



Middle East digital economy outlook

Special report: Digital growth opportunities in UAE, Pakistan, and Oman

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Arthur D Little

Content

1. Think differently, think archetype, your digital economy model – Middle East special report	3
2. Archetypes: a strategic approach to digital policy development	5
3. Archetypes in practice: recommended future steps in case study countries	11
Conclusion	21

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1. Think differently, think archetype, your digital economy model – Middle East special report

Pre-pandemic, digital transformation of the global economy was underway. 5G auctions were held, spectrum allocated, and deployment commenced in multiple economies. E-commerce was growing its share of consumer expenditure, and businesses were embracing cloud computing and new digital technologies.

During the pandemic there has been a clear acceleration of this digital transformation. More rapid technology adoption and industry disruption is forcing faster 5G and cloud deployment. Keeping the lights on and supply chains moving, customers have been more accepting of change and new ways of working. Equally, regulators have been more relenting, enabling faster adoption and greater experimentation with digital solutions. Remote working, contactless payments, and autonomous systems are now part of everyday norms. Our recent COVID-19 report¹ covers many of developments of the past 12 months and the implications for the digital economy.

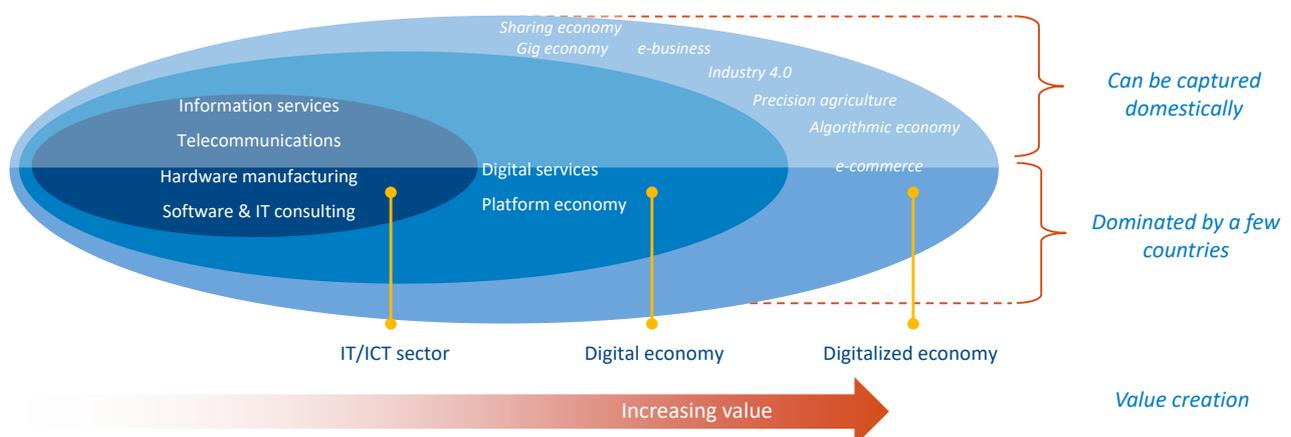
Post-pandemic, global economies are grappling with the twin challenges of how to recover from a severe economic downturn and adapt to the disruption that has occurred. Governments, businesses, and households operate and interact differently in the new normal. Although some snapback is likely given our social tendencies and need for in-person interaction, it is recognized that the digital economy has taken a major step

forward, with multiple technologies and solutions entering our lives for good, our behaviors and preferences irreversibly altered. We have also come to realize the digital economy is more resilient, with businesses now considering how digitalization can improve preparedness for the next global threat: climate change.

The leading puzzle for policy makers is how to capitalize on accelerated digitization to drive the recovery and realize the opportunities of the new economy over the longer term. Although counterintuitive, we argue in this report that now is the time for Middle East countries to double efforts to support digital transformation in all industries. We use the term Middle East to refer to (in alphabetical order): **Afghanistan, Bahrain, Iraq, Jordan, Kuwait, Lebanon, Oman, Pakistan, Qatar, Saudi Arabia, Syria, United Arab Emirates (UAE), and Yemen.**

We argue that those nations making use of the current flux to build the foundations of a strong and sustainable digital economy will emerge from the downturn stronger, more competitive, supporting more well-paid and high-quality jobs. Figure 1 illustrates the increasing value economies can capture along the value chain by moving beyond infrastructure and ICT services to provide digital solutions, create digital content, and digitalize industries for improved productivity.

Figure 1: Digital economy refers to a broad range of economic activities that use digitized infrastructure and knowledge as the key factors of value creation



Source: Arthur D. Little analysis

1 "Putting digital at the heart of the economic recovery," ADL TIME, July 2020 (<https://www.adlittle.com/en/putting-digital-heart-economic-recovery>)

At stake is a 2.2% GDP digital boost in developing countries, 1.6% in developed countries

Depending on the definition, estimates of the size of the digital economy today range from 4.5% to 15.5% of world GDP² The digital economy, per the broadest of definitions, is estimated to be US\$11.5 trillion – on average 18.4% of GDP in developed economies and 10% in developing economies.

In Arab countries, by comparison (Figure 2), the average contribution of the digital economy is around 4%. **Saudi Arabia** performs above average at 6.4%, while **Oman** (2.1%) and **Pakistan** (1%) significantly underperform. Compared with the 9% in the USA and Sweden, and 7.7% in the UK, there is clearly potential for improvement. We believe that a more than doubling of the digital economy in Middle East economies is possible and can be unlocked with the correct policies.

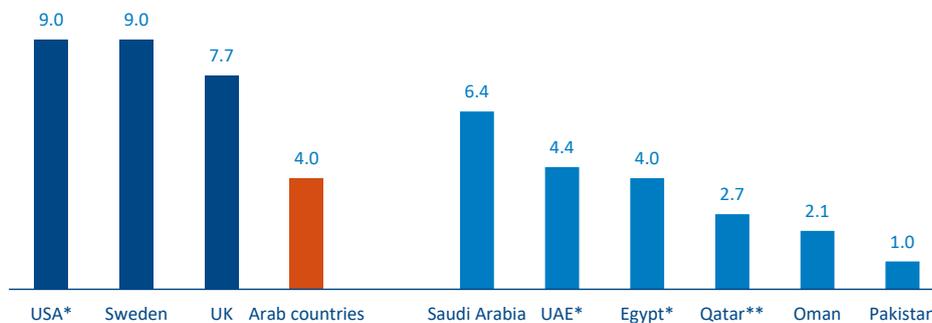
Digital transformation offers a unique opportunity for developed economies to become more competitive, maintain their global influence as business centers, and to diversify their economies by capturing value in new areas. **Saudi Arabia’s** Vision 2030 makes clear the role for the digital economy to drive ecommerce, improve public services, and support a thriving non-oil-based private-sector economy. Other oil-dependent economies in the Middle East share similar goals.

For developing countries, the prize attainable from digital transformation is even more significant, as digitalization supports an economic leapfrog in development, giving rise to sustained productivity gains, higher standards of living, and most importantly in the short term, lifting economies out of the current downturn.

Differences among countries in the contribution of the digital economy to GDP and the goals each country wishes to attain highlights that one size does not fit all when it comes to national policies supporting the digital economy. “Think different, think archetype, your digital economy” is our approach to policy making, recognizing the differences and helping countries to implement successful digitalization visions and strategies. In this report, we investigate what this approach means for Middle East economies and how they can maximize the economic impact of their own digital transformations.

The prize, as estimated in a recent Oxford Economics and Huawei³ study, which captures the value of digital spillovers, is that the global digital economy could grow to account for 24.3% of global GDP by 2025 under a high-digitization scenario, which equates to US\$23 trillion. For developing economies, the gain is a 2.2% boost to GDP by 2025, and for advanced economies, the gain is 1.6% over the same period.

