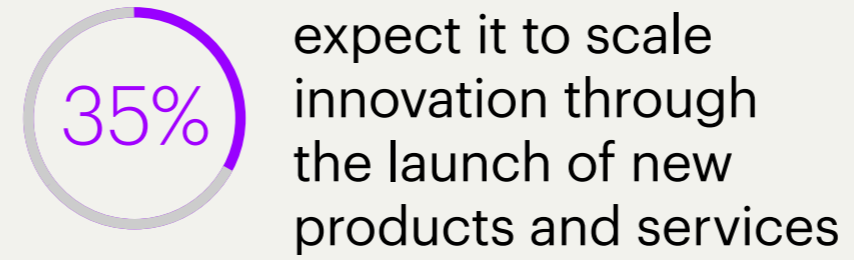


of financial services executives expect 5G to have transformational-high impact on their business

Financial Services

New use cases are emerging, with 10 to 15% of respondents citing that they are trialing use cases such as enhancing banking customer experience, connected inter-branch operations, secure mobile payments and fraud detection, managing insurance claims and damage inspection, and a small fraction

also testing high frequency automated trading in capital markets. Experts cited that the main challenges with 5G solution deployment are around lack of internal technology skills and funding limitation which arise due to inadequate awareness of 5G and technology benefits across the organization.



Be ready for what comes next

Advances in networks and digital technologies will unlock radically different opportunities for Middle East enterprises to create value. But there are also barriers to clear before these latest innovations can truly become a vehicle for business growth.

Organizations that want to lead the way have pivotal decisions to make. From feasibility issues to priority use cases, new business models and device strategies, there is a great deal of complexity to navigate. The right strategy—and partnerships—will be vital to success. With these in place, enterprises across the Middle East can capitalize on the tangible acceleration opportunities and maximize the disruptive power of next-gen technologies.

About the research

We employed a multi-method research approach. Specifically, the research program included primary survey, interviews, and case study research.

Survey:

We conducted an online study of 257 Middle East enterprise senior technology executives in April 2021 to understand their perspectives on 5G impact, adoption, use cases, barriers to adoption and 5G solution ecosystem & partners. Six industries were covered as part of the study: Manufacturing, Oil & Gas, Healthcare, Financial Services, Retail and Government/Public Services.

The study covered four primary topics:

- 1.** Enterprise key business priorities, overall technology adoption and connectivity pain points
- 2.** Enterprise expectations for 5G including perceived impact, benefits, adoption, and challenges
- 3.** 5G business use cases covering significance, adoption, and accelerators by industry
- 4.** 5G solution marketplace and ecosystem depicting the key criteria for selection of 5G solution providers and trusted partners

About the research

Interviews and Case studies: To triangulate our findings from the survey, we conducted several interviews with Accenture and Microsoft business leaders who are established experts in the domain as well as select 14 senior IT/Technology executives from Middle East enterprises across all six industries. These insights were complemented by case studies collected through secondary research.

Definition of Tech Leaders and Index:

We created a customized weighted index to capture the impact of three foundational pillars i.e., next gen technology (cloud, edge computing, IoT, AI, etc.) adoption, advanced networks (5G) future investment, and innovation workforce, on revenue and margin performance of companies.

Based on the index, a small portion of our sample is classified as 'Tech Leaders'.

The following variables were considered in development of the index, and each variable was assigned with a different weight in the index.

- **Technology adoption:** Widely implemented business solutions that rely on new technologies
- **Technology effectiveness:** Effectiveness at adopting and scaling innovative new technologies
- **Innovation workforce:** Workforce dedicated to innovation functions i.e., innovation is their primary job responsibility
- **5G future investment:** Investment in 5G-enabled solutions in the future
- **5G advancement:** Progress across different phases of 5G journey

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