

Ideation Center insight

# *Empowering the GCC digital workforce*

## Building adaptable skills in the digital era

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## **About the Ideation Center**

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*The Ideation Center is the leading think tank for Strategy& Middle East, part of the PwC network. We aim to promote sustainable growth in the region by helping leaders across sectors translate socioeconomic trends into actions and better business decisions. Combining innovative research, analysis, and dialogue with hands-on expertise from the professional community in the private and public sectors, the Ideation Center delivers impactful ideas through our publications, website, and forums. The end result is one that inspires, enriches, and rewards. The Ideation Center upholds Strategy&'s mission to develop practical strategies and turn ideas into action. At the Ideation Center, we enjoy the full support of all practices in the Middle East. Together we bring unsurpassed commitment to the goal of advancing the interests of the Middle East region. Find out more by visiting [www.ideationcenter.com](http://www.ideationcenter.com).*

## **About LinkedIn**

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*LinkedIn connects the world's professionals to make them more productive and successful and transforms the ways companies hire, market, and sell. Our vision is to create economic opportunity for every member of the global workforce through the ongoing development of the world's first Economic Graph. LinkedIn has more than 500 million members and has offices around the world.*

# Executive summary



**Gulf Cooperation Council (GCC) countries<sup>1</sup>** are engaged in ambitious national transformation plans such as Saudi Vision 2030 and Abu Dhabi Economic Vision 2030. The full scale of these plans can be realized only by increasing efficiency across sectors, mainly through digitization. A digitized economy requires a skilled digital workforce able to keep pace with the rapidly changing information and communications technology (ICT) industry. Digital jobs have other benefits, including flexibility and project-based work models that can increase labor force participation, particularly among women. However, such digital professionals and jobs are in short supply in the GCC.

An analysis by Strategy& together with LinkedIn in 2017 revealed key supply and demand issues in the GCC's digital job market. At present, the few existing digital jobs are held mostly by expatriates. Educational and professional development environments do not prepare GCC nationals with the necessary digital skills to match the global ICT industry's changing requirements, which serves to dissuade job seekers from exploring the field. At the same time, the region remains largely a technology consumer, as evidenced by an underdeveloped ICT sector. Also, there is low digitization across sectors and limited innovation in digital entrepreneurship.

The analysis conducted by Strategy& together with LinkedIn concluded that GCC governments should partner with technology players, educational institutions, the private sector, and entrepreneurs to launch initiatives that grow the digital job market by helping the workforce to develop and retain digital skills and creating high-value jobs. Governments should build the right skills across all stages of education, improve professional development opportunities, and foster enthusiasm for working in the digital field. A culture of lifelong learning is crucial to keep skills relevant in a continuously progressing market. Governments should also promote digitization across sectors, stimulate the ICT industry, and encourage digital entrepreneurship to transform their economies into technology producers and innovators.

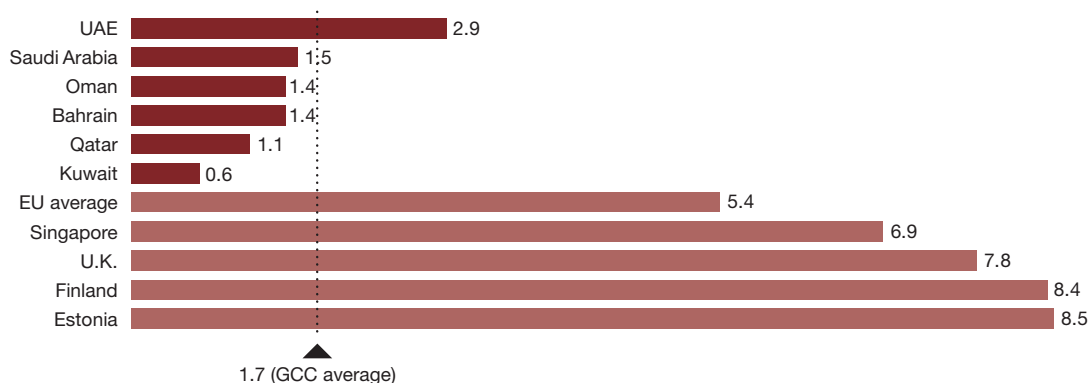
# Digital jobs can help fill a significant portion of the estimated job gap in the GCC

GCC countries are engaged in large-scale national transformation and economic diversification plans that will require them to maximize efficiency throughout their economies. Digitization will be one of the key enablers in achieving such an endeavor. This leads to a recognition that they need a capable digital workforce to be able to attain these economic goals. However, the GCC lacks these digital professionals. Compared to international benchmarks, the percentage of the workforce holding digital jobs is low in GCC countries. For instance, the average percentage of digital jobs in 2015 was at 1.7 percent in the GCC and at 5.4 percent in the EU. Even though the United Arab Emirates (UAE) boasts the highest proportion of digital jobs in the region (2.9 percent), it is behind countries like Estonia, Finland, Singapore, and the U.K. (see *Exhibit 1*).

## Exhibit 1

### There are fewer digital jobs in the GCC than in comparable countries

Digital jobs as a percentage of the total workforce (2015)



Note: Bahrain figure is for 2013.

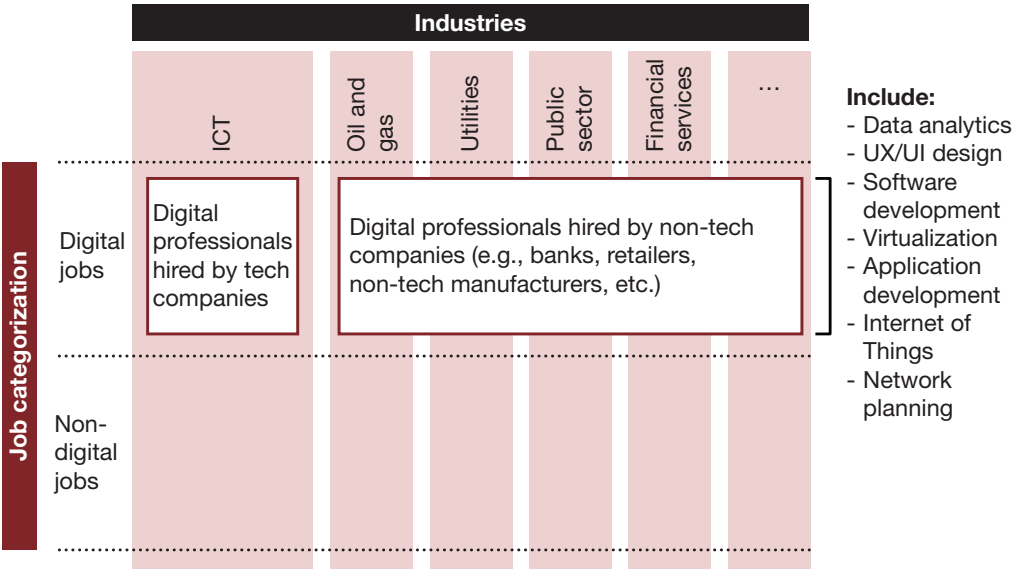
Source: Kingdom of Bahrain Central Informatics Organisation; Dubai Statistics Center; Kuwait Central Statistical Bureau; General Authority for Statistics in Saudi Arabia; Ministry of Development Planning and Statistics in Qatar; National Center for Statistics and Information in Oman; World Bank, World Development Indicators; Eurostat; Strategy& analysis

This report defines digital jobs as roles in the production, distribution, implementation, or servicing of ICT. They include all such roles across sectors that are transforming business models using new technologies (see Exhibit 2). The fact that these jobs are enabled by emerging technologies means they are continuously changing as technological advances redefine them or render some obsolete.

