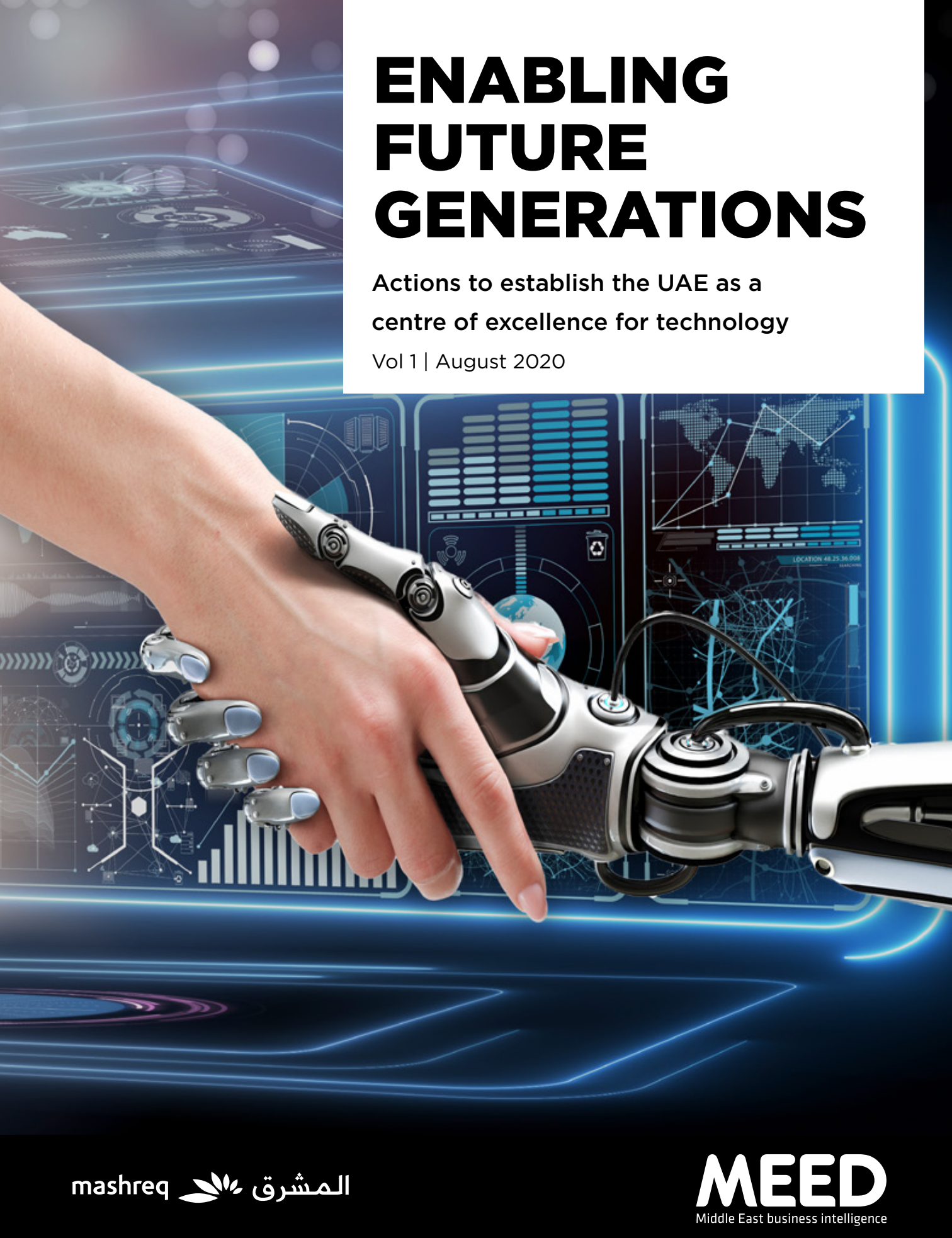


ENABLING FUTURE GENERATIONS

Actions to establish the UAE as a
centre of excellence for technology

Vol 1 | August 2020





THE CHALLENGE NOW FOR THE UAE IS TO BUILD A NATIONAL TECHNOLOGY ECOSYSTEM THAT WILL SUPPORT THE EXPANSION OF THE COUNTRY'S TECH SECTOR AND MAKE THE UAE A GLOBAL CENTRE FOR TECHNOLOGY RESEARCH, DEVELOPMENT AND INNOVATION”

FOREWORD

ENABLING DIGITALISATION

The ambition of the UAE to become one of the world's most technologically advanced countries by 2030 is as bold as it is inspiring.

For a country that has for decades been associated with oil production, real estate development, and tourism to sets its sights on becoming a global tech influencer is a huge strategic shift in focus.

It is a smart play, in all senses. But it is also a strategic change that requires many technical, financial and cultural barriers to be overcome.

Over the past ten years, the UAE has invested heavily in installing world-class telecoms infrastructure. And as we enter the era of the ultra-fast fifth generation of mobile phone technology (5G), the UAE is leading the world in its preparedness for the next generation of broadband services.

With the foundation in place, the challenge now for the UAE is to build a national technology ecosystem that will support the expansion of the country's tech sector and make the UAE a global centre for technology research, development and innovation.

Enabling the future potential of the UAE tech sector requires close collaboration between government, industry and universities. It also requires alignment among stakeholders.

On the 28 and 29 June, leading figures from across the UAE technology and telecoms sector took part in the first UAE Technology Think Tank.

