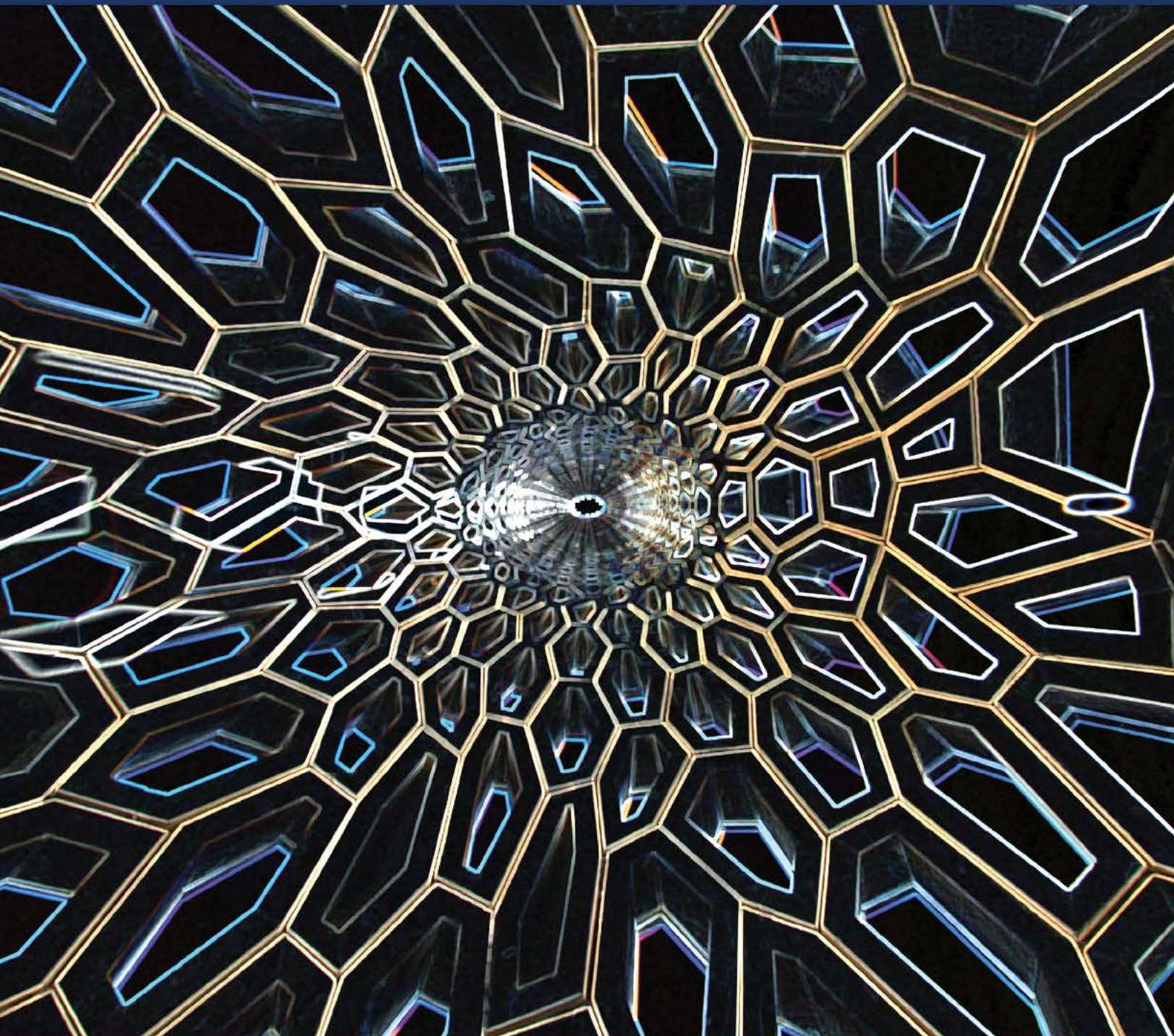


# BRAINSTORMING THE GULF

Innovation and the Knowledge Economy in the GCC



**Atlantic Council**

BRENT SCOWCROFT CENTER  
ON INTERNATIONAL SECURITY

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# BRAINSTORMING THE GULF

## INNOVATION AND THE KNOWLEDGE ECONOMY IN THE GCC

When it comes to building the knowledge economy, the Gulf is one of the most ambitious regions in the world. Recognizing that their countries' fossil-fuel-driven wealth will come to an end at some unknown point in the future, leaders of the six Gulf Cooperation Council (GCC) countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) are investing heavily in the infrastructure necessary to create economies driven more by innovation than by energy exports. They have created ambitious national strategies to build research-and-development capacity, enable venture capital, attract highly skilled foreign workers, and create innovation clusters. Several countries in the region aim to become global powerhouses, seeking to rival powers such as the United States and Singapore among the world's best-known knowledge economies.<sup>1</sup>

The term "knowledge economy" is used to describe societies where wealth is generated primarily through the production of goods and services that have significant intellectual content, rather than through the production of raw materials or resources, or through industrial-era manufacturing processes. While definitions of the knowledge economy vary, the basic idea emphasizes the creation and maintenance of the systems that give rise to innovation.<sup>2</sup> Knowledge economies arise when some combination of advanced scientific and technological research platforms, entrepreneurial business activity, and creative thinkers all come together within a specific place. High-performing knowledge economies generally have a well-educated and well-trained workforce, quality research institutions and infrastructure, an entrepreneurial business climate, an enabling legal environment, and a culture that values learning, creative expression, and the acceptance of risk. Today, cities, regions, and nation-states around the world are competing with one another to become knowledge economy leaders.