Figure 2: Digital contribution to GDP (%), Middle East and global benchmarks (2018)



Source: Arthur D. Little analysis
 Note: *2019, **2017 data

2 “Digital Economy Report 2019,” United Nations Conference on Trade and Development (UNCTAD), 2019
 3 “Digital Spillover,” Huawei, 2017. https://www.huawei.com/minisite/gci/en/digital-spillover/files/gci_digital_spillover.pdf

2. Archetypes: a strategic approach to digital policy development

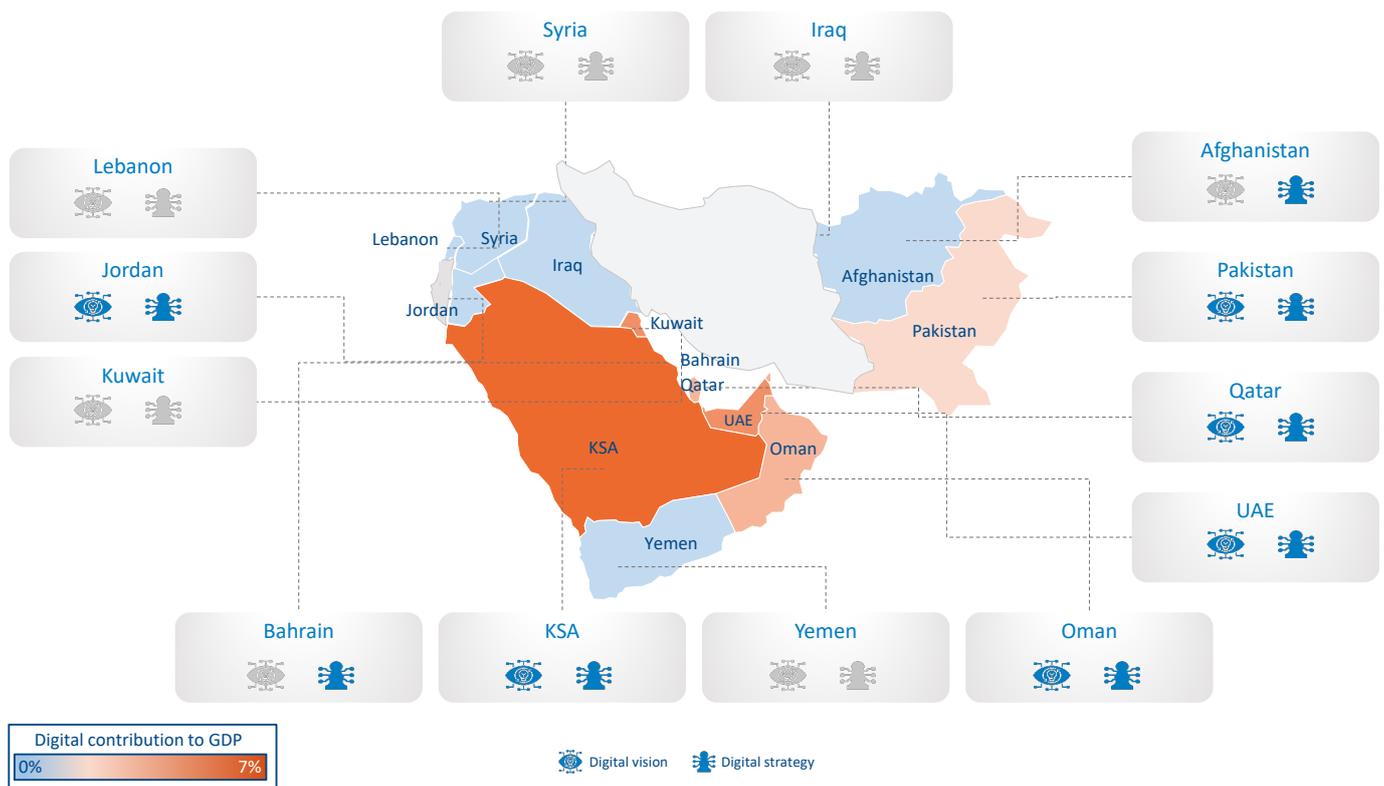
All Middle East countries possess a digital transformation agenda – a political and financial commitment to create knowledge-based economies from the creation, deployment, and/or use of digital technologies and business models. Figure 3 illustrates that the majority also have digital strategies in place. Many strategies contain the right ingredients, combining boldness and long-term vision, while giving attention to quick-win, short-term initiatives. However, not all have a clear vision of what a digital economy will mean for their citizens and businesses. There is also the question of how to accelerate digitalization amidst a global pandemic and to rapidly kickstart a recovery.

Countries must select the policy goals and visions that are appropriate for them

Some countries look to replicate digital leaders such as the US or China as their ultimate goal, not realizing that other options are attainable with a large positive impact on growth. Goals and visions should be realistic and attainable with the resources and capabilities available to each economy.

Endowed with limited financial resources, countries also need to prioritize those policies that maximize impact. Recognizing that not every economy can or should be an innovation powerhouse is an important step. Ensuring policies build on existing strengths and address the root causes of weaknesses is another. Collectively, sustained benefits come from realistic targets and objectives.

Figure 3: Digital economy progress by country



Source: Arthur D. Little analysis
Based on the most recent year for which data was available

Digital policies should be holistic and recognize strategic effects

The absence of a holistic vision or failure to recognize complementary policies can mean the countries follow policies that do not reinforce each other, resulting in less than maximum impact. Protection of industry laggards, while supporting disruptive start-ups that threaten traditional players, is clearly not optimal policy. Technology, tax, industry regulation, and funding should all push in the same direction.

Countries can have multiple digital visions, short-term objectives to benefit from quick wins, and a longer-term strategy to elevate the future digital economy to higher levels of added value.

For large economies and regional clusters, there are portfolio effects to consider. Objectives and strategies can complement each other and benefit from synergies and the efficiencies in specialization. In a regional context, while one country may establish itself as the innovation leader, neighboring countries can best maximize the impact of digitalization by capturing areas of the value chain that complement the innovation leader rather than competing against it. In this way, a country or region can focus on digital innovation while others focus on deploying digital solutions in industry verticals or capture value from supplying ICT services and finance to its neighbors. Recognizing these independencies, a portfolio strategy can efficiently uplift an entire region's digital economic outlook.

“Think differently, think archetype, your digital economy” is our proposed framework for tailored digital policy development

In our previous report, we identified seven digital economy archetypes: Innovation Hubs, Efficient Prosumers, Service Powerhouses, Global Factories, Business Hubs, ICT Patrons, and ICT Novices, which can be thought of as building blocks for economies wishing to develop their digital economies, beginning as an ICT Novice or ICT Patron, and transitioning to higher value-generating archetypes by implementing the right policies.

Each archetype differs in its presence or dominance in the ICT value-chain step, as illustrated in Figure 4.⁴ However, archetypes are not limited to specific steps in the value chain; instead, their position marks the focal domain in the overall value chain. They can be further differentiated through other underlying characteristics, such as economic status, population size, political stability, geographical advantage, and technology penetration.