The aim of the Think Tank was to examine the opportunities and challenges facing the UAE as it seeks to be a global tech hub, and to produce a set of recommendations and actions that can be implemented by the government in the UAE together with the industry to help establish a tech-sector-friendly environment that will enable success for future generations in the UAE.

This White Paper contains the 18 recommendations of the first UAE Technology Think Tank that if implemented will help to unlock the future vision of the UAE



ENABLING
THE FUTURE
POTENTIAL
OF THE UAE
TECH SECTOR
REQUIRES CLOSE
COLLABORATION
BETWEEN
GOVERNMENT,
INDUSTRY AND
UNIVERSITIES”

Richard Thompson

Editorial Director
MEED

INDUSTRY REPRESENTATIVES



BUILDING AN ECOSYSTEM

AGILE REGULATION

- Bring together local, regional and international regulatory bodies to streamline regulation process
- Create more test environments with relaxed regulations to enable experimentation for the formulation of effective legislation
- Private and public sectors collaborate with innovators to present compelling business cases to justify priority regulation
- Regulatory bodies use a risk-based assessment to prioritise developments that pose the most potential threats to society

HARNESSING 5G

- Innovators develop use cases to show that proposals are viable, useful and profitable
- Industry to collaborate with academia to showcase local business uses and gain competitive advantage with niche opportunities
- Continue investment in edge computing capability for optimum 5G usage
- Provide subsidies or discounts for low-income workers to ensure that appropriate technology is available to the entire population
- Enable access to 5G technology in order to widen the innovation pool, encourage adoption and improve use cases return on investment
- Widen geographic coverage of 5G networks
- Price 5G for wider adoption

ATTRACTING TALENT

- Reform school curriculum to foster a more creative, problem-solving mindset
- Incentivise student enrolment higher education institutions in the UAE
- Provide adequate education and living allowances for key staff
- Review visa and work permit regulations to promote long-term residency
- Support the long-term survival of tech businesses in the region

RESEARCH

- Cement the country's reputation as a safe place to innovate with rigorous policing of intellectual property protection laws
- Provide incentives such as tax relief or matched funds for private investors
- Collaborations between academics, industry and government to set up sandboxes demonstrate business case for technology research to investors
- Make early decisions to prioritise regional domains of expertise
- Establish an intermediary body to receive and distribute research funding to governmental and private sector higher education institutions

FOUNDATION OF THE FUTURE

ULTRA-FAST 5G NETWORK CAPACITY IS A PLATFORM FOR THE UAE TO BECOME A WORLD-LEADING DIGITAL ECONOMY

Capable of providing up to 1 million network connections per square kilometre, fifth-generation (5G) wireless technology networks offer a tenfold increase in the network capacity provided by 4G.

This minimises network congestion and enables an unprecedented volume of internet-of-things (IoT) objects and devices to simultaneously transmit and receive data via the internet or cloud.

More important, 5G promises peak data rates of up to 10 gigabits per second, 10 times the maximum throughput of 4G, and a latency (responsiveness) rate of under 1 millisecond, compared with 4G's 10.

But while 5G will unlock better, faster services, the biggest benefit is that it will enable the digital transformation of the entire UAE economy.

5G will drive high-density sensor connections to the IoT that will underpin smart utilities and smart city concepts such as dynamic traffic control, and will be used widely in predictive maintenance. These machine-type communications (MTCs) will be central to major infrastructure projects, reducing unplanned downtime and lowering costs.

As the technology takes hold, enterprises will look at 5G as part of a next-gen wide area network (WAN) solution. Network slicing will allow IT managers to set policies for speed and quality of service on a per-application basis. It also allows for networks to be partitioned, which is an important consideration for security as operational and information technology converges.

5G introduces ultra-low latency, which promises an application response time of several milliseconds – at least 10 times faster than human reaction time. This brings in new capabilities, including high accuracy indoor geolocation terminals, and tactile internet, which applies the forces of human senses, such as vibrations or motions, to an application in near real time. 5G

also allows edge computing, which takes computation to the edge of a network, where the data is being generated. This reduces latency and the need to backhaul data to the network core.

The UAE will not only accelerate its adoption of 'hybrid cloud' services, but these will now be 'core' and 'edge' solutions. The use cases, mostly driven by AI, will have a multiplier effect across industries.

BIG PICTURE

When combined with a high availability of applications, 5G moves us towards new use cases. These include the roll-out of autonomous vehicles. Dubai, which has already tested flying driverless taxis, could use 5G to set up an intelligent vehicular network.

The technology also supports virtualising the urban space through augmented/virtual reality and mixed-reality, dense sensor monitoring for asset tracking and preventative maintenance, and the use of wearables to improve workplace health and safety.

Peak investment in 5G is expected by around 2025 but the pace of investment will depend on what is in place. 5G capacity sits on top of 4G networks. Markets with established long-term evolution (LTE) infrastructure, such as Dubai and Abu Dhabi will move fastest.

Both emirate's are developing technology hubs to encourage investments and innovation. Services will then be rolled out geographically in phases, first to landmark areas in the UAE's main centres.

Consumers fear that 5G services, like 5G devices, will cost more. This raises a risk that the technology will increase the divide between the region's haves and have nots.

To maximise the benefit of 5G to the nation, authorities should prioritise inclusivity when it comes to 5G network planning.