1 The author wishes to thank Georgina Campbell, William Colglazier, Scott McGuigan, Dick O'Neill, Christopher Schroeder, and Charles Wessner for their insights on innovation in the Middle East and the Gulf region, as offered at a June 2014 Atlantic Council roundtable.

2 OECD, "OECD Glossary of Statistical Terms," <http://stats.oecd.org/glossary/detail.asp?ID=6864>.

### **The Middle East Peace and Security Initiative**

Established in 2012 as a core practice area of the Brent Scowcroft Center on International Security at the Atlantic Council, the Middle East Peace and Security Initiative brings together thought leaders and experts from the policy, business, and civil-society communities to design innovative strategies to tackle present and future challenges in the region.

### **The Strategic Foresight Initiative**

The Strategic Foresight Initiative (SFI) at the Brent Scowcroft Center on International Security develops actionable foresight by identifying and assessing long-term, emerging global trends; connecting them to current challenges to inform policy and draw implications for strategy; and designing innovative strategies to reach desired future scenarios.

Petroleum should remain one of the world's most important commodities for the foreseeable future, owing to growing middle-class consumption—through motorization—in China, India, and other emerging economies. It is therefore reasonable to expect that income from oil exports should remain the greatest source of prosperity for Arab Gulf countries for years to come.

However, there are two major problems with Gulf dependency on oil revenues. The first involves the commodity cycle, the fluctuations of which subject oil-exporting countries to commodity price fluctuations and, therefore, to significant revenue divergences from year to year. As of March 2015, global oil prices had been falling for nine months, driven to a large extent by Saudi Arabia's decision to maintain production levels in the face of global oversupply.

The second problem facing the Gulf is even more serious. Over longer timeframes, the odds are that shifts in consumer preferences, combined with technological innovation, will dramatically reshape both the supply

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of oil and the demand for it. As demonstrated by the fracking revolution, technological advances are already upending oil and natural-gas markets, with global repercussions. The United States, which perfected fracking technology, has gone from the world's greatest net importers of oil to one of its greatest producers. As a direct result of the United States' strengthened position as an energy producer, in July 2014 Nigeria did not export a single barrel of oil to the United States—for the first time since recordkeeping began in 1973.<sup>3</sup> Although the Gulf's exports have not yet been as dramatically affected, the shale revolution provides evidence of how technological innovation can disrupt commodity markets. Nor will shale be the end of the story. Future technologies will likely cause even more dramatic breakthroughs that should transition the global energy regime away from fossil fuels altogether. For instance, improved electrical vehicle technologies—in particular, battery technologies—have significant potential to depress demand for oil as a transport fuel over the long run.<sup>4</sup> It is not difficult to foresee a long-range scenario in which consumer preferences shift decisively toward electric vehicles.

Economic diversification is key to sustaining living standards in the Gulf and retaining Arab Gulf states' power in the international system. GCC leaders understand that their basic challenge consists of a race against time.

### Innovation from the Top Down

A decade ago, the consensus view from outside the region was that Middle Eastern countries, including those in the Gulf, were in a poor position to build knowledge economies. In 2003, the United Nations Development Program released a controversial report claiming that the Arab world in general was a long way from developing “knowledge societies.”<sup>5</sup> This report argued that the Arab world lacked a commitment to science and technology, had underperforming educational systems, and generally discouraged innovation and creative expression.<sup>6</sup> The report painted

in broad brushstrokes, and discussed the Arab world as a whole. It did occasionally highlight examples of progress in the Gulf, such as ambitious science and technology initiatives, but otherwise it did not treat the Gulf separately from other Arab states.<sup>7</sup> This approach was unfortunate, for Arab Gulf leaders already were committing to the knowledge-economy model. Having the wealth to invest in ambitious projects and plans, Arab Gulf economies have come a long way in a relatively short period of time.<sup>8</sup>

**ECONOMIC DIVERSIFICATION IS KEY TO SUSTAINING LIVING STANDARDS IN THE GULF AND RETAINING ARAB GULF STATES' POWER IN THE INTERNATIONAL SYSTEM.**

As the Gulf region's largest country, and historically the world's most important oil producer, Saudi Arabia has an influence that is difficult to overstate. Recognizing its dependence on oil revenues, which accounted for more than 90 percent of the government's budget, the government dramatically shifted its priorities during the 2000s, focusing on development of the country's human capital and knowledge-economy infrastructure. During this time, Saudi Arabia's five-year plans increased spending on education at all levels, research-and-development initiatives (particularly in science and technology), information and communications technology (ICT) infrastructure, and upgrading the quality and efficiency of public services.<sup>9</sup>

In 2010, the United Arab Emirates created the national agenda *UAE Vision 2021*, a core pillar of which is building a “competitive knowledge economy.” Among other strategies, this includes boosting the non-oil share of

3 Javier Blas, “Nigeria Oil Exports to the US Turned Off as Shale Revolution Dries Up Demand,” *Financial Times*, October 3, 2014, p. 1.