Figure 4: Digital economy archetypes with illustrative country examples



Source: Arthur D. Little analysis
 Note: * ICT Patrons can produce and consume as well

4 The archetype of other countries can be found in our earlier report that introduced the archetype framework, “Think differently, think archetype, your digital economy model” (https://www.huawei.com/-/media/corp2020/pdf/public-policy/adl_huawei_digital_transformation_main_report.pdf?la=en)

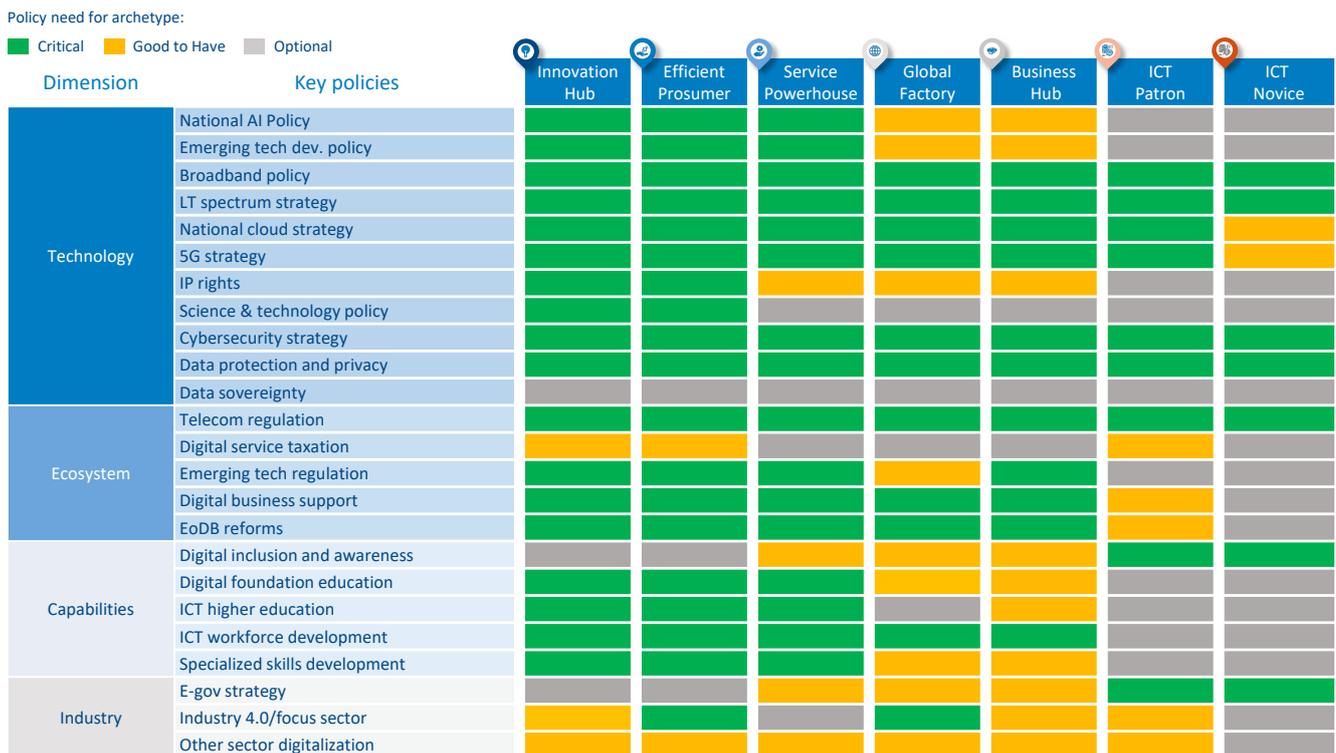
Different policy areas are relevant and critical for each archetype

Policy makers need to formulate policies, laws, and regulations across four interrelated policy dimensions – **technology**, **capabilities**, **ecosystem**, and **industry** – as we believe these to be the driving forces underpinning digital transformation relevant to each archetype.

This framework (Figure 5) recognizes that successful digital economies require a whole range of infrastructure and capabilities, but that each starting point is different and requires a tailored policy pathway to be formulated for each country first to excel within an archetype and then to advance to another archetype.

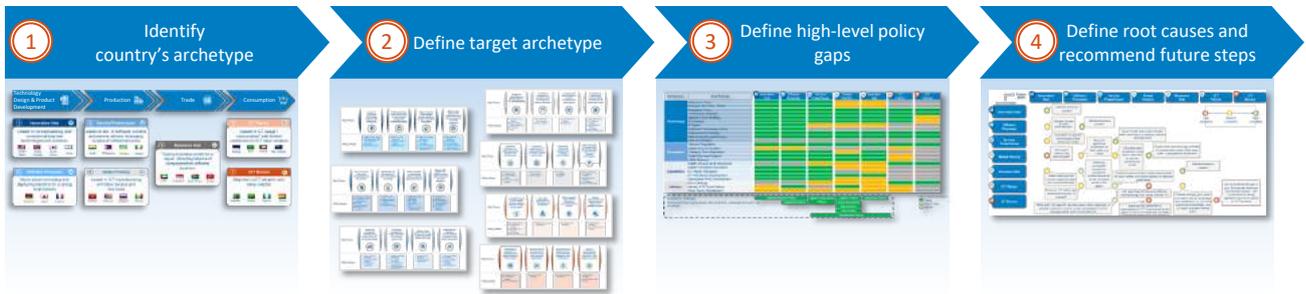
For ICT Novice economies characterized by basic infrastructure, capabilities, and limited development of digital ecosystems, movement up the value chain requires policies to strengthen infrastructure (i.e., improve coverage), create opportunities for businesses (i.e., encouraging domestic content and services), and upskill workforce capabilities. For ICT Patrons with strong infrastructure, upscaling to 5G communications should be considered, in addition to policies strengthening education in digital skills and improving the ease of doing business to capture increasing value from digitalization. At each step up the value chain, additional policies become relevant until economies achieve their digital visions as Innovation Hubs, Efficient Prosumers, Service Powerhouses, or Business Hubs. Primary and secondary archetypes can also exist as digital visions dictate. A tailored solution, each resulting digital roadmap is unique and address each country’s specific challenges.

Figure 5: Different policy areas are relevant and critical for each archetype



Source: Arthur D. Little analysis

Figure 6: Country approach to digital economy strategy and policy reforms



Source: Arthur D. Little analysis

Implementing this archetype approach so countries can benefit from this different, albeit strategic, approach, we follow a four-step process (Figure 6):

- **Step 1:** Identify the **current archetype** that best characterizes the country's present digital economy.
- **Step 2:** Define the **target archetype and best-fit strategy**. This can be the iterative improvement of the digital economy to excel within the current archetype or can be a different archetype that the country aspires to achieve. Multiple archetypes are possible, as noted above.
- **Step 3:** To achieve a given archetype, we define a set of digital economy foundations that must be established – technology, ecosystem, capability, and industry. Assessed against the digital foundations, we define the **high-level gaps between current and target archetypes** for each county, and thus the priority policy areas on which to focus.
- **Step 4:** Deep-dive on the identified gaps to establish the root causes and make tailored recommendations on how the gaps can be addressed through policy actions.

Putting theory into practice, we have applied our approach to three case study countries in the Middle East: the **UAE**, **Pakistan**, and **Oman**. The case study examples correspond to Step 1 of the archetype approach.

UAE is a regional Business Hub aspiring to become an Innovation Hub

GDP per capita	US\$ 75,075
Population	9.63 mn
Internet penetration	95%
Political stability	0.74
ICT goods exports (% of GDP)	6.61%

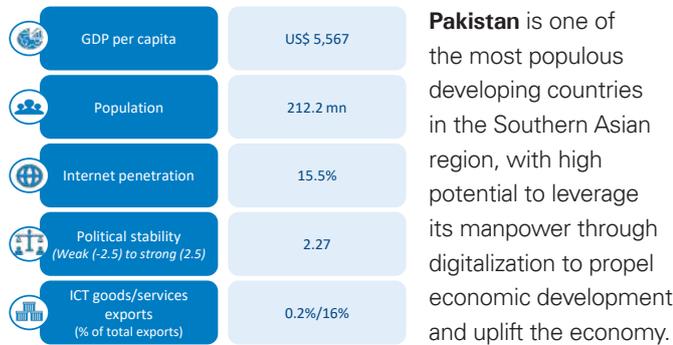
UAE has cemented its status as the Middle East's Business Hub, attracting global talent and regional corporate headquarters. Its strategic location, world-class infrastructure, strong connectivity, business-friendly

environment, and increasing cultural assets are key factors driving its success.