CACHING IN ON CONNECTIVITY

5G promises to provide billions of dollars in additional revenues to the region's mobile network operators and ICT providers on the back of continuing growth in data and video consumption by businesses, industries and individuals



\$273bn

10-year cumulative 5G revenue opportunity for GCC mobile network operators and ICT suppliers



668,000

Internet-of-things and machine-to-machine connections in MEA, 2022



790m

Mena mobile broadband subscriptions by 2024



2.5bn

Internet-connected devices in MEA, 2022



11%

Mena mobile broadband subscriptions CAGR, 2018-24

10.8

Mena monthly mobile data traffic in exabytes, 2024



81%

Video as % of total internet traffic in MEA, 2022

42%

Mena monthly mobile data traffic CAGR, 2018-24

\$3.3bn

Additional revenues from 5G for UAE telecoms firms, 2026

CENTRE OF EXCELLENCE

STEPS NEED TO BE TAKEN TO SECURE THE REGION'S POSITION AS A GLOBAL CENTRE OF TECHNOLOGY

There is no doubt about the UAE's capacity to produce successful tech companies capable of having a global impact. Over the past four years, local tech start ups have attracted multi-million-dollar interest from some of the biggest companies in the world.

The region's biggest ever tech deal was confirmed at the start of 2020 when US ride-sharing company Uber completed its AED11.3bn (\$3.1bn) purchase of Dubai-based Careem.

In July 2017, e-commerce behemoth Amazon acquired Dubai's Souq.com for AED2.1bn (\$580m). One year earlier, in August 2016, Dubai-based advertising technology company Media.net was bought by a consortium of Chinese investors for AED3.3bn (US\$900m) - the third biggest ad-tech deal ever.

These deals prompted UAE Vice President and Prime Minister, and Ruler of Dubai, Sheikh Mohammed bin Rashid al-Maktoum to describe Dubai as the "Silicon Valley of the Middle East".

But despite the size and the headlines generated by these mega-deals, there are still too few tech companies coming through to establish the UAE as a genuine global centre of technology.

ECONOMIES OF SCALE

Additionally, the UAE faces a challenge of scale. Despite its huge ambitions and supportive government framework, the UAE's tech sector is still small when compared to current hubs such as California's Silicon Valley, or Barcelona in Spain.

This lack of technology research & development (R&D) capacity means that for global companies such as Uber, Microsoft, Amazon or Facebook, there is not enough incentive to invest in R&D in the UAE.

This means every time a UAE start up is acquired by a big international company, investment in local R&D risks being taken overseas.

Building a local tech-friendly eco-system by attracting the best talent to the UAE and building an R&D track record is essential to delivering Sheikh Mohammed's Silicon Valley vision.

MARKET OPPORTUNITY

Investment to lay the foundations for the UAE's digital vision is underway. The country's two major telecom operators, Etisalat and du, have invested billions in the deployment of 5G technology to foster the growth of a digital ecosystem across all sectors, making it first in the region and fourth globally to launch and use 5G networks, according to the Global Connectivity Index.

Etisalat invested AED4bn in network upgrades in 2019, while du aims to invest about AED1.5 billion in 2020, mainly in preparations for the 5G network.

With world-class telecoms infrastructure in place, the priority for the UAE is to identify the addressable market opportunity for 5G-enabled services and technology in order to attract talent and investment in R&D. It also needs to develop its strategy to tap the opportunity.

Increasing connectivity and the introduction of pro-business reforms, particularly in Saudi Arabia, are increasing competition for regional tech investment and the UAE must think holistically. Initiatives such as Ghadan 21, Hub 71, Dubai Future Foundation, Sharjah Technology and Innovation Park have put the UAE at the front. But it must continue to build momentum in order to stay ahead of its regional rivals.

One of the biggest challenges facing the UAE in attracting and retaining talent is the high cost of living and doing business in the country.

High school fees and rents are significant deterrents for prospective employees, especially those with families. HSBC's 2017 global Value of Education report found that the UAE has the

second highest school fees in the world. According to Mercer's 2020 Cost of Living survey of 500 cities, Dubai is the second most expensive city in the Middle East for expatriates. While a Deutsche Bank report in 2019 said the UAE's broadband prices are the highest in the world.

Company leaders have called the process of importing talent "exhausting and very expensive" especially when hiring tech talent with new in-demand expertise in areas such as 5G, data science and artificial intelligence.

Compounding the high cost of living and employer sponsorship-dependence, the majority of expatriate families in the UAE prefer to send their children abroad for higher education, reducing the pipeline of locally-available talent. HSBC's 2017 Value of Education report found that 65 percent of parents in the UAE would consider a university abroad for their child.

The brain drain further hurts the talent pool when professionals with local experience choose to pursue international post-graduate degrees. The loss of these students at a highly productive phase of their career, along with the body of work that they produce, is detrimental to the innovation ecosystem in the UAE.

PROTECTING DEVELOPMENT

Other barriers to tech entrepreneurs and investors include the consequences of bankruptcy, regulations covering investment and ownership, and intellectual property (IP) protection.

IP protection systems and patents is a significant factor for academic researchers and entrepreneurs and consistent IP enforcement actions are important for investors.

At the Regional Intellectual Property Crime Conference in Mena 2018 conference in Dubai, participants said free trade zones pose complications in relation to the enforcement of IP rights, as the procedures and the authority within each jurisdiction can differ.

Authorities across the UAE are preparing laws to align legislation in key investment zones with international treaties on IP rights, and the newly established post of Commissioner of Intellectual Property is responsible for enforcing these laws.