For instance, the next wave of digital jobs will be shaped by the “Essential Eight” technologies: blockchain, 3D printing, drones, virtual reality, augmented reality, the Internet of Things, robotics, and artificial intelligence.<sup>2</sup>

Exhibit 2  
**Digital jobs include ICT-related positions in the ICT sector and other sectors**

Digital jobs definition



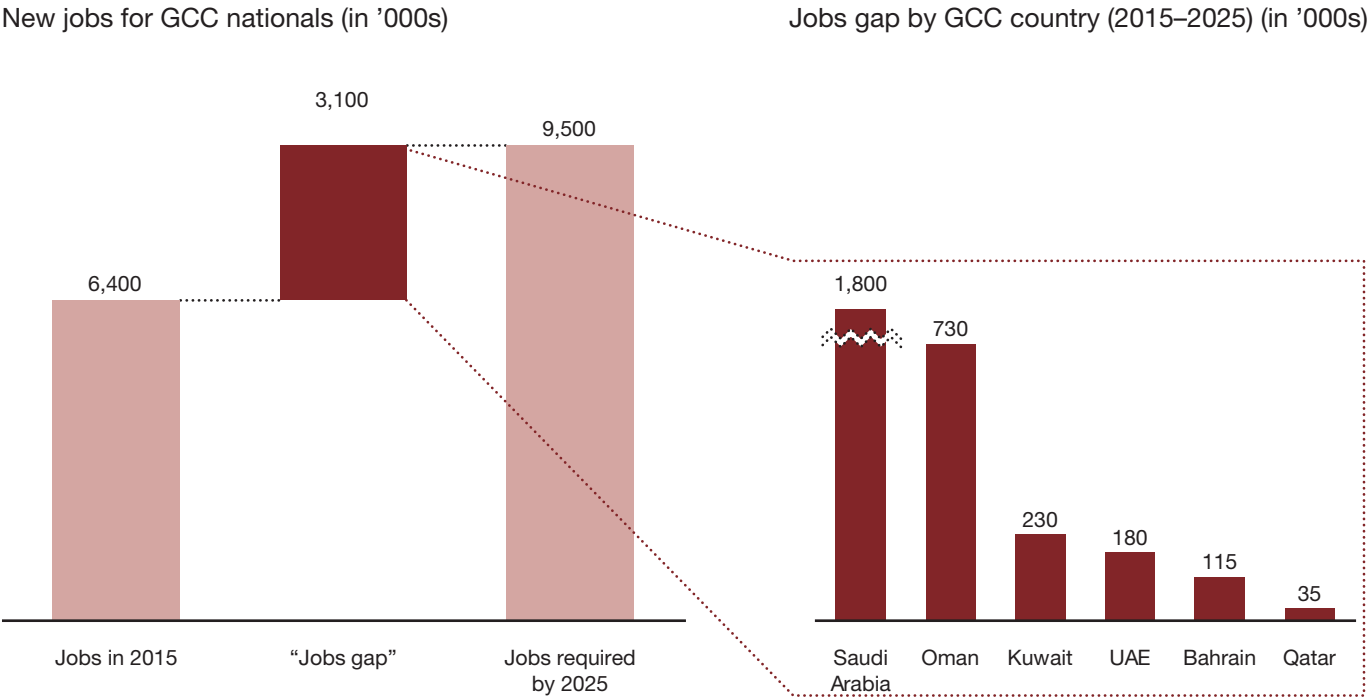
Note: UX = user experience, UI = user interface.

Source: Strategy&

Moreover, few nationals across the region actually hold these jobs; they are mostly filled by expatriates. For example, nationals hold only 13 percent of the total digital jobs in Qatar and 5 percent of those in the UAE.

To remedy this, GCC countries should undertake the large-scale creation of digital jobs — both within and outside the ICT sector. Without this impetus, the lack of digital jobs will contribute to a larger anticipated job shortage of 3.1 million posts for their nationals, across industries, by 2025 (see Exhibit 3).

Exhibit 3  
GCC countries face a gap of 3.1 million jobs for nationals by 2025



Source: Kingdom of Bahrain Central Informatics Organisation; Dubai Statistics Center; Kuwait Central Statistical Bureau; General Authority for Statistics in Saudi Arabia; Ministry of Development Planning and Statistics in Qatar; Central Bank of Oman; *BQ magazine*; Strategy& analysis

# ***Digital jobs have significant advantages over more traditional employment opportunities***

Aside from helping to reduce the shortfall in overall employment, creating more digital jobs and skills in the GCC region would have three main advantages. First, the jobs themselves would be more “future proof,” that is, better able to adjust to new technological demands than many other jobs. Second, many of these jobs are likely to come with a more flexible working culture that allows self-employment and remote work, giving women and youth more opportunities to participate in the labor force. Third, they would help GCC countries realize their national plans for digitizing their economies.

## **1. More resilient jobs**

According to the World Economic Forum’s report, “The Future of Jobs,” a very high percentage of GCC nationals are now employed in sectors that are at high risk of disruption by new digital technologies.<sup>3</sup> This particularly affects jobs in professional services and public administration (see *Exhibit 4*).

By contrast, digital jobs are more adaptable in the face of technological disruption, especially those related to emerging technologies in information technology, data analysis, artificial intelligence, nanotechnology, or biotechnology. The growth of such jobs will help nationals move from largely administrative jobs in the government sector to higher-value-added roles in industries with future importance. If, by 2025, the region reaches the same proportion of digital employment that the EU has today, then approximately 1.3 million new digital jobs could be created, including more than 700,000 in Saudi Arabia alone.

## **2. Increased self-employment opportunities**

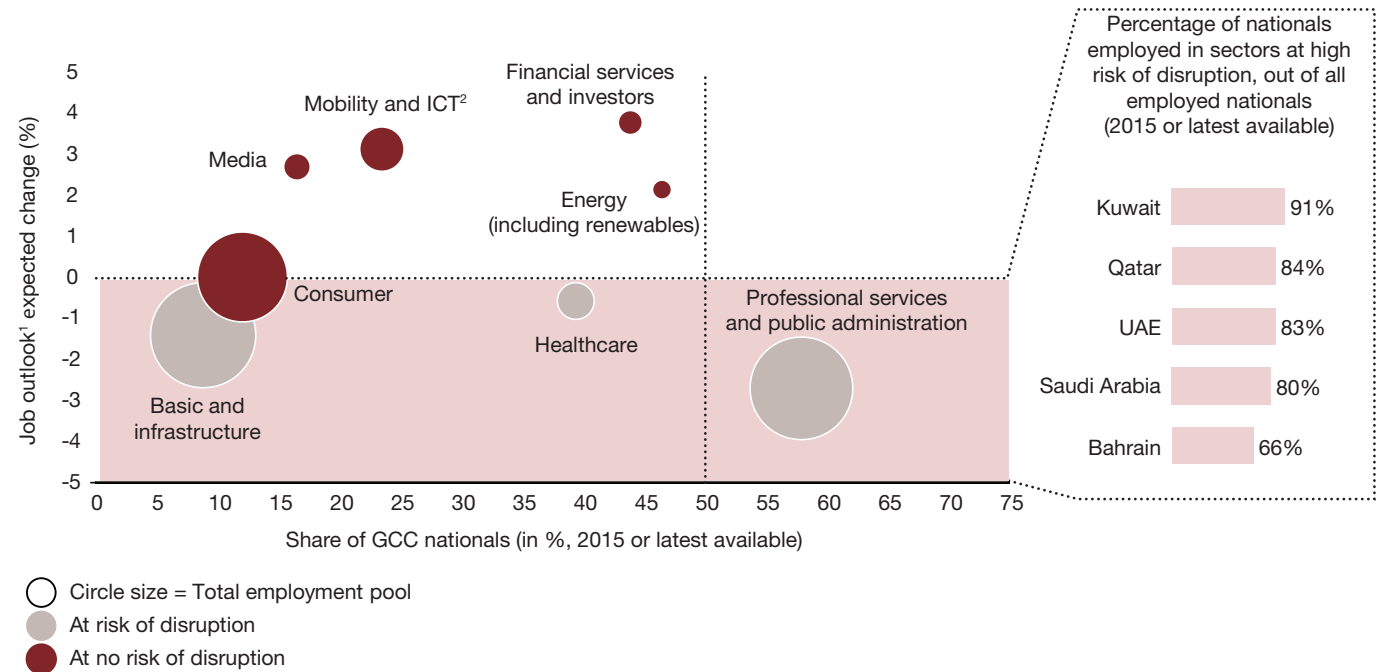
The advantage of digital jobs is that they can be flexible. In particular, some aspects of digital, such as the sharing economy and communications platforms, facilitate remote work through an infrastructure that supports freelancers and flexible working arrangements.