An ICT Business Hub, it maintains a developed digital economy importing the latest digital technologies and innovations to meet the needs of **UAE's** increasingly sophisticated consumers and businesses. Combining world-class infrastructure with digitally savvy and demanding users has seen **UAE** become a pioneer in smart city development. Dubai smart city initiatives have included new ways to deliver more efficient government services, on-demand transport, contactless payments, and mobile Apps to make finding places and information easier for citizens and visitors. The latest developments include a substantial boost to cloud and IoT infrastructure, plus the adoption of AI and blockchain technologies to power the next stage of smart city transformation.

Smart cities are built on strong foundations. **UAE's** key strengths include high 4G network coverage and smartphone penetration (96% and 82% of the population, respectively), strong IP rights protection, and robust cybersecurity. Together, these features enable value to be created from the application and adoption of innovative technologies, which in turn fosters more efficient services and businesses, with consumers and companies confident in the knowledge that personal data is secure and intellectual property is protected, spurring further investment and entrepreneurship. Beyond solid foundations, ICT infrastructure must also achieve high technical performance (i.e., coverage, low latency, and capacity) to support a future smart digital economy. A testament to **UAE's** vision, it has promised 100% 5G coverage by 2025, recently boosted by additional investment that also includes funding of IoT, AI, and blockchain technologies. Based on these foundations, we believe progress from Business Hub to an Innovation Hub is a logical next step for **UAE** and aligns to its 2021 Vision to become a knowledge-based economy driven by innovation, research, science, and technology.

Pakistan is an ICT Novice with potential to advance to a Service Powerhouse by leveraging its geographic and manpower strengths

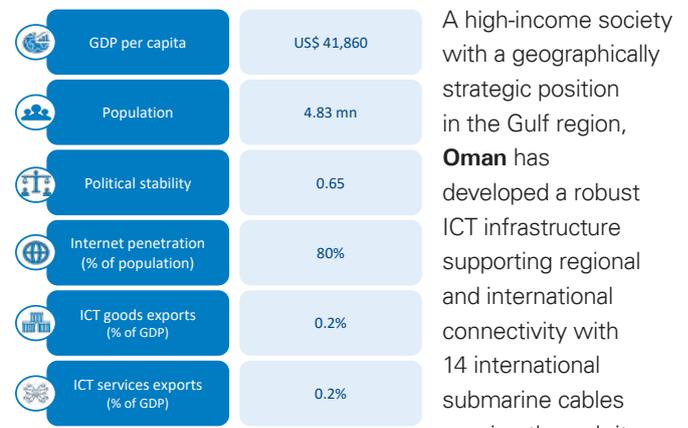


An ICT Novice, a lack of core infrastructure is having a detrimental impact on **Pakistan’s** digital economy, holding back productivity and economic growth. In the absence of core infrastructure there is limited demand for ICT products and services and consequently lower investment. **Pakistan** also suffers from low levels of literacy (59% of the population), in part due to the number of children (44%) who do not receive a school education.

Despite these setbacks, **Pakistan** launched its Digital Pakistan Policy in 2018 to nurture its domestic digital industries by rewarding export sales with cash, reducing sales taxes on domestic IT revenues, improving ICT education and Internet access in educational institutes, and encouraging homegrown companies in key technologies including IoT, FinTech, AI, and robotics. In so doing it is supporting job and value creation and optimizing the impact of digital by ensuring that value stays in and supports the economy of **Pakistan**.

Accelerating digital transformation with the right policies does provide the opportunity to lift **Pakistan’s** growth prospects and leapfrog its development, to excel as an ICT Novice and eventually progress to a Software/Service Powerhouse, making best use of its manpower and geographic advantages. We believe the digital economy has a bright future in **Pakistan** and can contribute significantly to its economic development and bring benefits to its citizens.

Oman can move up the digital value chain from ICT Patron to Business Hub/Service Powerhouse by leveraging its ICT infrastructure and position in the Gulf region



territory. Although largely dependent on oil exports, **Oman** does have one of the more diverse economies in the region, with tourism growing in importance alongside manufacturing, and a strategically important port sector at the entrance to the Gulf.

Oman remains a net importer, liberalizing many markets to attract international companies, and is a major consumer of ICT goods and services. High smartphone penetration of 92% of the population, 4G coverage of 99%, and widespread high-speed Internet are characteristics of Oman’s digital development. These factors place **Oman** firmly as an ICT Patron, characterized by high ICT usage but with limited contribution to ICT value creation, evidenced by digital’s contribution to GDP at just 2.1% (see Figure 2).

Exploiting its strategic location and competitive advantages for economic gain, we consider that **Oman** can develop firstly as a Service Powerhouse by leveraging its population of highly skilled ICT graduates, solid ICT infrastructure, and active ICT workforce. Secondly, we see potential for **Oman** to move up the value chain in digital services to become a Business Hub, attracting businesses that can benefit from its strategic position, liberalized markets, and growing tourism sector.



3. Archetypes in practice: recommended future steps in case study countries

The archetype approach clearly resonates with the development aspirations and the realities of each of the countries we examined. This strategic approach to digital transformation is the basis for driving maximum impact through tailored policy formulation. Corresponding to steps 3 and 4 of the archetype framework, in this chapter we summarize the key digital foundation gaps between current archetype and target archetype for **UAE**, **Pakistan**, and **Oman**. We share evidence for the root causes of each gap, make policy recommendations based on the findings, and provide a high-level quantification of the likely economic benefits.

United Arab Emirates

Addressing a lack of R&D activity, high costs of connectivity, lack of unified regulation, and limited ICT capabilities are policy priorities for UAE to become an Innovation Hub

Comparing **UAE** digital economy indicators against Innovation Hub thresholds, we identify key gaps in technology and capability foundations (Figure 7). Scores for ecosystem and industry foundation indicators were found to be consistent with Innovation Hub thresholds.

Lack of emerging technology development in UAE limits value creation

Emerging technology development is limited in **UAE**, evidenced by comparatively low numbers of patents granted and R&D expenditure as a percentage of GDP (1.3% in **UAE**, compared with 3.3% in Sweden and 4.8% in South Korea).⁵ **UAE** has the opportunity to increase value creation by increasing domestic R&D and commercialization activities in emerging digital technologies.

Many multinational companies establish administrative and sales offices in **UAE**, supporting accounting, legal, and business services for which **UAE** has built competitive advantage. Far fewer companies locate their technology, design, or research centers in **UAE**, which would support software engineers, ICT developers, and data scientists. We consider this an untapped opportunity to generate significant added value and jobs, building on existing strengths as a regional Business Hub. Creating a hub for science, research, technology, and digital services requires attracting global talent, developing domestic capabilities, and increasing funding for science and technology research.