4 Pilita Clark, “New Battery Set to Revamp Electric Cars,” *Financial Times*, November 3, 2014, p. 15.

5 United Nations Development Program, *Arab Human Development Report 2003: Building a Knowledge Society* (New York: United Nations Development Program, Regional Bureau for Arab States, 2003), <http://www.arab-hdr.org/publications/other/ahdr/ahdr2003e.pdf>.

6 Ibid.

7 United Nations Development Program, *Arab Human Development Report 2003: Building a Knowledge Society*.

8 Kristin M. Lord, *A New Millennium of Knowledge* (Washington: Brookings Project on US Relations with the Islamic World, Analysis Paper 12, April 2008), pp. 9-13.

9 Omar Salem Bashehab and Sanghamitra Buddhapriya, “Status of Knowledge Based Economy in the Kingdom of Saudi Arabia: An Analysis,” *Journal of Social and Development Sciences* vol. 4, no. 6, June 2013, pp. 268-277, <http://www.ifrnd.org/Research%20Papers/S61.pdf>.

**TABLE 1. UAE VISION 2021:  
“Competitive Knowledge Economy” Measures and Targets**

BENCHMARK	DESCRIPTION	TARGETS FOR 2021
Non-oil real GDP growth	Economic growth of all sectors except oil	5 percent annual growth
Gross national income per capita	Average income per person	Among top ten globally
Net inflow of foreign direct investment as percent of GDP	Economic attractiveness to foreign investors	5 percent
Global Competitiveness Index	World Economic Forum’s index measuring national competitiveness	Among top ten globally
Ease of Doing Business Index	World Bank’s index measuring government support for business	First globally
Share of UAE nationals in workforce	Share of nationals employed in economy	Double 2010 share
Emiratization rate in the private sector	Share of nationals employed in the private sector	Tenfold increase compared with 2010
Small and medium-sized enterprises (SMEs) contribution to non-oil GDP	Share of GDP produced by SMEs	70 percent of GDP
Global Entrepreneurship and Development Index (GEDI)	An index measuring entrepreneurialism	Among top ten globally
Global Innovation Index	An index measuring national innovativeness	Among top twenty globally
Share of “knowledge workers” in the labor force	Share of highly skilled workers in workforce	Double 2010 share
Research-and-development expenditure as % of GDP	R&D expenditure as a share of the economy	Triple 2010 share

Source: *National Agenda: UAE Vision 2021*, <http://www.vision2021.ae/en/national-priority-areas/competitive-knowledge-economy>.

the economy, encouraging small startups, and investing in research and development (table 1). UAE leadership has committed substantial resources into realizing this vision. In human capital, for example, the UAE works to improve the quality of the educational system through complying with international standards, devoting more than 20 percent of its budget to education, and partnering with foreign higher-education institutions (some twenty-six international universities have some kind of presence in Dubai alone). Although research-and-development investments currently fall short of budgetary targets, the UAE has built significant scientific and technological capabilities, whether at Abu Dhabi's Khalifa University or at Dubai's TechnoPark.<sup>10</sup>

In October 2014, the UAE announced a *National Innovation Strategy* that aims to realize *UAE Vision 2021's* primary goal of turning the UAE into a global innovation leader. It focuses policy on seven sectors (renewable energy, transport, education, health, technology, water, and space), with priority given to the development of incubators and technology infrastructure, upgrading workforce skills, forming international research partnerships, fostering public-sector innovation, and creating incentives to attract and develop private-sector startups.<sup>11</sup>

In 2008, Qatar produced its own long-range plan, *Qatar National Vision 2030*. As operationalized in the 2011 *National Strategy* document, Qatar aims to diversify its economy through innovation and entrepreneurship. The government sought to increase spending on research and development, provide a supportive environment for growing private-sector technology firms, and build a world-class educational and skills-training system for Qatari citizens. Qatar has much of the infrastructure in place to accomplish these tasks, via a series of well-funded institutions that include the Qatar Foundation (consisting of more than eighty centers and joint ventures, and dedicated to education and research), Enterprise Qatar (which promotes small and medium enterprises), *ictQATAR* (which builds Qatar's ICT infrastructure), and the Qatar Development Bank (which provides capital for startups).<sup>12</sup>

10 Anmad Bin Byat and Osman Sultan du, "The United Arab Emirates: Fostering a Unique Innovation Ecosystem for a Knowledge-Based Economy," in Cornell University, INSEAD, and WIPO, *The Global Innovation Index 2014: The Human Factor in Innovation* (Fountainbleau, Ithaca, and Geneva, 2014), pp. 101-110.

11 UAE Interact, "Mohammed bin Rashid Launches National Innovation Strategy," October 20, 2014, [http://www.uaeinteract.com/docs/Mohammed\\_bin\\_Rashid\\_launches\\_National\\_Innovation\\_Strategy/64538.htm](http://www.uaeinteract.com/docs/Mohammed_bin_Rashid_launches_National_Innovation_Strategy/64538.htm).