Indeed, self-employment throughout the developed world is on the increase, propelled by a digital age that gives people more ability to

#### Exhibit 4

### Most jobs held by GCC nationals today are at high risk of disruption by new technologies

2015–2020



<sup>1</sup> Based on technology drivers, new energy supplies, climate change, etc.

<sup>2</sup> Mobility includes aviation and travel, automotive, and supply chain and transportation.

Note: Data do not include Oman; data for UAE are from 2008 and for Saudi Arabia are from Q3 2016.

Source: “The Future of Jobs,” World Economic Forum; GCC countries’ labor force surveys (latest available data); Strategy& analysis

design the rhythm and schedule of their working lives. In the U.S., for example, there are now 53 million freelance workers, representing 34 percent of the workforce.<sup>4</sup>

Another emerging factor in the labor market is so-called snippet employment (i.e., task-related work), which allows people to take on multiple work engagements simultaneously. Flexible employment arrangements will increase labor force participation as they are better aligned with the lifestyles of youth and women in the GCC, and can provide income-generating opportunities for people in remote areas. Based on available data from the World Bank and countries’ labor force surveys, Strategy& estimates that there are some 3.9 million inactive women and male youth in the GCC, some of whom could benefit from digital self-employment. This would bring the labor force participation and unemployment rates in the GCC closer to the level of G20 countries.

### **3. Implementation of national digitization aspirations**

Any growth in digital activity and the resulting increase in relevant skill levels would clearly also be of great value to the regional economy, especially considering the ambitious digitization plans of GCC countries. The success of these plans relies on professionals with the necessary know-how to put digital technologies into practice and maximize their economic benefits. In a Strategy& report published in December 2016 on the state of corporate digitization in the GCC, the lack of digital skills came out as a major challenge among surveyed companies.<sup>5</sup>

As far as national schemes are concerned, Saudi Arabia's National Transformation Program focuses on digital transformation to help execute Saudi Vision 2030, a plan to reduce the country's reliance on the oil and gas sector and create private-sector jobs.<sup>6</sup> Similarly, the Smart Dubai program aims to "deliver world-class smart services and infrastructure to create happiness" through such initiatives as smart infrastructure, open data, and citywide applications.<sup>7</sup>

# GCC countries should address supply and demand issues in their digital job market

The digital job market in GCC countries is underdeveloped when compared to countries with similar income levels. Strategy& together with LinkedIn mapped global digital professionals on the LinkedIn platform across a variety of functions in digital-related industries, as well as those from non-digital industries whose title indicated a focus on digital-related work (see *Exhibit 5*).

## Exhibit 5

GCC digital professionals on LinkedIn provide a picture of the region's digital job market

Relevant LinkedIn functions, industries, and titles

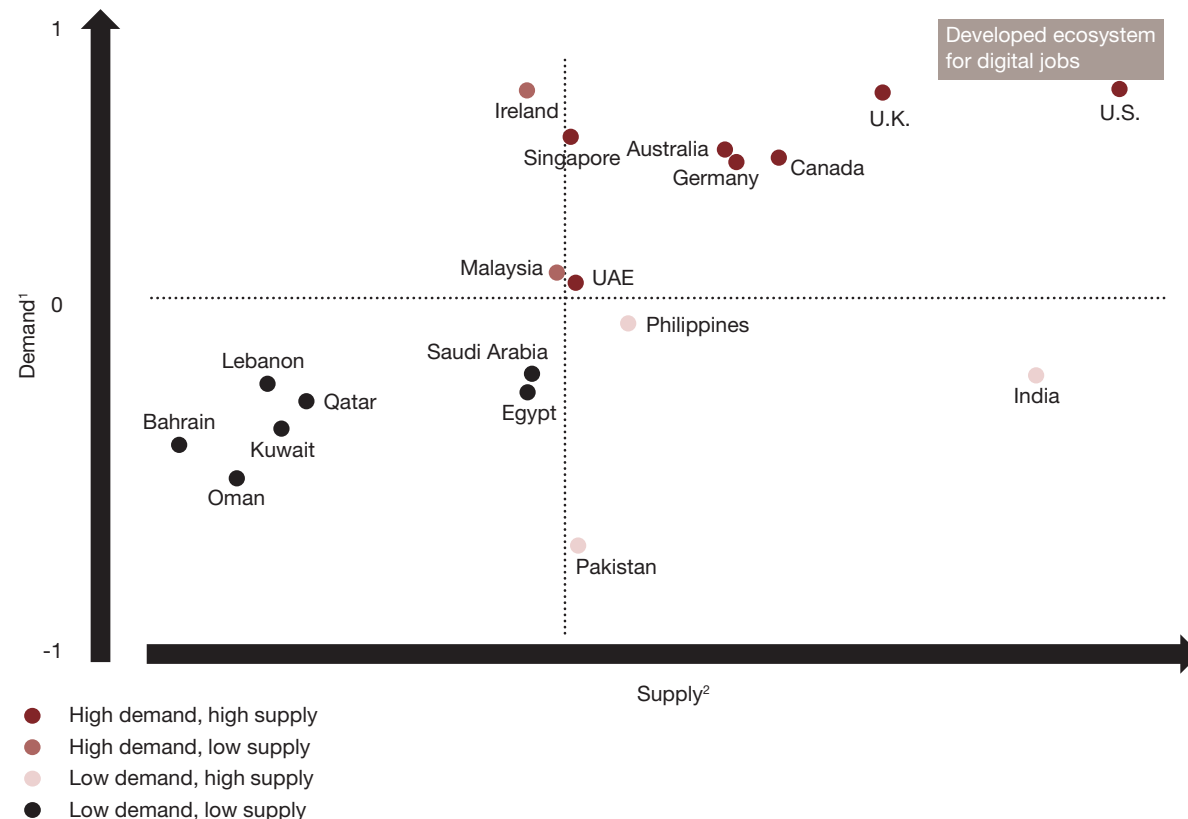
Functions	Industry-related criteria	OR	Title-related criteria
Information technology	Complete function	OR	Complete function
Business development			Titles including one or more of the following: IT, software, computer, technology, digital, Internet
Consulting			
Engineering			
Entrepreneurship			
Marketing			
Media and communications			
Operations			
Product management			
Program/project management			
Sales			
Support			
Accounting	None		None
Administrative	None		None
Legal	None		None
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Source: Strategy& together with LinkedIn

The analysis showed that the UAE is more advanced than its GCC peers in terms of the availability of, and demand for, digital professionals. However, the UAE is still behind in relation to developed countries (see Exhibit 6).