Figure 7: Key gaps in UAE’s digital foundations to be an Innovation Hub

Policy area		Indicator	UAE’s score vs IH thresholds (scale of 1 to 10)	Areas for improvement
Technology	Emerging tech development	Patent requests per million population	2 (1.93) vs 7 (19.5 to 25.5)	R&D activity, specifically in emerging technology
	Cloud and data center	Number of data centers per million population	5 (2.2) vs 7 (8 to 12)	Cost of connectivity and price of cloud services
	Data protection and privacy	Data regulation and enforcement	5 (2) vs 10 (4)	Unified regional and federal data protection framework
Capabilities	Digital foundation education	Performance in science (Pisa scores)	5 (436.73) vs 8 (510)	ICT skills and capabilities developed through schools, universities and vocational training
	ICT higher education	Proportion of tertiary students pursuing ICT careers (% of student population)	4 (6.36) vs 8 (7)	
	Specialized skills development	Proportion of workforce in technical jobs (% of workforce)	4 (10.32) vs 8 (17)	

■ Country’s normalized score ⋮ Threshold’s normalized value
(x) Country’s measure value (x) Threshold’s measure value

Source: Arthur D. Little analysis

Reducing connectivity costs can facilitate ICT service adoption

UAE’s access infrastructure to carry data traffic is among the world’s best, illustrated by the planned rollout of 5G by 2025. For the ability of content infrastructure to host and exchange data at a local level, **UAE** has made ongoing, significant investment in data center development, which has increased substantially in recent years. However, despite having the largest Internet Exchange Point (IXP) in the region, UAE-IX, the cost of national connectivity is 10x that of international connectivity coming into the country. This has naturally led to the import of data content and services from other countries when much more could be delivered locally, supporting skilled ICT jobs and capabilities. Every Mbit/s of traffic that originates within the country lowers the latency of accessing the content, which in turn increases the usage of content and data revenues earned by ISPs. Thus, Internet exchanges and data centers have an important role in furthering the development of the digital economy, which includes the adoption of cloud services and AI solutions.

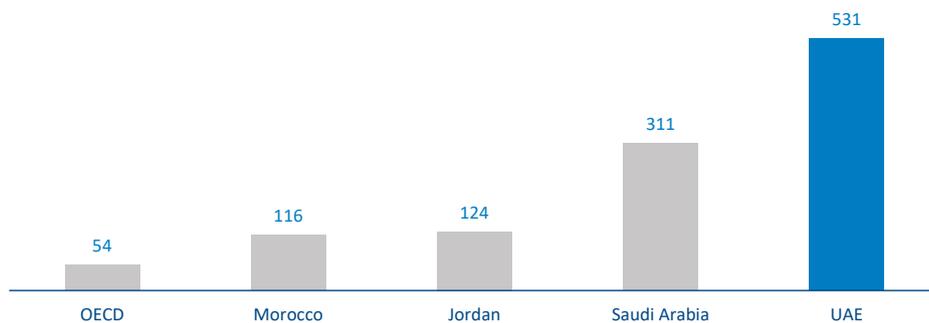
Limited local content traffic, development of IXPs and skilled ICT capabilities should be supported by the development of content infrastructure. Policy and licensing conditions on connectivity and high costs of land, energy, and construction are contributing factors to the high connectivity costs we observe today and hold back ICT service adoption (see Figure 8).

Uniform regional and federal data protection regulation can establish UAE as regulatory hub

Barriers to **UAE’s** leadership in regional regulation include a lack of federal-level data protection, as the three free zones (Dubai International Finance Center, Dubai Health Care City, Abu Dhabi Global Market) of **UAE** have enacted their own data protection laws; lack of federal competition laws to tackle market dominance and malpractice; and few data residency requirements.

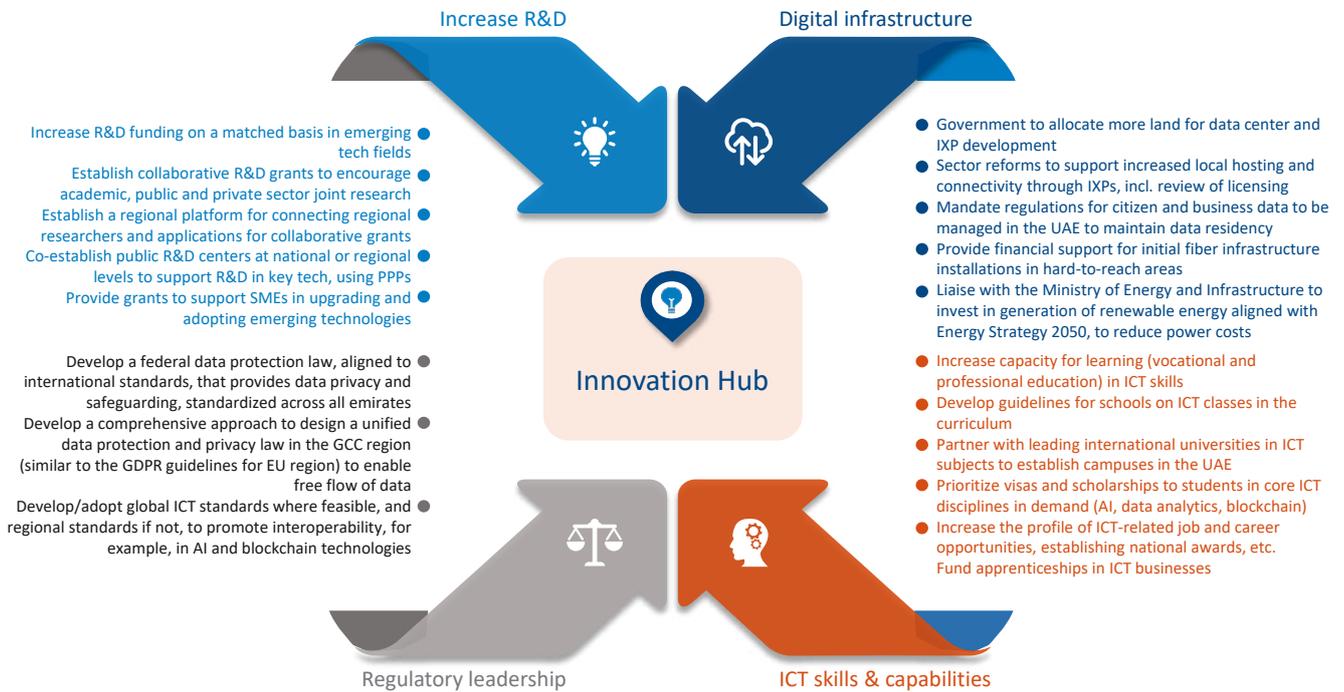
Regional leadership on digital regulation and governance topics, such as data protection, cybersecurity, and data management is important, as it can be leveraged to attract digital investment. For example, as the leading center for initial token offerings (ITOs) and initial coin offerings (ICO) using blockchain and AI technologies, **UAE** can play a significant role in establishing global standards and practices in emerging markets. Companies are attracted to regulatory leaders to understand and influence the regulatory process and also benefit from the pool of skilled labor that clusters around regulatory, consulting, and research organizations. Europe implemented the General Data Protection Regulation (GDPR), which has become the de facto standard on which countries inside and outside Europe have based their data protection regulations. For the Gulf Cooperation Council (GCC) countries, there is no comparable harmonized approach to data protection that reflects the region’s own social, cultural, and political context. We believe that, as an Innovation Hub, this is a major opportunity for **UAE** to build on its existing strengths to become a digital research and regulatory center by first developing unified regional and federal regulations.

Figure 8: Business fixed broadband connectivity prices – monthly cost US\$ (2019)



Source: Arthur D. Little analysis, TRA Bahrain price benchmarking report – high-speed prices

We recommend 19 policy actions to increase R&D activity in UAE, reduce connectivity costs by lowering digital infrastructure costs, establish regulatory leadership, and develop ICT skills and capabilities in the workforce



Capability gaps in foundation education and ICT skills are holding back the digital economy

Among students and the wider workforce in **UAE**, there are significant gaps between ICT skills and capabilities when compared with Innovation Hubs. The causes of these gaps include a lack of funding in education (1.5% of GDP in **UAE** compared to 4-7% in leading economies) and limited capacity in quality teaching and research institutes, specifically in engineering and technology disciplines (a single university, Khalifa, is the only university ranked in the top 300 globally). This gap contributes to **UAE** having to import much of its digital needs and reduces its domestic digital capabilities. Developing homegrown capabilities is critical for **UAE** to become an Innovation Hub.