12 Qatar General Secretariat for Development Planning 2011, pp. 2-16.

## Chasing Silicon Valley

Creating innovation "hubs" or "clusters"—specific places that facilitate and encourage innovation—is a common strategy for building the knowledge economy. Successful clusters concentrate firms, research institutions, specialized suppliers, entrepreneurs, and supporting institutions in one place. These initiatives either take advantage of existing cultural milieus that value creativity and innovation, or attempt to create them. The point is to build a critical mass of talented entrepreneurs, researchers, and innovators, whose interactions result in commercially viable knowledge products. Aware of the gains to be made, governments around the world have been racing to build clusters for quite some time. In 2006, for example, one study estimated there were more than 1,400 cluster initiatives globally, with that number rising.<sup>13</sup> While the United States has been the world leader, other countries—including China, France, Singapore, and India—are also proving adept at building such clusters.<sup>14</sup>

IN OCTOBER 2014, THE UAE ANNOUNCED A NATIONAL INNOVATION STRATEGY THAT AIMS TO REALIZE UAE VISION 2021'S PRIMARY GOAL OF TURNING THE UAE INTO A GLOBAL INNOVATION LEADER.

As California's Silicon Valley is the iconic expression of the innovation cluster, policymakers elsewhere often define their challenge as building "the next Silicon Valley." As attractive as it is to imagine replicating the Valley's success, however, it is important to provide two caveats. First, Silicon Valley is a specific place on the

13 Cited in James Watson and Aviva Freudmann, *Fostering Innovation-Led Clusters: A Review of Leading Global Practices*, (Economist Intelligence Unit, December 2011), p. 6.

14 National Research Council, *Clustering for 21st Century Prosperity. Summary of a Symposium* (2012), pp. 4-8; Charles W. Wessner, ed., *Understanding Research, Science and Technology Parks: Global Best Practices* (National Research Council, 2009), pp. 2-31.

Earth that arose at a specific time in history and under specific circumstances. By definition, these conditions will never be exactly replicated anywhere else. For example, Cold War-era research-and-development funds, provided by the US government from the 1950s onward, fueled much of the area's early growth. US government funding provided the area with secure revenue streams for decades before the Valley turned to consumer-oriented products. Those streams enabled pioneering firms, such as Fairchild Semiconductor, to establish themselves and then, over time, build out the area's technology-based ecosystem. Silicon Valley also possesses unique attributes that cannot be copied. For instance, northern California's glorious weather helps it attract talented people who want to put down roots in the area. Therefore, competing successfully against Silicon Valley will require other countries and regions to identify and build upon their own unique strengths.<sup>15</sup>

FOR THE PAST DECADE OR MORE, ARAB GULF COUNTRIES HAVE FOLLOWED THE INNOVATION-CLUSTER SCRIPT, INVESTING BILLIONS IN DOZENS OF INITIATIVES THAT CO-LOCATE THE SOURCES OF INNOVATION.

Second, Silicon Valley was not created overnight. Building the innovation ecosystems upon which much of a knowledge economy rests is a long-term proposition, and governments cannot expect their efforts to pay off immediately. The clustering together of cutting-edge private and public-sector institutions provides only the surface explanation for Silicon Valley's success. The

harder part of the equation, and the deeper explanation for Silicon Valley's success, is that the Valley's cultural milieu places a very high value on creativity, learning, risk, and daring entrepreneurialism. These forces mix with the area's technical savvy, ready access to capital, and business acumen to create the dynamic region known as "Silicon Valley." Governments can create the physical infrastructure to co-locate firms and institutions far more quickly and easily than they can the underlying "soft" cultural infrastructure that ultimately facilitates innovation.<sup>16</sup>

Silicon Valley has benefited immensely from the presence of Stanford University, which has churned out generations of highly trained scientists and engineers in the region. But Stanford also has worked hard to expose its students to the Valley's entrepreneurial culture, in the process giving the Valley a cadre of technicians who are as interested in creating startups as they are in research and development. *Stanford Ignite* is a program created by Stanford's business school that is designed to match "students and entrepreneurs with innovators, scientists, and engineers from leading companies." This program is based on the premise that specialized education (whether in business, science, or engineering) does not give a person the full skill set necessary to create successful start-up tech companies.<sup>17</sup> What is needed, this program implies, is interdisciplinary training combined with exposure to a wide range of stakeholders in the business and technology worlds. Yet building synergies between university-based research and commercial development is harder than it appears. In contrast to Stanford, for instance, European universities generally have not incentivized their students and researchers to build linkages into the commercial world, or to become entrepreneurs themselves.<sup>18</sup>

For the past decade or more, Arab Gulf countries have followed the innovation-cluster script, investing billions in dozens of initiatives that co-locate the sources of innovation (research labs, venture capital, entrepreneurs, high-technology companies, educational institutions, etc.). Dubai's TechnoPark, for example, co-locates technology firms and organizations, so as

15 On Silicon Valley's unique experience, see Rhett Morris and Mariana Penido, *How Did Silicon Valley Become Silicon Valley? Three Surprising Lessons for Other Cities and Regions*, (Endeavor Global, 2014); Vivek Wadhwa, "Silicon Valley Can't Be Copied," *A Business Report on the Next Silicon Valley*, (MIT Technology Review, July 2013), pp. 3-4, <http://www.technologyreview.com/news/516501/in-innovation-quest-regions-seek-critical-mass/>; David Auerbach, "The Do-Over," *Slate*, December 2, 2013, [http://www.slate.com/articles/technology/the\\_next\\_silicon\\_valley/2013/12/the\\_origins\\_of\\_silicon\\_valley\\_could\\_they\\_ever\\_be\\_replicated.html](http://www.slate.com/articles/technology/the_next_silicon_valley/2013/12/the_origins_of_silicon_valley_could_they_ever_be_replicated.html).