### Exhibit 6 GCC markets for digital jobs still lag behind international benchmarks

Global positioning of the GCC digital job market (March 2017)



<sup>1</sup> Higher demand index means that GCC digital professionals on LinkedIn are receiving more contact from recruiters than peers in other regions.

<sup>2</sup> Supply corresponds to the number of digital professionals on LinkedIn.

Source: LinkedIn

The analysis also showed that digital professionals in the GCC lag behind their global peers when it comes to the advanced technical skills necessary for the digital age. Only one of the 10 skills GCC digital professionals cite most commonly matches the fastest-growing skills globally on the LinkedIn platform. Worse, this is a soft skill, “business development.” None of the top 10 available skills in the GCC is a technical skill (see Exhibit 7).

Although there is a growing trend in the region toward more technical skills, they remain scarce for emerging technologies such as big data, analytics, cybersecurity, and cloud computing. Most of the skills that GCC professionals promote on the platform are soft or rather vague in nature, whereas more specific and technical skills such as knowledge of C++, social media, and data analysis appear to dominate elsewhere. For example, only two of the top 10 available skills among GCC professionals (project management and business analysis) match those of their peers in benchmarks.

Moreover, the skills demonstrating the highest growth among GCC digital professionals are mainly required to service and distribute technology. They include, for instance, technical support, team management, marketing, team leadership, and project management. By comparison, most rapidly growing digital skills globally are related to product development, such as business process improvement and business development (see Exhibit 7). This is mainly due to the fact that technology companies in the GCC are focused on sales, and it implies that a shift toward a production model is key to foster the development of those sought-after skills.

Exhibit 7

GCC digital professionals’ top skills are less related and specific in nature to digital than those in benchmark markets

Top available skills among digital professionals			Fastest-growing skills among digital professionals		
	GCC	Benchmarks		GCC	Benchmarks
1	Management	Project management	1	Technical support	Business process improvement
2	Team management	SQL	2	JavaScript	Social media
3	Project management	Integration	3	Networking	JavaScript
4	Microsoft Office	Process improvement	4	Team management	Data analysis
5	Team leadership	Business analysis	5	Marketing	Business development
6	Business development	Program management	6	HTML	HTML
7	Customer service	Troubleshooting	7	Team leadership	Java
8	Project planning	Software development	8	Java	SQL
9	Leadership	Strategic planning	9	SQL	C++
10	Business analysis	Social media	10	Project management	Marketing

xxx Match between GCC and benchmarks

Skill among GCC digital professionals matching fastest-growing skills internationally

Note: Benchmark markets are Malaysia, Singapore, U.K., and U.S.

Source: LinkedIn; Strategy&

Additionally, the analysis showed a mismatch between what organizations want and what GCC professionals can offer. The digital skills most highly prized by employers in all sectors are almost absent among GCC digital professionals. Of the 10 skills in highest demand in the UAE, for example, six were technical. However, digital professionals in the GCC have none of these digital skills in the top 20 that they list on their LinkedIn profiles (see *Exhibit 8*).

### Exhibit 8

#### The GCC's workforce lacks the digital skills that recruiters are seeking

Top available skills among GCC digital professionals (2017)		Digital skills most in demand across sectors	
1	Management	1	Statistical analysis and data mining ↔
2	Team management	2	Algorithm design ↔
3	Project management	3	Web architecture and development framework ↑
4	Microsoft Office	4	SEO/SEM marketing ↓
5	Team leadership	5	Middleware and integration of software ↑
6	Business development	6	User interface design ↑
7	Customer service		↔ Stayed the same
8	Project planning		↑ Improved relative to 2015
9	Leadership		↓ Dropped relative to 2015
10	Business analysis		
11	Sales		
12	Troubleshooting		
13	Networking		
14	Microsoft Excel		
15	Negotiation		
16	Integration		
17	CRM		
18	Pre-sales		
19	Business strategy		
20	SQL		

Source: LinkedIn; Strategy&

The roots of the GCC's underdeveloped digital job market are in its supply and demand dynamics.

### ***Supply-side challenges***

The current disparity between the available skills and those in demand in the GCC and in comparable countries is due to three root causes:

#### **1. Limited academic preparation for digital skills**

The output of the GCC's education system is partly responsible for the underdeveloped digital skills in the region. The system is not keeping pace with technological change, as evidenced by generic and outdated digital-relevant courses in universities. The Communications and Information Technology Commission (CITC), the Saudi regulator, has noted a decrease in the quality of education in the less prestigious universities, a general scarcity of qualifications in emerging technologies, and a low level of English language capability among ICT graduates.<sup>8</sup> In addition, the GCC has a shortage of teachers with sufficient expertise.<sup>9</sup> This shortage is attributable to factors such as low wages and inadequate school management. This leads to the unproductive delivery of academic curricula and impairs students' performance.

At the same time, the GCC's technical and vocational education and training sector (TVET) does not attract the same number of students as in comparable countries. The TVET sector should stand alongside universities and act as a breeding ground for digital talent. The enrollment of students in TVET in the G20 accounts on average for 21 percent of total students in secondary education, according to the World Bank as of 2015 (or latest available data). Germany and the U.K., for example, recorded enrollment rates of 23 percent and 47 percent, respectively. By contrast, the highest enrollment in the GCC was in Bahrain, at 8 percent. TVET enrollment accounted for only 5 percent of total students in secondary education in Saudi Arabia and 2 percent in the UAE.<sup>10</sup>

There are structural and social reasons for this low level of enrollment. Because it is not a priority for governments, there are no large-scale plans to develop or promote the TVET sector, and funding for TVET centers is limited. In addition, there are unfavorable social attitudes toward vocational training in the GCC, which has an image of being of low social status.

This lack of provision for digital is reflected in the fact that fully 93 percent of the region's digital professionals on LinkedIn completed their university education abroad. These degrees were often encouraged by educational sponsorship programs. Indeed, only 2 percent of digital professionals in Kuwait and Qatar have studied locally. By contrast, of digital professionals in the U.K. and in the U.S., 37 percent and 64 percent, respectively, have graduated from U.K. and U.S. universities.

However, the analysis by Strategy& together with LinkedIn of digital professionals in the GCC indicates a slight improvement in the region, with more graduates from local institutions such as King Saud University, King Fahd University of Petroleum and Minerals, and Al-Imam Muhammad Ibn Saud Islamic University. Nevertheless, none of these GCC-based institutions currently figures among the leading international universities graduating digital professionals.