Dubai International Financial Centre's (DIFC)

STARTUP ECOSYSTEM

Tech startups in the Mena region raised \$659m in the first half of 2020, according to a report published on 7 July by investment data platform Magnitt, an year-on-year increase of 35 per cent, and roughly 95 per cent of investments raised in the whole of 2019. The increase is largely attributed to a few startups raising sizeable funding rounds prior and during the Covid-19 outbreak.

These include \$60m raised by Dubai-based cloud kitchen platform Kitopi; \$40m raised by the Egyptian online medical booking platform Veseeta; and \$36.5m raised by Saudi Arabia-based food delivery app Jahez.

The volume of investment deals in the first half of 2020 decreased, however, by 8 per cent compared with the first six months of 2019. Transactions bounced back in June, and were up by 45 per cent, indicating the Covid-19 shock had abated.

- **June 2020:** District 2020 signs partnership with Dubai SME and the Mohammed bin Rashid Innovation Fund (MBRIF) to support startups and small businesses in the UAE through Scale2Dubai entrepreneur programme
- **January 2020:** Uber completes acquisition of Dubai-based Careem for AED11.3bn (\$3.1bn)
- **October 2019:** Mubadala launches \$250m fund for VCs and startups based in the Middle East
- **March 2019:** Abu Dhabi launches the Hub71 in collaboration with players including Microsoft, Mubadala, ADGM, tapping into the Ghadan 21 fund
- **September 2018:** Abu Dhabi launches three-year AED50bn Ghadan 21 economic stimulus fund includes an allocation of AED4bn (\$1.09bn) for R&D
- **July 2017:** Amazon acquires Dubai's Souq.com for AED2.1 bn (\$580m)
- **August 2016:** Dubai-based advertising technology company Media.net is bought by a consortium of Chinese investors for AED3.3bn (\$900m)

updated data protection law 2020 (DIFC Law No. 5 of 2020) came into effect from 1 July, combining best practices from a variety of international data protection laws, such as EU's General Data Protection Regulation (GDPR) and the California Consumer Privacy Act.

The new law holds controllers and processors of data accountable through compliance programmes and allows for the appointment of data protection officers where necessary.

The legislation also requires the rights of users to be made clear, especially when their data is being shared with vendors of emerging technologies, such as blockchain and AI. It includes appropriate data-sharing structures between government authorities allowing for further enhancement of data-sharing standards in the region.

Meanwhile, Dubai Economy and the American University in Dubai are planning to collaborate on offering specialised academic programmes in intellectual property, innovation and entrepreneurship in alignment with the UAE's knowledge economy vision and Dubai's emphasis on R&D as a driver of economic growth and prosperity.

Strict enforcement of the IP protection laws will provide a important boost to the UAE's efforts to attract investors and researchers.

RESEARCH SPENDING

Government spending on R&D is set to rise sharply. Abu Dhabi's three-year AED50bn Ghadan 21 economic stimulus fund aims to accelerate the country's transition to a knowledge-based economy. The fund includes an allocation of AED4bn (\$1.09bn) for R&D in Abu Dhabi.

Abu Dhabi also recently formed an Advanced Technology Research Council to set priorities for technology development in the emirate and promote standards for R&D to make the emirate an attractive hub for innovation.

But while the government can provide seed corn funding and academic capacity, the vital ingredient for a thriving R&D sector is private sector investment. Incentives need to be developed for private sector industries to allocate a certain percentage for R&D.

Closer collaboration between corporates, universities and government is needed to develop

commercially viable innovations and to launch them in the market.

NETWORK CAPABILITY

In 2019, Dubai unveiled a strategy to create economic and creative free zones in universities across the emirate. The initiative aims to transform public and private universities in the UAE into free zones that will allow students to carry out business and creative activities as an integrated part of their higher education.

The initiative prioritises collaboration with top international research institutions and universities and hopefully paves the way to enhanced collaboration in the future.

The UAE is leading the world in investment in 5G telecoms technology that promises to unleash a wave of next-generation broadband services that will transform the way that we live and work. And with some of the highest rates of mobile adoption in the world, the Gulf region is well positioned to benefit from 5G.

According to Sweden-based Ericsson's Mobility Report published in June 2020, there will be 80 million 5G mobile subscriptions in the Mena region by 2025 and mobile data traffic is expected to be the highest globally with nine times growth forecast.

A 2019 report from UK-based Analysis Mason estimates that 5G could generate a cumulative new revenue opportunity of \$273bn over 10 years for the GCC.

Commercialising 5G networks is the next challenge. So far, the commercial opportunities from 5G beyond the boost to speed and efficiency are still not obvious enough to drive adoption.

A 2018 report by consultant Gartner warned that by 2022, half of communications service providers that had completed commercial 5G deployments will fail to monetise their technology infrastructure investments due to systems not meeting 5G use case requirements.

The wireless architecture needs a critical mass of people to operate effectively, so the power of the platform is still not being fully leveraged. A high level of 5G adoption is therefore vital to attract investment in 5G applications.

Developing 5G consumer-use cases is not

straightforward, however, and will require extensive alignment and collaboration between all stakeholders, including the government. The industry has yet to identify the best sectors for investment in 5G-enabled technologies.

The most apparent uses cases for 5G networks include smart city applications such as autonomous vehicles and IoT. The automotive industry and outdoor surveillance cameras are forecast to become the biggest market for 5G IoT in 2023, according to Gartner.