16 Watson and Freudmann 2011, p. 4.

17 Stanford School of Business, "Stanford Ignite," <http://www.gsb.stanford.edu/programs/stanford-ignite>.

18 Peter Engelke and Robert A. Manning, "Labor, Technology, and Innovation in Europe: Facing Global Risk through Increased Resiliency," Atlantic Council, May 2013, <http://www.atlanticcouncil.org/publications/issue-briefs/labor-technology-and-innovation-in-europe-facing-global-risk-through-increased-resiliency>.

## BOX 1. MASDAR

Abu Dhabi's Masdar project is perhaps the Gulf region's most famous attempt to build the knowledge economy from the top down. The Abu Dhabi government's Mubadala Development Company oversees this project, which includes four components, all focused on renewable energy and green technology: Masdar Clean Energy; Masdar Capital; Masdar City; and Masdar Institute of Science and Technology, a graduate engineering institution developed in partnership with the Massachusetts Institute of Technology (MIT). The project has a global mandate; for instance, Masdar Clean Energy has made massive investments in Britain's offshore windfarms and Spain's concentrated-solar-power plants, in addition to the emirate's own renewable-energy plans.

Masdar City, an enormous planned development on the outskirts of Abu Dhabi, is the project's capstone effort, designed by the famed British architect Sir Norman Foster. Masdar City offered a sweeping vision of the future when it was announced to great fanfare in 2006. Upon completion in 2016, it was to house fifty thousand residents and fifteen hundred firms, produce all of its own energy from renewable sources, create no carbon emissions or other waste, recycle nearly all of its water, and move residents around without any automobiles. Staying true to the cluster model, Masdar City was to bring public research facilities and private firms together within an environment designed to stimulate creativity. In every way, this city within a city was to burnish Abu Dhabi's global credentials as an innovative, forward-thinking, green-minded, and cutting-edge place.

However, reality has not yet matched ambition. Masdar City's completion target has been pushed back from 2016 to the mid-2020s. As promised, it now houses residents, firms, and institutions (including the Masdar Institute, the campus of which is prominently featured at the city center). But to date, it has attracted only a fraction of the originally announced numbers of firms and residents. For example, the 2016 residential target was reduced from fifty thousand people to seven thousand. A big part of the explanation has had to do with the vagaries of the economic cycle. After 2008, the global economic downturn exacerbated a weak commercial property market, and interrupted real-estate construction. A glut of real estate, much of which was located at the center of Abu Dhabi, made the peripheral Masdar City less desirable.

Masdar City's bigger challenge is whether its lofty green ambitions will be realized. For example, while the designers aimed to produce all of the project's power from onsite renewable-energy sources, Masdar City has fallen far short of this goal. Wind speeds at the site, it turns out, are too low on average to produce much wind-generated power. Solar photovoltaic panels on the site can be damaged by sandstorms, and they generate power inefficiently when stressed by extreme heat. The project's transportation vision—to move everyone around its six square kilometers without cars—also has fallen victim to cost considerations and reduced ambition. The core of this plan involved a network of driverless pods that would shuttle people between buildings. While a nascent system is built and operating, it consists of one or two dozen pods, far short of the three thousand originally envisioned. Plans to build out that system appear to be on hold.

Most seriously, Masdar City always has attracted criticism that the project is an exercise in green-tech utopianism that does little or nothing to address Abu Dhabi's extraordinarily high



The wind tower at the Masdar Institute of Science and Technology, a graduate engineering institution, is part of the Abu Dhabi government's ambitious effort to build the knowledge economy. *Photo credit: Masdar Official, Flickr. Licensed under Creative Commons.*

resource-consumption patterns. Mubadala principals defend their project by arguing that, in addition to supporting the commercial development of renewable-energy technologies, the City and the Institute both will have important demonstration effects for Abu Dhabi, through heightening ecological awareness and focusing attention on resource conservation. To be fair, there is a great deal of merit to this defense. Nonetheless, the critique raises a core question that is common to all such utopian schemes—namely, whether building grand, but physically isolated, showpiece projects is the best strategy for effecting broader societal change.