Real GDP growth in excess of 2.2% is the prize for UAE advancing to an Innovation Hub

The positive relationship between R&D expenditure and economic growth is well established. Recent empirical research has quantified the impact, concluding that an increase in R&D expenditure as a percentage of GDP by 1% has an impact on real GDP growth of 2.2%, which for **UAE** implies an impact of US\$ 9 billion.

Adoption of cloud computing has been shown to generate benefits of 0.2%–0.71% of GDP in Europe per year from reduced ICT costs, business efficiency, and value creation. For **UAE** this equates to approximately US\$1.45–5.1 billion in added value.

To illustrate the impact of **UAE** becoming a regional hub for data regulation, there are parallels with London as the former host of the European Medicines Agency (EMA), the European drug regulator. Relocated in 2019 to Amsterdam due to Brexit, studies revealed the EMA directly supported over US\$100 million in gross value added and contributed 2,151 full-time jobs to the UK economy. It also brought indirect benefits for the UK life sciences sector by being close to regulators and attracting a highly skilled workforce. Establishing **UAE** as a leader in regional digital regulation, standards development, and specialist know-how could be expected to yield a similar scale of benefits for the **UAE** economy.

In conclusion, by becoming a regulation hub for the Middle East region, we anticipate UAE could generate around US\$100 million in added value, in addition to many international companies establishing their regulatory and policy teams in UAE, with the economic benefits that would bring.

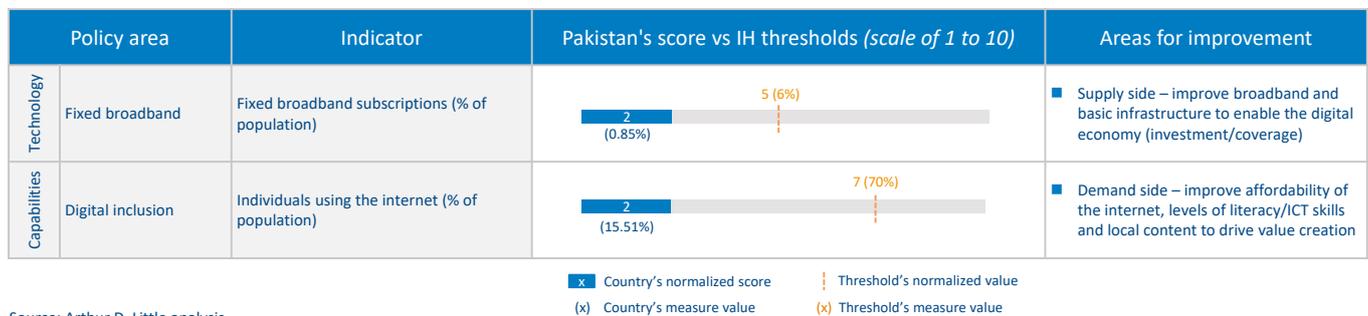
Pakistan

Addressing infrastructure and capability gaps as an ICT Novice are a first step for Pakistan to advance as an ICT Service Powerhouse

When measured against ICT Novice thresholds, our analysis identified two focal improvements areas, ICT infrastructure and digital inclusion, corresponding to the supply and demand side of **Pakistan’s** digital economy (Figure 9). While we identify ICT Service Powerhouse as the digital economy Vision for Pakistan, first policy steps should address current weaknesses as an ICT Novice.

- Provide tax incentives for infrastructure investment and attract international ICT companies in strategic sectors.
- Develop a national tariff control policy on right of way in order to reduce the costs of infrastructure investments for operators.
- Subsidize solar and wind energy projects in rural and urban areas.

Figure 9: Key gaps in Pakistan’s digital foundations as an Innovation Novice



Source: Arthur D. Little analysis

Digital infrastructure investment is required to improve access and support digital economy advancement

Improving infrastructure must be a priority in **Pakistan** to support economic development. **Pakistan** currently invests the equivalent of 2% of GDP in ICT compared to an ICT Novice threshold of 5%, resulting in only 0.85% of the population having a fixed broadband subscription and limited fiber-optic network coverage. A supply side issue, without reliable and secure infrastructure it is difficult to expect electronic payments, ecommerce, cloud services providers, and emerging digital solutions to flourish. To address this issue we recommend the following actions:

- Funding agencies and donors should prioritize ICT infrastructure in the same way as essential utilities (e.g., water and electricity).
- Inject more private capital into infrastructure development by deepening international operator involvement in the industry, encouraging joint investments, and facilitating learnings from best practice in other developing countries.
- Use public-private partnerships to increase investment in infrastructure (for example, to support ICT cluster/hub development).
- Provide grants to operators to increase fiber use in the urban backbone and increase coverage in rural areas.

Digital inclusion policies are needed to improve access and digital literacy and to capture value from ICT services

On the demand side, consumers and businesses must increase the use of the Internet to benefit from lower-cost products, services, and transactions. At present, only 41% of the population of Pakistan⁶ currently has access to the Internet, compared to a threshold of 70%. This gap is caused by limited affordability of the Internet, low levels of literacy in the population, limited digital content to attract users, and limited access to reliable supplies of electricity.

Recommendation on the demand side include actions to capture ecosystem value and to improve Internet access and literacy.

Capture ecosystem value

- Pioneer e-gov services to take all services online (e.g., e-elections, e-procurement, e-licenses, etc.), facilitating the use of digital tools and encouraging the private sector to follow.
- Promote e-commerce by strengthening online payment systems, help SMEs to move online, streamline processes for starting up new businesses online, and ensure adequate protection for users.

- Establish a center of excellence for strategic industries (e.g., entertainment and software) to drive adoption and testing of digital solutions, and also develop digital content.
- Establish clusters/hubs, bringing together ICT companies, research institutes, educators, start-ups, accelerators, and international companies to boost the development of strategic sectors and national capabilities (i.e., in software services).
- Deregulate industry and support competition, encouraging overseas investment and encouraging start-ups and SMEs to grow, enabling customers to benefit from innovation.

Improving Internet access

- Establish reseller initiative to sell old smartphones from other markets, increasing smartphone adoption.
- Launch vouchers for providing free Internet for low-income families and students.
- Provide free Internet access in remote areas (i.e., within public buildings in remote areas).
- Subsidize last-mile costs of fixed broadband connections in order to encourage uptake.

Improve literacy and digital literacy levels

- Develop public-private partnerships to improve formal and non-formal education programs.
- Subsidize ICT infrastructure for schools.
- Launch free Internet education program targeted at hard-to-reach groups.
- Develop public-private partnerships to improve formal and non-formal education programs.
- Subsidize ICT infrastructure for schools.
- Launch free Internet education program targeted at harder to reach groups: *Ukraine’s experience illustrates how digitalization can kick-start economic development for Pakistan.*

Ukraine was an ICT Novice in 2000, ranked 52 in the world for ICT service exports. By 2017, Ukraine had improved its ranking to 25, increasing the value of its ICT service exports from US\$56 million to US\$2.8 billion over the same period. Three policies are noted for driving this transformation:

- **Attractive tax policy:** Ukrainian tax legislation allows companies to work with self-employed specialists who pay only a single tax (5% of their income) and a monthly unified social tax, which is 22% of the minimum wage, or 819 hryvnias (US\$31). This allows both companies and IT specialists to maximize their income.

- **Progressive regulations:** A simplified process for registering private entrepreneurs enables smoother cooperation between Ukrainian IT companies and foreign tech professionals. A simplified process for importing prototypes for R&D purposes has also been enacted.
- **Focus on ICT education:** Ukraine’s IT Association and the Ministry of Education and Science of Ukraine signed a memorandum of cooperation to build a technology-based educational environment.