However, with limited local research capacity, the UAE is at risk of running a copy-and-paste use case list rather than developing its own innovative use cases that are of specific relevance to the needs of the local market.

COLLABORATIVE OUTCOMES

Although dialogues have begun, mechanisms to collaboratively identify and explore innovative local use cases are limited and have not yet taken off completely.

The first example of partnership between a UAE research university and telecom providers is the Emirates ICT Innovation Centre (EBTIC), an ICT research and innovation centre established by Etisalat BT and Khalifa University (KU) and supported by ICT Fund.

Today, EBTIC is a key part of KU's Artificial Intelligence and Intelligent Systems Institute (AI-ISI) at the latter's Abu Dhabi campus, with top research staff from BT, Etisalat and KU.

In 2019, Huawei announced that it will build a '5G and IoT Joint OpenLab' in Dubai in partnership with the UAE's Telecommunications Regulatory Authority (TRA). The Dubai Media City-based lab, expected to be ready by the end of 2020, will develop 5G and IoT technologies.

Meanwhile, in line with the vision of the UAE 2021, the TRA has established a three committees including all stakeholders – operators, manufacturers, academia and users – to collaborate to make UAE a leading country in deploying 5G.

The question remains: How can 5G be effectively scaled to maximise its transformative potential?

SMART PLANNING

As part of its vision to become one of the most technologically-advanced nations in the world, the UAE has implemented several initiatives and investments to ensure its technology adoption preparedness.

These include the appointment of a Minister of Artificial Intelligence, and the 2019 UAE National AI Programme, which seeks to drive the use of AI to enrich and enhance every sector in the country. The ministry also established an internship programme for 500 students in 2019.

In its 2020 Global Autonomous Vehicles Readiness Index (AVRI), published on 7 July, consultant KPMG said that UAE ranked eighth in the world in terms of readiness to accommodate driverless vehicles.

KPMG's AVRI assesses the level of preparedness and openness of 30 countries to AV technology, adoption and their progress in making driverless cars a reality. The main indicators of measuring a country's readiness and progress in furthering AV deployment and innovation are:

policy and legislation, technology and innovation, infrastructure and consumer acceptance.

The UAE ranks in the global top 10 in the index for the third consecutive year, moving up one place to eighth position in 2020, putting the UAE ahead of the UK and Denmark, behind Singapore, the Netherlands, Norway, the US, Finland, Sweden and South Korea.

In 2016, the UAE announced a strategy to make 25 per cent of transport in the UAE autonomous by 2030. The UAE scored highest among the 30 countries on measures of change readiness for technology infrastructure and mobile data speeds under the infrastructure pillar, as well as the readiness of individuals under the consumer acceptance pillar.

The country also scored highly for its government's overall change readiness and consumer information and communications technology (ICT) adoption (ranked second) in addition to ranking third on a measure of efficiency in their legal system in challenging regulations.

THE WAY AHEAD

EARLY INVESTMENT IN NETWORK INFRASTRUCTURE PUT THE UAE IN A STRONG POSITION FOR DIGITAL TRANSFORMATION

Quick to understand the importance of digitalisation, early government investment saw the creation of a world-leading network infrastructure across the UAE that proved itself to be resilient and flexible during the Covid-19 crisis.

Within two weeks of the lockdowns being implemented in the UAE, the country had 600,000 students engaged in remote learning and businesses were able to successfully implement online, home-working strategies.

But with the network structure in place, how can the UAE now enable and accelerate the adoption of new technology and seize the opportunities it offers? What investment, skills and infrastructure is needed to support the future success of the technology sector and foster innovation, agility and competitiveness?

The UAE Technology Think Tank looks at how advanced technology and telecoms can lead the next phase of regional growth and ways to support the development of advanced technology and telecoms in the region.

An ideal technology industry would be one that:

- Supports the diversification of the economy
- Is regulated to ensure the welfare of society and promote fair competition, innovation and growth
- Takes advantage of niche opportunities in the Middle East market
- Uses targeted investment to develop regional domains of expertise
- Attracts, nurtures and retains the best industry professionals and innovators
- Streamlines the journey from establishing a tech startup to harvesting its rewards

At the first UAE Technology Think Tank, representatives from across the UAE's technology industry gathered to address four key questions:

THE QUESTIONS

OPPORTUNITIES FOR A WORLD-CLASS TECHNOLOGY INDUSTRY



What needs to be done to create a more agile regulatory environment?



How can the UAE maximise returns on infrastructure investment?



How can the UAE attract and develop the best talent?



How can the UAE become a centre of research and development?

AGILE REGULATION

Proper regulation is required to ensure the welfare of society and the economy and, done well, it can promote fair competition, innovation and growth. However, regulatory failure can lead to the addition of supplementary rules which creates a complex and unwieldy infrastructure that is difficult for innovators to navigate.

While the region is receptive to new technologies, there is a lag in regulation, which inhibits adoption and stalls investment.

The introduction of legislation for new technology frequently involves multiple regulatory bodies within the UAE and sometimes international organisations as well. For example, anything that uses radio transmissions has to conform to international law as well as both national and municipal regulations. This makes the regulatory process complicated and slow.

While regulatory bodies are generally very receptive to ideas and requests, without a detailed understanding of the impact of new technology, including potential hazards, faults and commercial viability, it is very difficult for them to generate effective legislation. But without legislation, it is not possible for innovators to test the technology and observe any effects.