## **2. Inadequate professional development environment**

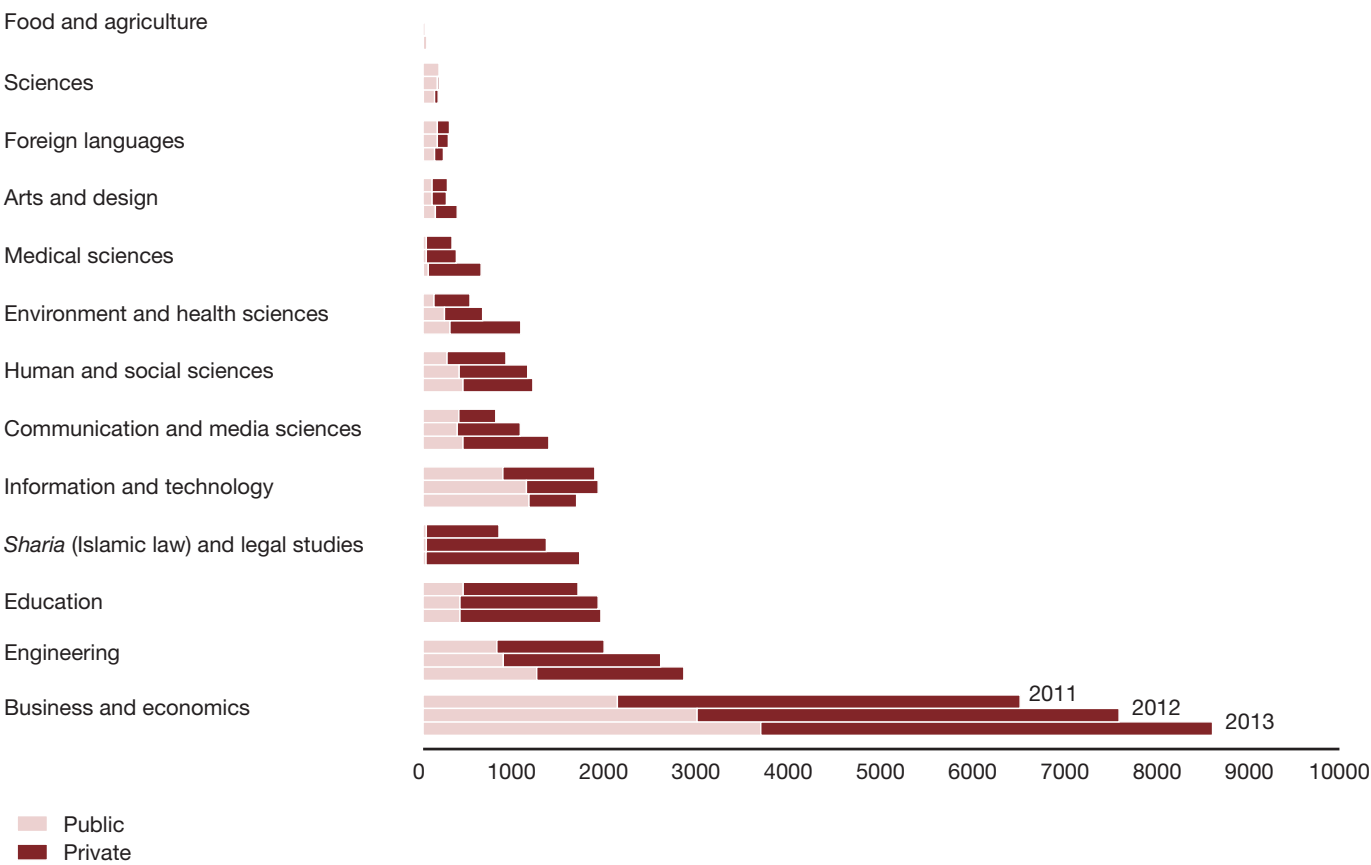
The GCC countries lack enough initiatives to improve the skills of their employees at the entry level and as they rise up the ranks. There is also insufficient interaction between employers and educational institutions, which means that they are not collaborating to meet the skill requirements for the modern workplace. According to the CITC, only 47 percent of surveyed organizations in Saudi Arabia said that the entry-level graduates they hired were equipped with the necessary skills to fulfill their job responsibilities. Additionally, only 29 percent of Saudi employers offer apprenticeships or internships to make up for this skill shortage.<sup>11</sup>

Part of the problem for employers is that they lack qualified trainers in specialized technical topics who can offer training to their employees. Only 34 percent of surveyed Saudi organizations said they currently have a formal ICT professional training program and 37 percent provide structured off-the-job training programs to employees interested in developing their career.<sup>12</sup>

## **3. Limited interest in pursuing digital careers**

Students show little interest in studying ICT in GCC universities, preferring instead well-established courses. For example, enrollment figures in UAE universities between 2011 and 2013, the most recent figures available, showed that business and economics majors remained very popular, with information technology lagging far behind. Moreover, the majority of ICT graduates who opt to continue their education by pursuing a master's degree avoid technical subjects in favor of a business program (*see Exhibit 9, page 17*).

*Exhibit 9*  
**Business and economics remain the most popular majors among university students**  
 UAE university graduates by major (2011–2013)



Source: UAE Ministry of Higher Education and Scientific Research; PwC analysis (“Understanding the GCC Education Sector – a country by country guide”); Strategy& analysis

Other factors inhibiting interest in digital careers include GCC nationals' preference for stable employment in more traditional sectors, in part due to their limited awareness of what digital careers can offer, or how to train for them. Most young people have a preference for traditional public-sector employment in their country because it offers them job security and high pay. Indeed, according to a 2016 survey, more than two thirds (70 percent) of GCC youth prefer public-sector jobs over private-sector employment.<sup>13</sup>

A LinkedIn analysis revealed little interest in digital careers among GCC youth. Digital careers, especially in emerging technologies, are noted for being challenging and changing quickly, which usually makes them better suited to young professionals and fresh graduates. In the GCC, however, challenging work ranked lowest in a list of young professionals' top five career incentives, with only 41 percent of surveyed profiles selecting this option. By contrast, the same analysis showed that profiles ranked first an advantageous compensation and benefits scheme (68 percent of the total), followed by a strong career path, a good work/life balance, and job security.

The lack of interest in digital careers is particularly apparent among women. GCC women tend to be well educated, yet the percentage of women among digital professionals in GCC countries (14 percent) is significantly lower than in peer countries (30 percent), according to LinkedIn. However, if attitudes change, women would constitute a large pool of potential digital workers, provided that the education system, employer training, and specific working arrangements cater to their needs.

### ***Demand-side challenges***

Demand for digital talent in the GCC is limited, owing to low levels of digitization across sectors, an underdeveloped digital industry, and conditions that do not sufficiently encourage entrepreneurship in general. LinkedIn data illustrate the low level of digital development in GCC companies. Almost half of GCC digital professionals (46 percent) are employed in international companies, whereas 54 percent are employed in local or regional companies. By comparison, 68 and 88 percent of U.K. and U.S. digital professionals, respectively, are employed in companies based in their home countries.

## **1. Low digitization across sectors**

Digitization is low across the board in the GCC, with both the public and private sectors recording very limited digital adoption. For example, there is a huge potential for digitization in the entire transportation sector (airports, airlines, and public transportation companies), as well as in every other sector. According to a previous Strategy& report on digitization in GCC businesses, corporate leaders outside the ICT industry have a limited awareness of digitization and lack strategic direction. Many organizations have only a partial understanding of what digitization can offer them. The failure to understand its broader potential restrains the uptake of digital technology and restricts demand for digital jobs.