*Source: Emirates Competitiveness Council, Policy in Action. Masdar: Powering UAE's Competitiveness with Clean Energy, issue 5 (July 2013); Lawrence Crot, "Planning for Sustainability in Non-Democratic Polities: The Case of Masdar City," Urban Studies vol. 50, no. 13, October 2013, pp. 2809-2825; Hugo C., "The Sustainable Desert City Paradox: Masdar," Archugotecture, April 28, 2014, <http://archugotecture.weebly.com/perspectives/the-sustainable-desert-city-paradox-masdar>; Paul Cochrane, "Middle East—Energy Shortfall in the Midst of Plenty," Modern Power System, March 31, 2013, p. 22; Ben Webster, "Trouble in Paradise," Times (London), March 3, 2011, pp. 42-49; Irene Quaille, "Masdar Eco-City Rebounds After Setbacks," Deutsche Welle, March 12, 2013, <http://www.dw.de/masdar-eco-city-rebounds-after-setbacks/a-16664316>; Zachary Shahan, "Masdar—manufactured Silicon Valley of Cleantech?," Cleantechnica, February 13, 2013, <http://cleantechnica.com/2013/02/13/what-is-masdar/>; "Abu Dhabi's Masdar Takes 35% Stake in Dudgeon Windfarm," Utility Week, October 3, 2014; "Masdar Completion Delayed, Goals Scaled Back," Emirates24/7, October 10, 2010, <http://www.emirates247.com/eb247/companies-markets/construction/masdar-completion-delayed-goals-scaled-back-2010-10-10-1.301956>.*

to promote “continuous innovation and progress.”<sup>19</sup> Similarly, Qatar’s Science and Technology Park (QSTP), part of the Qatar Foundation’s massive Education City, is called an “incubator for start-up enterprises.” In order to attract cutting-edge tech startups, QSTP provides world-class facilities, access to venture capital, sponsorship of expatriate staff, and training programs.<sup>20</sup> Not to be outdone, in 2009 Saudi Arabia opened the King Abdullah University of Science and Technology (KAUST), north of Jeddah. Although it is not strictly intended as an innovation cluster, the goal is for KAUST to become a world-class scientific research institution. The size of Saudi Arabia’s investment in KAUST has astonished the global scientific community. Its endowment is estimated at between \$10 billion and \$20 billion, making it one of the two or three largest university endowments in the world.<sup>21</sup>

But grand ambition and billions in investment capital are insufficient by themselves. As history has shown repeatedly around the world, realizing grand projects from scratch is far more difficult in practice than in theory. Currently, both Saudi Arabia, with KAUST, and the UAE, with Abu Dhabi’s Masdar City (box 1), are encountering this challenge. Large and ambitious greenfield projects frequently take much longer to build than anticipated, typically create unexpected and sometimes-undesirable outcomes, often fail to fulfill their highest ambitions, and occasionally never reach fruition at all.<sup>22</sup>

## Innovation from the Bottom Up

Bottom-up trends also are shaking up the economies of the region. As outlined by the journalist Christopher Schroeder in his 2013 book *Startup Rising: The Entrepreneurial Revolution Remaking the Middle East*, there are emerging grassroots in the Middle East and the Gulf that embrace innovation and entrepreneurialism.<sup>23</sup>

Different groups—especially the region’s youth and women—are building upon their high levels of education and access to global information flows to become entrepreneurial leaders. In general terms, the groups that are driving entrepreneurialism are more expressive, less patient with existing socioeconomic structures, and more willing to pursue their aspirations on their own terms. They are finding one another and building grassroots communities through educational institutions, face-to-face interactions, and online. The region’s teenagers, for example, often are as embedded in global cultural flows as teenagers in Europe, the United States, Singapore, or Japan. Younger people are invigorating consumer markets and creating startups, both of which help build the cultural foundations of a knowledge economy.<sup>24</sup> Samih Toukan, who was in his early thirties when he founded the Arabic email provider Maktoob in 1998, is a representative and iconic figure. After selling Maktoob to Yahoo! for \$175 million in 2009, Toukan moved on to chair the Jabbar Internet Group, headquartered in Dubai. Jabbar creates Internet companies, including souq.com, the largest e-commerce website in the Arab world.<sup>25</sup>

Indeed, optimists have much to point to when it comes to online activity in the Gulf. Internet penetration in the Arab world in general is roughly on par with the global average, and penetration in the Gulf is much higher. Gulf countries’ aggressive investment in broadband infrastructure, combined with the region’s high incomes and youthful demography, explains most of this phenomenon. Twitter, YouTube, and Facebook are popular across the region, with GCC states boasting some of the highest usage rates in the Arab world (for example, in March 2012, 88 percent of the Arab region’s tweets came from Saudi Arabia, the UAE, Kuwait, Bahrain, or Egypt).<sup>26</sup> Optimists such as Schroeder view these trends positively, seeing the Internet and social media as powerful tools for open exchange—and therefore, for greater creativity, expression, and entrepreneurial activity.

Yet there is a cautionary tale here as well. The Internet and social media are proving to be useful tools for those

19 Dubai TechnoPark, “Introduction,” <http://www.technopark.ae/en/developments/category/introduction/>.

20 QSTP, “Qatar Science and Technology Park,” <http://www.qstp.org.qa/>.

21 Jeffrey Mervis, “Growing Pains in the Desert,” *Science* no. 338, December 7, 2012, pp. 1276-1281; Jeffrey Mervis, “The Big Gamble in the Saudi Desert,” *Science* no. 326, October 16, 2009, pp. 354-357.