The primary objective of any legislation is to protect the community, so 100 per cent safety must be guaranteed. This makes regulatory bodies understandably risk-averse, and any attempts to push through changes without proper evidence of security will be blocked.

Regulatory uncertainty kills innovation by discouraging investment and stifling talent. Grey areas surrounding issues such as intellectual property rights, data hosting, liability and privacy are causing serious problems.

With the rapid introduction of many new technologies, regulatory bodies are struggling to keep up with demand. However, even when standards are available, the resources to police standards within the industry are not.

AN IDEAL SCENARIO

Legislation is created to tackle specific local and regional requirements. To ensure synergy within the international community, international regulations are also considered.

To streamline this process, a council or synchronised forum is established to bring together regulatory bodies, banks, service providers and users to focus on a particular technology. These groups include experts and regulators from different regions and neighbouring countries. International bodies are also invited to participate.

Innovators approach regulators with clear requests and a good understanding of the impact of a technology on users, society and the economy.

To enable this, a sandbox, freezone or temporary testing environment with relaxed regulations is set up to allow experimentation at a scale that will not interfere with the wider community.

Sandboxes are established by both government and private companies to test business uses and ensure commercial viability. ADGM's RegLab is the world's second most active regulatory sandbox.

Businesses in both the private and public sectors, including banks, collaborate with innovators to present strong business cases that justify regulatory overhaul.

Regulatory bodies use a risk-based assessment to prioritise legislation for developments that pose the most potential hazards to society. These can be targeted for early legislation with measures such as digital monitoring in place to ensure that the rules are upheld.

WHAT NEEDS TO BE DONE TO CREATE A MORE AGILE REGULATORY ENVIRONMENT?

CHALLENGES	RECOMMENDATIONS
COMPLEX PROCESS Multiple and sometimes overlapping regulatory bodies both within the UAE and internationally make regulation a complicated and time-consuming process	COORDINATED PROGRESS Establish a council including local, regional and international regulatory bodies, along with other stakeholders, to streamline regulatory process
UNDERSTANDING THE TECH Effective regulation needed to roll out a technology requires a good understanding of the impact of the innovation, but it is hard to gain this understanding before the technology is deployed	LEARN TO EXPERIMENT Create more sandboxes, free zones or temporary testing environments with relaxed regulations to enable experimentation
SLOWER DECISIONS Regulatory uncertainty hampers innovation, discourages investment and stifles talent	COLLABORATION Private and public sectors collaborate with innovators to present business cases to justify priority regulation
GAUGING RISK With the rapid introduction of new technologies, resources to create and enforce legislation are not always available. But some developments present a much greater risk than others	RISK ASSESSMENT Regulatory bodies use a risk-based assessment to prioritise developments that pose the most potential threats to society

HARNESSING 5G

The fourth industrial revolution hinges on access to the fast speeds and low latency provided by 5G networks and the UAE has been quick to understand this. After early investment in a large fibre optic network, Etisalat began the digital evolution by installing the region's first 5G network in 2018.

With 5G infrastructure now in place, the challenge becomes how to make the best use of it.

It is clear that the biggest value is going to come from business uses, but with so many competing technologies emerging around the world, attracting investment is not easy. Innovators are not always able to demonstrate that their ideas are solving a genuine problem or answering a specific need.

5G is going to present niche opportunities in the region, but there is a concern that uses will be adopted from other countries along with the technologies that enable them. These uses may not be appropriate for the local market. In 2018, Huawei, in partnership with Analysis Mason, launched a white paper on 5G use cases for the Middle East region.

Edge computing capability must be developed alongside 5G networks to maximise benefit. This technology moves computing capability as close to the end-user as possible, reducing latency and further increasing efficiency. However, developing this framework of edge computing capability requires significant and continuous investment.

It may be difficult to justify 5G uptake to consumers in the UAE because of the strength of the existing fibre network, which is consistently ranked in first place globally for fibre-to-the-home penetration. People have little incentive to upgrade their already-excellent service.

Also, the high cost of network infrastructure in the region limits accessibility and usability for some of the population.

AN IDEAL SCENARIO

Innovators to present business use cases to demonstrate that their proposals are viable, useful and profitable to businesses in the UAE.

Industry to collaborate with academic institutions to showcase local business uses and attract investment.

These use cases are specific to the region to gain competitive advantage with niche opportunities and can be mapped to 5G technology bundles servicing the needs of UAE-specific application domains.

For example, 5G's capabilities make the technology particularly suited to the offsite, real-time management and automation of oil and gas platforms, so a pairings between academia and the oil and gas sector would be beneficial.

Advanced farming methods are being adopted in the region as part of the drive for localised production and food security. 5G can provide huge benefits such as collating real-time data from weather stations and data from moisture and salinity sensors to automatically fertilise and water crops. So there is potential for collaboration between farmers and startups to explore these benefits further.

Ongoing investment is made in edge computing capability for optimum 5G usage.

Decisions are made at an early stage about which uses should be prioritised for investment.

5G technology is made available to the entire population of the UAE and subsidies or discounts are provided for low-income workers to ensure that high network costs do not prohibit access for all.

Broader access to 5G technology should be encouraged in order to widen the innovation pool, encourage adoption and improve use cases return on investment. This primarily means widening the geographic coverage and pricing it for wide adoption.

HOW CAN THE UAE MAXIMISE RETURNS ON INFRASTRUCTURE INVESTMENT?