More than three quarters (77 percent) of surveyed companies in Qatar and the UAE consider digitization to be merely the adoption of one specific technology, rather than viewing it as a broader transformation. Just over a third of companies (37 percent) in both countries have a digital strategy. Very few companies (less than 1 percent) have designated a chief digital officer (CDO) as a specialist who can champion the digital transformation. As a result, many organizations register low adoption rates for emerging technologies, with only 18 percent, for example, using cloud computing.<sup>14</sup>

## **2. Weak digital industry**

The added value of the ICT industry in GCC countries is lower than in comparable countries, although there are signs that it is catching up. In addition, none of the region's top 100 publicly listed companies are technology players. Those ICT companies that are active also tend to be cautious, engaging mainly in sales and services rather than research and development (R&D) and product development. This dissipates ICT spending across the value chain instead of concentrating it in R&D and new products, thereby limiting the demand for production-based digital jobs. As such, if the region does not move from being a consumer to being a producer of technology, the disruptive impact of digitization will eliminate commoditized jobs (e.g., drivers, construction workers, accountants, etc.) but will not confer its job creation potential.

### 3. Underdeveloped entrepreneurship ecosystem

The overall entrepreneurship ecosystem in the region is not conducive to digital growth and innovation. Many digital entrepreneurs prefer to found their startups outside the GCC where they benefit from favorable regulations, smoother company setup processes, as well as more favorable bankruptcy and intellectual property (IP) laws.

The broader economy does not properly support the kind of small firms and startups that demand digital skills. Small and medium-sized enterprises (SMEs) in the GCC contribute more to employment than to the GDP, indicating low monetization and efficiency.<sup>15</sup> Few of these companies are at the forefront of innovation, with limited R&D and product development in evidence. In 2014, only 13 percent of digital SMEs in the GCC implemented some form of innovation, compared to 23 percent in the EU.<sup>16</sup>

Additional constraints on the entrepreneurship ecosystem still remain and contribute to discouraging people from starting their own businesses. These include limited access to funding, unclear legal frameworks, and high fees for registration and licensing, in addition to social attitudes that do not favor risk taking.

However, there has recently been steep growth in the number of local digital startups, albeit starting from a low base. The number of incubators and accelerators in the broader Middle East and North Africa (MENA) region increased from 183 in 2010 to 463 in 2015.<sup>17</sup> A LinkedIn report from 2016 states that the number of those who identify entrepreneurship as their job function in the UAE had almost doubled since 2015, with software technology being the second most popular industry for startup founders.<sup>18</sup> Venture capital transactions across all industries have also risen sharply in the MENA region, from 72 transactions in 2014 to 175 in 2015.<sup>19</sup> GCC governments should capitalize on this trend to further promote startups and unleash their digital potential.

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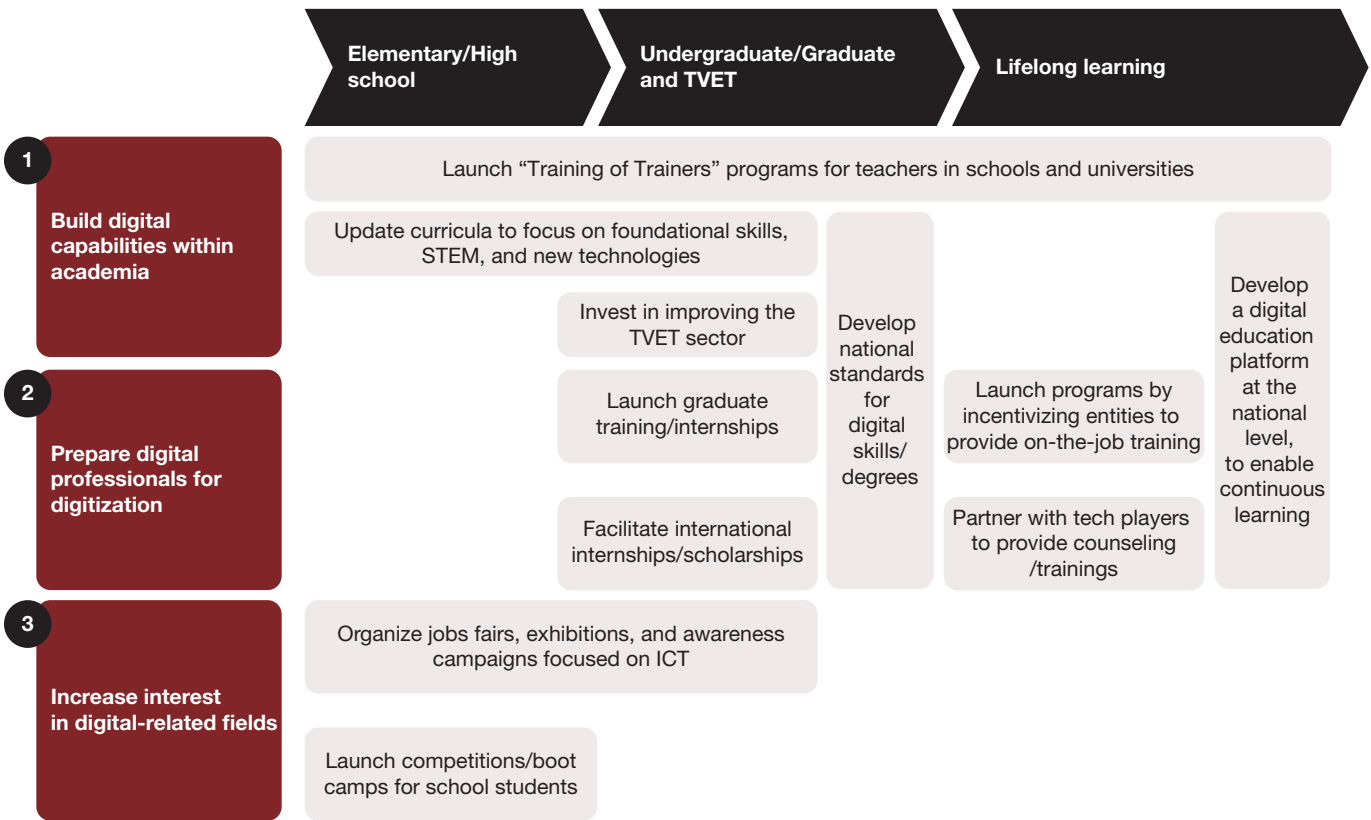
# ***Building a future-proof digital workforce***

GCC countries need to address immediate needs in their digital job market ecosystem by boosting supply and creating demand. Strategy& examined initiatives in different countries around the world and focused on those that took place in contexts that reflect the GCC's current challenges. However, to maximize the impact of these initiatives, GCC countries will need to integrate them into a comprehensive framework.

## ***Initiatives to boost supply***

GCC countries need to deepen the pool of digital skills to the level of similar countries. This requires creating an environment of continuous learning encompassing the acquisition, updating, and innovative application of digital skills, as they are constantly changing with new technologies. To achieve this, GCC countries have to focus their efforts on three objectives: building digital capabilities within academia, improving the professional development environment, and increasing interest in digital-related fields (*see Exhibit 10, page 22*). Because this scope of intervention is extremely wide, there are abundant opportunities for launching initiatives. GCC governments should prioritize these initiatives and continuously monitor their impact by adopting an agile approach, because the skills required will keep on changing with the evolution of technology and economic models.

*Exhibit 10*  
**Supply initiatives should target academia, the professional development environment, and students’ interest in digital**



Source: Strategy&

**1. Build digital capabilities within academia**  
GCC countries should overhaul their education systems to address the implications of the digital economy in schools, universities, and vocational training centers.