Pakistan can learn from Ukraine’s experience to increase investment from the private sector through cooperation with international entities to prototype and develop new ICT solutions, at the same time continuing to develop ICT skills in the workforce and retaining the best talent in the industry.

By our estimates, increasing broadband penetration by 5 percentage points in **Pakistan** can be expected to increase GDP by 0.69 percentage points, which implies a US\$1.9 billion impact and corresponding increase in employment.

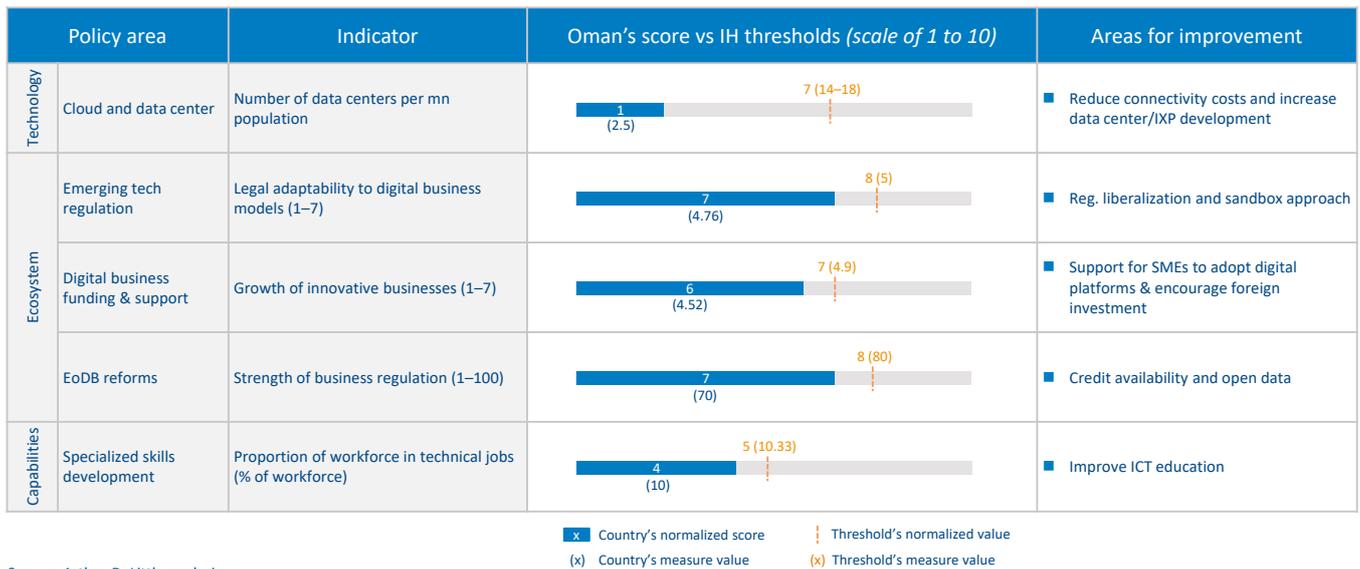
Oman

Continuing business-friendly reforms, investment in cloud and data center capacity, and boosting ICT capabilities will unlock Oman’s digital potential

Our analysis identifies a lack of cloud and data center capacity and capabilities as a priority gap to address in **Oman’s** IT infrastructure if it is to attain the data and computing power to drive a Service Powerhouse or Business Hub economy. As we noted earlier in relation to **UAE**, cloud and data center capacity are important for developing the technical and engineering capabilities required for domestic ICT companies to emerge and thrive. In short, we recommend the upscaling of ICT infrastructure from the solid foundations of an ICT Patron, to one that can attract and drive an advanced digital economy.

Once infrastructure is in place, our analysis identifies further areas of weakness in **Oman’s** IT infrastructure when compared to service powerhouse and business hub foundation thresholds. The key gaps relate to the ecosystem and capabilities, summarized in Figure 10.

Figure 10: Improvement areas for Oman to transform from ICT Patron to Service Powerhouse/Business Hub



Source: Arthur D. Little analysis

Emerging technology regulation is required and liberalization should continue

Within the digital ecosystem, we observe that **Oman** lacks national-level policies for emerging technologies like cloud, AI, and blockchain. Further, the telco sector is dominated by two operators, which could hinder competition. Recognizing recent efforts to liberalize the economy in **Oman**, we recommend more could be done to unlock the digital potential in the economy, leveraging **Oman's** strategic location to progress to an ICT business hub:

- Establish a regulatory framework permitting encryption.
- Establish a clear policy on OTT- and IP-based services, addressing regulatory asymmetry and providing clarity on data classification and hosting.
- Establish regulatory sandboxes for emerging technologies, with strong regulator and industry communication to design appropriate regulation and fast-track development of innovative solutions.
- Establish an authorization/notifications-based licensing regime and updating regulatory obligations.
- Ease the process of obtaining licenses (partially addressed by publishing the new telecom act).
- Encourage energy efficiency through guidelines and regulatory support.
- Develop a plan to enhance open data – increase number of datasets, collaborate with private sector to include data, define guidelines to upload and update data, ensure data is available in English, etc.

Addressing weaknesses in business funding and ease of doing business (EoDB) will unlock the private sector, including SMEs

Indicators point to difficulties for business, including a ranking of No. 144 in the world for ease of getting credit for businesses, and a ranking of No.81 globally for open data. Despite recent reforms to the EoDB and investing in **Oman**, collectively these indicators suggest more should be done to support businesses, specifically start-ups and SMEs in the digital economy. Our recommendations include:

- Establish a digital transformation advisory service unit (a one-stop shop) to:
 - Define and offer advisory services at subsidized rates for firms adopting digital solutions.
 - Prepare studies on digitalization applications and benefits for different sectors.
 - Promote and encourage digitalization among SME businesses.
 - Offer training, safety online guidance, and funding support to employees and start-ups.
 - Develop and launch a subsidy program for cloud services and hosting content locally, especially for domestic SMEs.
- Promote adoption and usage of cloud services:
 - Develop guidelines for cloud usage and transition for enterprises, especially SMEs.
 - Launch cloud service certifications and accreditation (e.g., through dedicated online cloud service portal).

- Develop a plan to enhance open data in both the number of data sets and access, collaborating with the private sector.
- Increase investment in local start-ups with strong IP and global market potential, adopting a matched funding approach to encourage private-sector investment.
- Establish a program to connect start-ups with established ICT companies that can support start-ups in global expansion.
- Establish a match-making platform to connect start-ups, incubators, accelerators, universities, and investors, etc.
- Establish ICT-focused “free zones”/digital corridors — with benefits such as single-window clearance, reduced rent and utilities, relaxed Omanization requirements, zero tax, and a simplified Visa process.

Limited capabilities in specialized skills development is holding back Service Powerhouse advancement

In common with the other countries we have analyzed, a lack of ICT capabilities is holding back **Oman’s** digital economy. Although **Oman** has one of the highest number of IT graduates globally, analysis shows that **Oman** has no engineering and technology university in the world’s top 600 to leverage in ICT research and development and there is no requirement for schools to teach ICT skills (computer science courses, program coding, etc.), unlike countries such as Australia, Italy, and the UK. Enhancing ICT capabilities should be a priority.

To address these weaknesses, we recommend:

- Ministry of Transport, Communication and Information Technology (MTCIT) and Ministry of Education to collaborate in publishing guidelines for including compulsory programming/coding courses in primary and secondary education.
- Enhance ICT teacher availability through direct funding, and equip educational institutions with tools and resources required for delivery of revised curricula.
- Develop a program to attract an international educational institution with focus on ICT:
 - Incentives to attract the university to Oman (e.g., land, facilities, research funding, faculty visas, etc.).
 - Incentives to attract local and international students to the university (e.g., student visas, scholarships, internship opportunities with local companies, etc.).
- Establish scholarship programs for gifted ICT students to specialize in ICT courses.