CHALLENGES	RECOMMENDATIONS
<p>HEAVY COMPETITION With so many 5G technology startups in the market, competition for investment is keen. Innovators are not always able to show investors that their proposals are filling a need or solving a genuine problem</p>	<p>USE CASES Innovators develop use cases to show that proposals are viable, useful and profitable</p>
<p>RELEVANCY TO MARKET Uses for technology can be imported from other countries, but these may not be appropriate for the UAE and will not leverage the benefits of operating in a unique market</p>	<p>PARTNERING WITH ACADEMIA Industry to collaborate with academia to showcase local business uses and gain competitive advantage with niche opportunities</p>
<p>MAXIMISING 5G BENEFIT Edge computing capability must be developed alongside 5G networks for maximum benefit. This technology moves computing capability as close to the end-user as possible, reducing latency and further increasing efficiency</p>	<p>EDGE COMPUTING INVESTMENT Continue investment in edge computing capability for optimum 5G usage. Design and deploy 5G technology bundles catering to the needs of UAE application domains</p>
<p>STEEP COSTS The high cost of infrastructure in the region affects network accessibility and usability</p>	<p>SUBSIDISE TECH Provide subsidies or discounts for low-income workers to ensure that appropriate technology is available to the entire population . Enable access to 5G technology across the broad, in order to widen the innovation pool, encourage adoption and improve use cases return on investment. Widen geographic coverage and price it for wide adoption</p>

ATTRACTING TALENT

The success of the technology sector will hinge on the region's ability to attract, nurture and retain industry professionals and innovators.

Utilising home-grown talent has advantages. There are no issues with work permits or visas and local staff are more likely to remain in the country in the longer term, creating a stable, invested workforce. But technology companies say that there is a lack of nationals with the skill set or experience to fill roles in the industry.

Industry professionals say the traditional schooling system may be partly to blame as it emphasises rote-learning and the acquisition of knowledge over creativity and problem solving; skills that are essential to the tech sector.

The higher education system faces an even greater challenge. Despite the fact that universities in the UAE provide a good standard of education, are partially funded by the government, and work closely with local industry to provide work experience and job opportunities, students are choosing to go abroad for higher education.

This is especially the case for post graduates, who feel that the research opportunities will be greater overseas.

Bringing new talent into the region is problematic. The high cost of living is a barrier, particularly to older professionals who may have to support a family. Although rents and healthcare are expensive, schooling is the biggest outgoing and the salary needed to cover this is high.

The UAE has benefitted from a transient expatriate workforce, but this has created a visa system that does not encourage long-term residency. While there have been recent moves to introduce five and ten-year visas, the conditions to apply are restrictive and may not include researchers at the earlier career stages.

Unemployment forces professionals to leave the country, it is difficult to change jobs and there are no pension plans available.

For these reasons, many see the UAE as a short-term option, so they may not be fully invested in the region's development. The UAE's

Business Vision initiative is one effort to address this issue.

AN IDEAL SCENARIO

Announced in 2017, the UAE government's National Strategy for Higher Education 2030 aims to "build generations that are able to break the traditional frameworks, invent solutions and come up with ideas that serve the community."

The plan is to equip students with skills that are relevant to the developing economy. Entrepreneurship, creativity and problem solving capability is being nurtured through academic partnerships with industry.

The Mohamed bin Zayed University of Artificial Intelligence (MBZUAI) in Abu Dhabi is an important academic institution for tech talent and R&D.

Using the same principal, this style of learning is started at an earlier stage in schools by fostering a more creative, less knowledge-centred educational approach.

At a later stage, learning pathways or groups of courses that work towards a single objective or skill set, are used to develop soft skills such as leadership, planning or collaboration.

While higher education institutions in the region provide good opportunities, local students are made aware of this and incentivised to stay with grants and the potential to make industry connections.

Education and living allowances are made available to key staff so that they can maintain a reasonable standard of living in the region.

The UAE reviews its visa and work permit regulations to enable long-term residency. This will allow employees to "buy-in" to their company and the local economy.

Support is provided for the long-term survival of technology businesses in the region. Mature, established and stable companies are attractive to talent and provide more reliable opportunities for career development.

HOW CAN THE UAE ATTRACT AND DEVELOP THE BEST TALENT?

CHALLENGES	RECOMMENDATIONS
<p>BUILD KNOWLEDGE BASE International recruitment is still required to fill roles in the tech industry. Educational establishments in the region do not equip local students with adequate skills</p>	<p>A NEW APPROACH Reform curriculum to foster a more creative, less knowledge-centred educational approach in schools</p>
<p>SUPPORT LOCAL EXPERTISE Higher education institutions in the UAE provide a good education with industry links and partial funding. This information has not yet filtered through to students, many of whom still enrol at foreign universities</p>	<p>IN-COUNTRY EDUCATION Conduct marketing and provide incentives for students to enrol in higher education in the UAE</p>
<p>TACKLING COSTS The high cost of living, including rent, healthcare and particularly schooling, is a barrier to many professionals as the salary needed to cover these expenses is not always available</p>	<p>SHOULDERING EXPENSES Provide adequate education and living allowances for key staff</p>
<p>DEPENDENCY ON VISA The visa system does not incentivise long-term residency. Unemployment forces professionals to leave the country and it is difficult to change jobs</p>	<p>EASE REGULATIONS Review visa and work permit regulations to encourage long-term residency</p>
<p>STABILITY OF STARTUPS Startups can be volatile and may not provide job security or career development opportunities to attract international talent in the longer term</p>	<p>SUPPORTING BUSINESSES Support the long-term survival of tech businesses in the region</p>

RESEARCH

As part of the drive to diversify the UAE economy from oil and gas, the government has provided significant funding for research in the region. However, more input is needed from private investors to ensure ongoing financial support and the commercial viability of research outcomes.