Governments can start by requiring academic institutions to update their curricula. Elementary, middle, and secondary schools should focus on a science, technology, engineering, and mathematics (STEM) approach, and include foundational skills such as critical thinking. ICT curricula in universities, at both the undergraduate and graduate levels, should also be up-to-date and include courses or specialization in the latest emerging technologies. Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) provides a good example of such government initiatives in academia. Since 2002, MEXT has been awarding the Super Science High School (SSH) designation to upper secondary schools that cooperate with universities and research institutes to redesign their curricula with a STEM focus. These schools gain access to additional ministry funding, and technical support from the Japan Science and Technology Agency. By 2014, 204 schools had earned the SSH designation.

Governments should also invest more funds to improve the TVET sector and equip students with the technical skills required by employers. They should introduce better monitoring and evaluation systems and raise awareness of available courses in TVET centers and career prospects to encourage more students to enroll. Between 2003 and 2012, for example, the Turkish government invested more than €9 billion (US\$10.6 billion) into the TVET sector to improve its programs.<sup>20</sup> This caused enrollment to grow from 1.26 million students per year in 2003 to 2.27 million in 2013, according to World Bank figures.

Finally, GCC countries should have training of trainers programs for teachers in formal and informal educational settings to give them the advanced ICT knowledge that these teachers can integrate into their course content. Estonia has made developing teachers' knowledge and skills in the use of ICT an official priority. During their university education, Estonian teachers are trained to integrate a wide range of ICT systems into their curricula to provide effective instruction to their students. This helps them become knowledgeable about technology and comfortable with using it for learning purposes, even outside official academic settings.

## **2. Prepare digital professionals for digitization**

Additional development opportunities can help professionals in digital fields to acquire advanced skills and continuously upgrade them, increasing their employability. These opportunities should start at university and extend to the workplace throughout the duration of employment.

Post-graduate training and internship programs should prepare students in digital fields for professional life. For example, the U.K. Tech Partnership, launched by leading employers and universities in that country, offers a range of accredited digital degree apprenticeships. These programs are designed to attract and retain top technology specialists by meeting industry standards for quality, content, and delivery.

Offering international internships and scholarships to top students in digital-related fields can motivate them to further develop their skills. Singapore's National Cybersecurity Postgraduate Scholarship (NCPS), for instance, allows working professionals in different fields of communication security to pursue their master's or doctorate degree at home or abroad, with the condition that they return to Singapore and contribute to the protection of the country's cyberspace.

Company-led programs can also provide on-the-job skills training for existing employees in digital roles. In 2016, key employers and industry partners in Singapore launched the Technology Skills Accelerator initiative with a budget of S\$120 million (\$89 million) over three years. The initiative trains ICT professionals in emerging areas such as cybersecurity, software development, networks and infrastructure, and data analytics.

Partnerships with technology players similarly can provide highly specialized and tailored counseling or training to companies or individuals. In 2012, some 13 regional Chambers of Commerce in France, along with other organizations, partnered with Google to provide free online and certified training in new digital skills for SMEs.<sup>21</sup> In 2016, the city of Manchester partnered with LinkedIn to facilitate self-learning for professionals and improve their employability through Project Manchester. The program analyzed the skills that established professionals declared and then provided them with tips to enhance the appeal of their LinkedIn profile. It also published online training in business and technical skills.

***Bridge the skills gap between the academic and professional environments***

GCC countries should also set national standards for digital skills and establish digital education platforms to promote these standards and improve digital skills. By doing so, national standards for digital skills, degrees, and apprenticeships can align requirements and expectations between the education sector and the private sector. Professionals who possess the recognized qualifications will attract employer interest more easily, which will increase the digital job market's fluidity and efficiency. Entities like the Skills Framework for the Information Age (SFIA) in the U.K., and the National Infocomm Competency Framework in Singapore, have been instrumental in that respect. These programs have brought together employers and digital experts to define the standards for digital skills and programs, align them across the industry, and continually update them as technology evolves.<sup>22</sup>

Government-sponsored online digital education platforms will be key enablers in creating a skilled and competitive digital workforce. They can provide training, courses, and certifications for students and adults — even those in remote locations — to facilitate knowledge sharing and enable continuous learning. Examples of such platforms include Estonia's koolielu.ee (school life) educational portal and meeting place for teachers, students, and parents, and the Cyber University of South Korea (CUK), a pioneering online university established in 2001. CUK is a leading institution in online and continuing education. It collaborates with corporations to have experts with hands-on experience teaching classes, and produces highly qualified graduates.

### **3. Increase interest in digital-related fields**

GCC countries need to boost their nationals' interest in pursuing digital careers through awareness programs in educational institutions and early interventions targeting young learners.

Awareness campaigns focused on ICT should address students in schools, universities, and TVET centers to introduce them to the career opportunities available to them. These campaigns can include events such as job fairs and exhibitions, as well as online information portals. In 2011, for example, the Information Technology Association of Canada (ITAC) launched CareerMash, a career network site and career week initiative to inspire students to pursue a career in ICT.

Early intervention programs such as competitions, hackathons, and boot camps in elementary and secondary schools are essential to get young people interested in the digital field. Canada's Girls Learning Code program demonstrates how effective such programs are. Initially launched in 2012, Girls Learning Code aimed to instill enthusiasm about technology in girls between the ages of 8 and 13, with camps and after-school clubs on a variety of topics such as HTML, image editing, blog creation, and 3D printing.<sup>23</sup> The success of the program led to the establishment of the Kids Learning Code program, aimed at both girls and boys, a year later. School competitions, whether they focus on programming, robotics, or other technologies, are also a fun way of motivating students to explore how they can apply what they learn from their ICT curriculum. Examples of such competitions include the Young ICT Explorers in Australia and the creative tech competitions organized by the U.K.'s Tech Partnership in schools.

Finally, GCC governments will have to instill a culture of lifelong learning, and encourage professionals to continuously update their skills, to ensure their capabilities remain relevant in a market prone to disruption.

### **Initiatives to stimulate demand**

GCC countries will also need to work on creating demand for their new digital professionals if they are to retain them. They will need to launch initiatives across three key components of the digital job market: organizations across sectors, the ICT sector, and the entrepreneurship ecosystem (*see Exhibit 11, page 28*).

Exhibit 11

**Demand initiatives aim to increase digitization across sectors, develop the digital industry, and boost digital entrepreneurship**



Source: Strategy&

## **1. Increase digitization across sectors**

A better understanding of digitization and its advantages among corporate leaders is necessary to drive organizations to adopt comprehensive digital strategies and hire more digital professionals. This will improve organizations' performance across the board and contribute to the digital transformation of GCC economies.

GCC governments need to provide the right environment and regulations to encourage corporations to digitize their operations. They should do so by removing data silos, enforcing strong cybersecurity measures, or moving to a cloud infrastructure. For example, the U.K. National Cyber Security Centre (NCSC) aims to improve cyber resilience by working in coordination with organizations, businesses, and individuals to provide authoritative and coherent cybersecurity advice and cyber incident management. Cybersecurity reduces vulnerabilities linked to digital transactions and data sharing, for instance, and this enables increased digital adoption.

GCC governments should lead by example through championing the digitization of public institutions. They can achieve this through promoting digital jobs within the public sector and establishing an accelerated digital career path in government with competitive compensation schemes. As an example, the U.K.'s Government Digital Service (GDS) employs more than 500 specialists dedicated to the digital transformation of government. To promote its agenda, the GDS has instituted a talent strategy that aims to make government an employer of choice for digital, data, and technology professionals through building a common taxonomy of job roles, setting out clear career paths and associated capabilities, and enhancing the pay and reward for critical roles.<sup>24</sup> In addition, the GDS has partnered with the Office for National Statistics (ONS) and the Government Office for Science to support the development of data science skills and tools among civil servants.<sup>25</sup>

## **2. Develop the digital industry**

To expand their ICT industry and increase demand for digital jobs, GCC countries need a strategy for attracting more ICT players and encouraging existing ones to pay more attention to R&D. This requires building an appealing ecosystem for international, regional, and local ICT companies to set up in the region through incentives in the form of favorable regulations and facilities (e.g., intellectual property protection laws).