22 For background reading on utopianism in planning history, see Robert Fishman, *Urban Utopias in the Twentieth Century: Ebenezer Howard, Frank Lloyd Wright, Le Corbusier* (Boston: MIT Press, 1982), and Sir Peter Hall, *Cities of Tomorrow: An Intellectual History of Urban Planning and Design in the Twentieth Century* (New York: Wiley-Blackwell, 2002).

23 Christopher M. Schroeder, *Startup Rising: The Entrepreneurial Revolution Remaking the Middle East* (New York: Palgrave Macmillan, 2013).

24 Vijay Mahajan with Dan Zehr, *The Arab World Unbound: Tapping into the Power of 350 Million Consumers* (New York: Jossey-Bass, 2012).

25 Schroeder 2013, pp. 34-39; Neil King, “Building an Entrepreneurial Ecosystem,” *Arabian Business*, March 30, 2013, <http://www.arabianbusiness.com/building-entrepreneurial-ecosystem-495633.html?page=0>; Jabbar Internet Group, <http://www.jabbar.com/>.

26 Jane Kinninmont, *To What Extent Is Twitter Changing Gulf Societies?* (London: Chatham House, February 1, 2013), <http://www.chathamhouse.org/publications/papers/view/189413>.



Amina Al Rustamani, Chief Executive Officer of TECOM Investments and one of Gulf's growing number of female entrepreneurs, in her office in Dubai. *Photo credit: Saleh Salem/Reuters.*

in the region who want societal change to move in a different direction than that envisioned by Schroeder, and others. In Saudi Arabia, for example, social conservatives have proven that they can use Twitter and other social-media vehicles effectively when advancing their interests, which include pushing back against those who call for greater flexibility and openness in social relations—in particular, for women—and also for other purposes.<sup>27</sup> They have proven adept at using online tools to resist the creation of a more permissive culture, including opposition to some aspects of entrepreneurial culture.

Women in the Arab Gulf therefore face a dual reality. On the one hand, the region's women have many opportunities in the knowledge economy. Women tend to be well educated, often more so than men. They also are important participants in the burgeoning consumer

society throughout the Middle East, shaping trends through their own behavior. Women are becoming more common in scientific and technological research circles. Public-policy changes have contributed somewhat to this particular trend. Saudi Arabia's KAUST, for instance, is the first Saudi higher-educational institution to allow male and female faculty and students to mix without restriction. On the other hand, female employment is significantly lower than male employment across the region, owing to social, economic, and legal obstacles. Female employment levels are especially low in the private sector; thus, women are employed disproportionately in public institutions. Science and technology fields remain dominated by males, and women in the region report ongoing obstacles to full inclusion.<sup>28</sup>

27 See "Social Media in Saudi Arabia: A Virtual Revolution," *Economist*, September 13, 2014, <http://www.economist.com/news/middle-east-and-africa/21617064-why-social-media-have-greater-impact-kingdom-elsewhere-virtual>; "Saudi Arabia 'Intensifies Twitter Crackdown,'" *Al Jazeera*, November 23, 2014, <http://www.aljazeera.com/news/middleeast/2014/11/saudi-arabia-intensifies-twitter-crackdown-2014112363955848622.html>.

28 Mahajan 2012, chapter 6; Mervis 2009, p. 354; Julia Sperling, Chiara Marcati, and Michael Rennie, *GCC Women in Leadership—From the First to the Norm* (McKinsey & Company, July 2014), p. 14; Rehab Abd Almosen, "Men Blamed for Hindering Female Arab Scientists," *SciDev.Net*, April 25, 2013, <http://www.scidev.net/global/gender/news/men-blamed-for-hindering-female-arab-scientists.html>.

Arab Gulf states generally acknowledge that expanding female participation is a key to building knowledge economies, and have taken important steps to encourage this participation, but the reality is that important obstacles remain. Cultural norms and constraints, government policies, and inertia all combine to keep women's workforce participation in the Gulf (and the broader Middle East) lower than the levels found in other world regions. In a 2012 report, the consultancy Booz & Company estimated female workforce participation rates at 12 percent for Saudi Arabia, 24 percent for Egypt, and 27.5 percent for the UAE—compared with 40 percent for Argentina, 46 percent for China, 60 percent for Brazil, 68 percent for the United States, and 71 percent for Germany.<sup>29</sup>

ARAB GULF COUNTRIES  
SCORE REASONABLY WELL  
ON INNOVATION-FOCUSED  
INDICES.

Female employment in the Gulf is often limited to traditional fields, such as teaching and services. In Saudi Arabia, for example, the great majority of female university graduates historically have focused their studies on either education or the humanities, after which they have gone on to forge careers in public service or teaching. Nonetheless, despite the obstacles, women are more regularly becoming participants in business and the sciences, are increasingly entrepreneurial in outlook, and are challenging expectations just about everywhere. The Booz study gave examples of successful professional women across the region: Saudi Arabia's Hayat Sindi, a medical researcher and entrepreneur; Lama Al Sulaiman, first Deputy Chairwoman of Jeddah's Chamber of Commerce; Amina Al Rustamani, CEO of TECOM Investments, which oversees Dubai's design district; and Sheikha Lubna Al Qasimi, the UAE's Trade Minister and the country's first female minister.<sup>30</sup>

29 DeAnne Aguirre et al., *Empowering the Third Billion: Women and the World of Work in 2012* (Booz & Co., 2012), pp. 33-74.