But investors and researchers may be discouraged from working in the UAE because of the relatively new and still-developing IP and patent protection laws. High application processing fees and poor policing of these laws have made it difficult to safeguard innovations, so startups, investors and researchers often choose to operate in other jurisdictions.

Recent government initiatives have seen IP transaction fees cut and new laws drafted to align legislation in key city zones with international treaties on IP rights. A new post of Commissioner of Intellectual Property, responsible for enforcing these laws, has been created.

However, work needs to be done to cement the UAE's reputation as a safe place to innovate.

There has been enormous investment in technology innovations and research in recent years, but not all of it has borne fruit. To attract funding researchers need to be able to demonstrate that their projects have business uses and will benefit investors.

Developments such as 5G networks, edge computing, artificial intelligence, and IoT have opened up a vast array of technology research opportunities, but with limited funds and research capacity, there is a danger that resources will be stretched too thin.

Locally owned companies are invested in the region and will be motivated to support research projects and startups. The sale of successful UAE tech companies like ride-hailing app Careem and e-commerce site Souq.com to international giants Uber and Amazon has been hailed a success. But with foreign ownership, these entities are now headquartered overseas and there is a danger that their research and development efforts will not be regionally focused.

AN IDEAL SCENARIO

Private investment in research and development is encouraged with incentives such as tax relief or matched funds. This secures sustainable funding to drive growth

UAE is seen to be enforcing IP rights where breaches have occurred to give researchers and investors confidence that the region is a safe place to innovate.

Greater collaboration between government, academia and industry ensures that efforts are directed towards research areas that will benefit the UAE economy.

Sandboxes and secure testing environments with relaxed legislation are set up jointly by researchers, industry and government to test and prove business use cases for technology.

Early decisions are made to prioritise domains of expertise that have particular relevance to the region. Focus is on key sectors including oil and gas, transportation, heavy manufacturing, construction and banking. Developments that target Islamic or Arab markets are favoured, and cross-regional coordination ensures that GCC countries have different specialisations.

An intermediary body or foundation is established to accept funding from private entities, then approve proposals and apply funds for academic research and startups. This simplifies grant application procedures and enables resources to be directed effectively.

HOW CAN THE UAE BECOME A CENTRE OF RESEARCH AND DEVELOPMENT?

CHALLENGES	RECOMMENDATIONS
<p>SAFEGUARD IDEAS In the past, high application processing fees and poor policing of intellectual property laws made it difficult to safeguard innovations, so startups, investors and researchers often chose to operate in other jurisdictions</p>	<p>IP PROTECTION Cement the country’s reputation as a safe place to innovate with rigorous policing of intellectual property protection laws</p>
<p>FUNDING RESEARCH Private investment is needed to secure sustainable funds for research that supports the UAE economy</p>	<p>INCENTIVISE R&D Provide incentives such as tax relief or matched funds for private investors to allocate a percentage of their budget to R&D</p>
<p>PROVING BENEFITS Researchers need to be able to demonstrate that their projects have business uses and will benefit investors</p>	<p>CROSS-INDUSTRY COLLABORATION Encourage collaboration between academics, industry and government to set up sandboxes to test demonstrate business uses for technology to investors</p>
<p>LIMITED RESOURCES Developments such as 5G networks have opened up a vast array of technology research opportunities, but with limited funds and research capacity, there is a danger that resources will be stretched too thin</p>	<p>ALLOCATING FUNDS Make early decisions to prioritise domains of expertise that have particular relevance to the region</p> <hr/> <p>Establish intermediary body to receive and distribute funding, to channel resources and simplify grant application procedures for governmental and private sector higher education institutions</p>

ABOUT MEED

MEED has been integral to delivering business information, news, intelligence and analysis on the Middle East economies and activities for over 60 years.

Attracting a key senior management audience through its content and activities, MEED is a media brand, publication and data business that covers a spectrum of services which inform, engage, connect and ultimately support our subscribers and partners in their business development and strategic growth.

Acquired by GlobalData Plc in December 2017, MEED is now part of one of the largest data and insights solution providers in the world with the capacity to build global communities for our clients.

Our purpose is to support the region's companies make better and more timely decisions through our innovative data solutions and grow through our comprehensive and world-class marketing solutions.

To find out more email: info@meed.com

ABOUT MASHREQ

Established in 1967, Mashreq is the oldest bank in the UAE, with award-winning financial solutions and services.

Throughout its 50 years' history, Mashreq has differentiated itself through innovative financial solutions, making it possible for its customers to achieve their aspirations.

Today, Mashreq has a significant presence in 11 countries outside the UAE, with 21 overseas branches and offices across Europe, the US, Asia and Africa.

Mashreq launched its new Vision and Mission recently, outlining its commitment towards its clients, colleagues and the community.

In line with its vision to be the region's most progressive bank, Mashreq leverages its leadership position in the banking industry to enable innovative possibilities and solutions for its customers across corporate, retail, international, treasury and Islamic banking.

Mashreq is proud to be the first financial institution in the UAE to be awarded the Gallup Great Workplace Award for four consecutive years from 2014-17.

Mashreq also continues to invest in recruiting, training and developing future generations of UAE national bankers.