## **3. Boost digital entrepreneurship**

GCC countries need to intensify their efforts to improve the entrepreneurship ecosystem, namely by amending regulations and improving access to facilities for startups.

Regulations should ensure that they facilitate the registration, operation, and termination of startups. Estonia, for example, has established itself as a startup hub by setting affordable and convenient regulations to facilitate the establishment of startups. It has also introduced the e-residency or “startup visa” concept, which allows any entrepreneur anywhere in the world with an innovative idea to open a startup in Estonia. These e-residents receive a government-issued secure digital ID and full access to Estonia’s public e-services. This enables them to establish a trusted EU business with all the systems and processes needed to manage their company entirely online and conduct business globally wherever they are in the world, with minimal cost and hassle.

GCC governments can provide better infrastructure, create additional sources of funding, and increase mentoring opportunities to support young startups and attract startups from around the world. The Chilean government achieved this with Start-Up Chile, a public startup accelerator that encourages entrepreneurs from all over the world to build their startups in Chile. After a highly competitive screening process, high-potential startups are selected to receive equity-free investment, mentoring, and coaching. To date, around 1,300 startups have benefited from the scheme. The goal of this program is to strengthen the country’s long-term growth prospects and position it as the innovation hub of Latin America. It also aims to advance a fundamental change in Chilean attitudes by demonstrating the economic and social benefits of entrepreneurship.

## Connecting supply and demand

The most efficient way for GCC countries to connect supply and demand for digital jobs is to set up dedicated digital platforms in their home market. Such digital platforms can provide remote work and income generation opportunities for GCC nationals who are not yet participating in the labor force, particularly women. It can break down large-scale digital projects from traditional employers into smaller tasks and divide them among different individuals based on their skill level. Such a platform can also serve to raise awareness of digital employment opportunities and include technical training components to boost digital professionals' skills.

An example of how such a platform would operate is the non-profit business Samasource. It uses an Internet-based model called “microwork” to provide remote work opportunities to unemployed people — mainly women and youth — in the U.S., Haiti, India, Kenya, Ghana, and Uganda. These part-time employees are first trained in basic computer skills and digital-related roles, then hired to undertake specific tasks. Samasource’s clients include high-profile companies such as Google, Microsoft, and Cisco, and the company has provided employment for more than 8,000 people to date.

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### Imperatives for GCC governments

Although GCC governments can be the driving force behind this enabling ecosystem, the ultimate success of their initiatives will hinge on multi-stakeholder partnerships. Most similar initiatives globally have involved governments partnering with different types of stakeholders such as technology players, educational institutions, or companies in other sectors (including large corporations, SMEs, startups, and entrepreneurs) (*see Exhibit 12, page 32*). It is important to note that every initiative needs to have a clear governance model to properly allocate the roles and responsibilities between the different stakeholders and ensure its successful implementation, avoiding inefficiencies and overlap.

GCC governments need to stay vigilant when building new skills in their workforce. The digital sector tends to change rapidly because of continuously emerging new technologies that redefine the way business is done as well as the skills needed and job requirements. Skills in digital employment require an update every few years, whereas this is less often the case in traditional employment. The progress linked to the position of data scientists over the past 15 years aptly illustrates this as it involved big changes in required skills and tools used. Therefore, governments need to take an adaptive approach that continuously accounts for the latest technological developments across all their initiatives aimed at educational institutions, professional workplaces, and individuals.

## Exhibit 12

### Ecosystems that enable digital talent growth need multi-stakeholder partnerships

Global initiatives with multi-stakeholder partnerships

	Government entities	Technology players	Education players	Private sector
	<ul style="list-style-type: none"> <li>- Ministry of labor</li> <li>- Ministry of education</li> </ul>	<ul style="list-style-type: none"> <li>- Large tech players</li> <li>- Talent platforms</li> </ul>	<ul style="list-style-type: none"> <li>- Schools/ universities</li> <li>- TVET institutions</li> <li>- Digital education platforms</li> </ul>	<ul style="list-style-type: none"> <li>- Large corporations</li> <li>- SMEs</li> <li>- Startups</li> <li>- Entrepreneurs</li> <li>- Think tanks</li> </ul>
Tech Partnership (U.K.)	✓	✓	✓	✓
Infocomm Competency Framework (Poland)	✓	✓		
Project Manchester (U.K.)	✓	✓	✓	
TechSkills Accelerator (Singapore)	✓	✓		✓
Girls/Kids Learning Code (Canada)		✓	✓	
TVET Sector development (Turkey)	✓	✓	✓	✓
Sama Group (U.S.)		✓	✓	✓
Start-up Chile (Chile)	✓	✓		✓
Google Pour les Pros (France)	✓	✓		✓

Source: Strategy& analysis

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# ***Conclusion***

GCC governments need a comprehensive plan that focuses on boosting digital professionals' skills and developing a workforce of continuous learners, while at the same time creating attractive employment opportunities. It is crucial that these plans continue to be updated to guarantee a capable digital workforce, equipped with sustainable skills that can adapt to new technologies.

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# Endnotes

<sup>1</sup> The GCC consists of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

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<sup>4</sup> “Freelancing in America: A national survey of the new workforce,” Freelancers Union & Elance-oDesk (<https://goo.gl/RvK6R0>).

<sup>5</sup> “Preparing for the digital era: The state of digitalization in GCC businesses,” Strategy&, 2016 (<https://www.strategyand.pwc.com/reports/preparing-digital-era>).

<sup>6</sup> “National Transformation Program,” Kingdom of Saudi Arabia, 2016 ([http://vision2030.gov.sa/sites/default/files/NTP\\_En.pdf](http://vision2030.gov.sa/sites/default/files/NTP_En.pdf)).

<sup>7</sup> “About Smart Dubai Gov,” Government of Dubai (<http://www.dubai.ae/en/AboutDubaiGovernment/Pages/default.aspx>).

<sup>8</sup> “ICT Report: ICT Workforce in the Kingdom of Saudi Arabia,” CITC, 2015 ([http://www.citc.gov.sa/en/reportsandstudies/Reports/Documents/ICTWorkforce\\_en.pdf](http://www.citc.gov.sa/en/reportsandstudies/Reports/Documents/ICTWorkforce_en.pdf)).

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<sup>11</sup> “ICT workforce in the Kingdom of Saudi Arabia,” CITC Publications, 2015, pages 19, 21 ([http://www.citc.gov.sa/en/reportsandstudies/Reports/Documents/ICTWorkforce\\_en.pdf](http://www.citc.gov.sa/en/reportsandstudies/Reports/Documents/ICTWorkforce_en.pdf)).

<sup>12</sup> “ICT workforce in the Kingdom of Saudi Arabia,” CITC Publications, 2015, p. 20-21 ([http://www.citc.gov.sa/en/reportsandstudies/Reports/Documents/ICTWorkforce\\_en.pdf](http://www.citc.gov.sa/en/reportsandstudies/Reports/Documents/ICTWorkforce_en.pdf)).

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