- Develop a collaborative platform between government, training sector, and industry to launch a national ICT skills and training program.

Over US\$850 million and 1,000 jobs are attainable for the Oman economy

The impact of digital transformation in **Oman** could be significant. For example, regulatory liberalization would allow innovative business models and emerging technologies to compete fairly, which is estimated to generate an additional US\$50 million from additional telco investment alone. This does not include the benefit to users from more efficient and lower-cost services.

Digitalization of **Oman** SMEs to support their growth and competitiveness is expected to increase SMEs’ contribution to GDP by 1 percentage point per year, equating to US\$120 million. In addition, attracting 10 new companies to Oman and venture capital funding to support start-ups is estimated to bring an additional US\$100 million to the economy. Strengthening capabilities will ultimately contribute to attracting these businesses and investments.

Finally, based on an evaluation of Ireland’s data center industry, we estimate that constructing 10 new data centers in this strategic location, close to submarine cables, would be expected to generate US\$1 billion in direct benefits and US\$580 million in indirect benefits for the economy, as well as 1,100 well-paid jobs.

Middle East recommendations by digital foundation

We conclude this report by offering more general recommendations on policies in the Middle East region applicable to multiple countries based on our analysis and, specifically, the case study countries. Our recommendations are listed by digital foundation – technology, capabilities, ecosystem, and industry.

Technology foundations are strong in many countries, but more needs to be done to leverage infrastructure spending to develop ICT capabilities and emerging technology R&D

Digital infrastructure is the foundation for higher value creation at all levels of the value chain; a fact that has been realized by many sectors as they undergo digital transformation. Without high-speed and pervasive connectivity infrastructure, there can be no digitalization – for nations of any size.

What should be emphasized is that digital infrastructure, the digital ecosystem, and capabilities must evolve in tandem for maximum impact. Without capabilities no one is able to use or leverage the infrastructure. Without digital goods and services in place to make use of the infrastructure, returns on investment will be lower and future investment curtailed. In fact, the opposite is true, as even when digital services are available, uptake will remain low if infrastructure has not been established.

Infrastructure brings more than physical assets; it also includes the human capital required in construction and operations, which draws in skilled technicians, engineers and software developers. Attracting and retaining this skilled talent is essential for realizing value-creating opportunities. Countries that invest strongly in infrastructure have the opportunity to sow the seeds of future start-ups, innovative businesses, and investment in the digital economy. Particularly relevant to the Middle East is the potential for leveraging a large and skilled expatriate population to develop domestic digital capabilities.

We observe that **UAE** has world-class infrastructure and access to the latest emerging technologies. Other countries are not far behind, such as **Bahrain, Kuwait, Oman, Saudi Arabia,** and **Qatar**, which continue to invest in infrastructure with the proceeds of fossil fuel exports. Each can be described as having solid infrastructure, the value from which is not fully captured and could be improved by investing in R&D and commercialization of emerging technologies.

The remaining countries (**Afghanistan, Iraq, Jordan, Lebanon, Pakistan, Syria,** and **Yemen**) have more basic infrastructure. Opportunity exists for peaceful countries in this group to rapidly improve infrastructure to catch up with the others in the region. With limited financial resources, the challenge is how to develop infrastructure in tandem with the other digital foundations.

Investment in ICT infrastructure should continue in the region, but this should be done in parallel with policies supporting the other three foundations, leveraging the investment to maximize the opportunities for attracting talent, workforce ICT training, and new business creation.

Lack of funding in R&D is holding back technology development in the region

Limited R&D expenditure in digital and emerging technologies, both in the public and private sector, and limited research more broadly are found to be significant contributors to low capabilities and limited emerging technology development. Gross domestic expenditure on R&D (GERD) is a measure of research intensity as a share of an economy's GDP. Values over 2% per annum are recorded in advanced economies — like Sweden (3.34%), Japan (3.26%), Germany (3.09%), USA (2.84%), and China (2.19%) — compared to less than 1% in Middle East economies such as Saudi Arabia (0.82%), Oman (0.22%), and Bahrain (0.1%). The exception is UAE at 1.3% of GDP.

Lack of education and training in STEM and ICT subjects limits digital capability development in the region; literacy is also an issue in less developed economies

In developed economies, a limited number of universities and higher education institutions offering courses in computer science, data analytics, and similar digital subjects is an issue, compounded by a lack of basic STEM graduates.

Some Middle East countries do benefit from the large number of graduates who study abroad and bring skills and capabilities back to their home countries (**Saudi Arabia, Oman, Qatar,** and **UAE** are examples). The challenge is then to employ these skills in the workforce to generate value.

In less advanced economies, limited literacy, basic ICT skills, and access to the Internet and ICT equipment are found to be barriers to capability development. Despite infrastructure improvements, addressing digital affordability, access, and education should be policy priorities.

Deregulation and reforms to improve the ease of doing business should continue to enable domestic value creation from the digital economy

A vibrant digital ecosystem is often the demand pull required to increase investment in infrastructure, digital education, job creation, and productivity improvement. We have observed numerous positive reforms in this area that have improved the ease of doing business, including the deregulation of sectors to allow foreign ownership and investment, and the updating of laws in **Oman, UAE**, and other countries to be more business friendly.

Digital business funding, support policies and EoDB reforms, and emerging technology regulation are critical for economies to attract private-sector investment, particularly in domains that support their archetype strategies and offer conducive environments for digital businesses to test new technologies and innovate. We note many countries have liberalized telecommunications industries in recent years and adopted business-friendly policies, but more should be done to support start-ups and SMEs. Opening up to international players can also be a source of much-needed private-sector investment in infrastructure and can be a valuable source of technical and management talent.

For all Arabic-speaking countries, there is substantial value to be created in the digital economy from increasing local content. The Arabic language is one of the most popular around the world, used by 422 million people as a first language and by a further 250 million people as a second language. Increasing local digital content has positive impacts on the proportion of society who see value in and use digital goods and services, thus increasing digital uptake, which in turn supports the business case for further investment.

Introducing e-government services has been a driver of the digital economy in many countries, efforts are now needed to digitalize the economy at large

Bahrain, Oman, Saudi Arabia, Qatar, and **UAE** have made substantial efforts to move government services online, with many countries now progressing with a move to cloud services. These countries have also launched or are planning to introduce 5G and AI-based services in the future, cornerstones of Industry 4.0 preparedness. However, **Jordan, Kuwait, Lebanon**, and **Pakistan** have much to do and would benefit from promoting e-government services to kick-start broader digitalization.



Conclusion

Recognizing that one size does not fit all, this study demonstrates how “Think differently, think archetype, your digital economy” can be used by policy makers to provide tailored policy recommendations that support the advancement of the digital economy in **UAE, Pakistan, and Oman**.

With limited resources and many demands on public finances, especially as we emerge from pandemic, this report also shows how countries in the Middle East can adopt the archetype framework to identify policy priorities that will yield the maximum value added in terms of economic growth and jobs for their economy and set attainable goals for the digital economy aligned to their respective visions and economic objectives.

We have shown how to reach tailored policy recommendations for economies with different levels of digital development, target visions, and resources. Recommendations address the specific gaps in the four digital foundations — **technology, ecosystem, capabilities, and industry** — and thus are unique to the country concerned.

Notes



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Middle East digital economy outlook

Special report: Digital growth opportunities in UAE, Pakistan, and Oman

Arthur D. Little

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