30 Aguirre et al. 2012, pp. 69-74; Mona Al Munajjed, *Women's Employment in Saudi Arabia: A Major Challenge* (Riyadh: Booz & Company, 2010), pp. 2-13, 19.

## Evaluating Progress

Global economic rankings position GCC countries in the top half of global standings, and often in the top third (table 2). Compared with the broader Middle East and North Africa (MENA) region, only Israel consistently outpaces Arab Gulf countries, and Turkey is the only other country roughly on par with GCC economies. Globally, Arab Gulf countries compare favorably with economic powerhouses such as China—at least in some metrics—but not as well with the recognized global innovation leaders, including Singapore and the United States.

These indices vary widely in scope and emphasis. The World Bank's Doing Business index is a narrow ranking, focusing on regulatory conditions. Conversely, the World Economic Forum's Global Competitiveness Index (GCI) is a broad metric that ranks countries along twelve "pillars of competitiveness" that include higher education and training, technological readiness, innovation, infrastructure, institutional quality, macroeconomic environment, goods and labor market efficiency, and business sophistication. The Cornell University/INSEAD/WIPO Global Innovation Index (GII) and the Global Entrepreneurship and Development Institute's Global Entrepreneurship and Development Index (GEDI) both attempt to measure the knowledge economy directly. While they recognize the slippery nature of terms such as "innovation," "entrepreneurship," and "knowledge," these indices nonetheless attempt to measure the components of the knowledge economy. The World Intellectual Property Organization (WIPO) measure reflects total patent filings by residency of applicant, which is an important dimension of intellectual-property (IP) development. Finally, Booz & Company's *Empowering the Third Billion* focuses on female economic participation (the term "third billion" refers to the one billion additional women who are expected to enter the world's workforce in the coming decade).

Arab Gulf countries perform best under the GCI, which takes into account their world-class physical infrastructure, high efficiencies in the goods and labor markets, and commitment to public investment and education. Under the GCI, Oman and Kuwait receive high marks for macroeconomic stability, world-class infrastructure, effective institutions, and efficient markets—but are given lower scores in areas related to innovative activity, and educational inclusion and quality. In contrast, the GCI rates Bahrain lower overall, but it also gives Bahrain higher marks on innovation-related

TABLE 2. Performance in Selected Global Economic Rankings

	WORLD ECONOMIC FORUM (GCI)*	WORLD BANK**	CORNELL/ INSEAD/ WIPO (GII)***	GEDI****	BOOZ & CO.*****	WIPO*****
GCC Countries						
Bahrain	43	46	62	37	101	--
Kuwait	36	104	69	43	97	--
Oman	33	47	75	29	118	--
Qatar	13	48	47	23	--	89
Saudi Arabia	20	26	38	45	123	32
United Arab Emirates	19	23	35	28	109	59
Select MENA						
Egypt	118	128	99	94	108	49
Israel	25	35	15	20	26	16
Jordan	68	119	64	72	110	74
Turkey	44	69	54	39	105	26
Yemen	145	133	141	--	128	100
Select Global						
China	29	96	29	46	58	1
Germany	4	21	13	16	8	3
Singapore	2	1	7	10	37	28
Switzerland	1	29	1	5	17	8
United States	5	4	6	1	30	2

\* Global Competitiveness Index, 2013-14. Source: Klaus Schwab, ed., *The Global Competitiveness Report 2013-2014. Full Data Edition* (Geneva: World Economic Forum, 2014), table 3, p. 15.

\*\* World Bank Doing Business index, 2014. Source: World Bank, *Doing Business 2014: Understanding Regulations for Small and Medium-Size Enterprises* (Washington, DC: World Bank Group, 2013), table 1.1, p. 3.

\*\*\* Global Innovation Index 2014. Source: Cornell University, INSEAD, and WIPO, *The Global Innovation Index 2014: The Human Factor in Innovation* (Fountainebleau, Ithaca, and Geneva, 2014), table 1, pp. 14-15.

\*\*\*\* Global Entrepreneurship & Development Index 2014. Source: Zoltán J. Ács, László Szerb, and Erko Autio, *Global Entrepreneurship & Development Index 2014* (Washington, DC: Global Entrepreneurship and Development Institute, table 1.2, pp. 9-10.

\*\*\*\*\* Booz & Co. Third Billion Index, 2012. Source: DeAnne Aguirre et al., *Empowering the Third Billion: Women and the World of Work in 2012* (Booz & Company, 2012), exhibit 4, p. 27.

\*\*\*\*\* Total patent filings, 2013. Source: World Intellectual Property Organization, *World Intellectual Property Indicators. Economics and Statistics Series* (Geneva, 2014), table 1, p. 8.

metrics within the index, such as the quality and reach of its skills-training programs.<sup>31</sup>

Arab Gulf countries score reasonably well on the two innovation-focused indices (GII and GEDI). The GII gives the UAE strong marks for its human-capital assets and ambitions, including its investments in education, its ability to attract skilled labor from abroad, and its creation of “accelerators” that provide budding entrepreneurs and startups with technical assistance and access to networks.<sup>32</sup> The GEDI gives Saudi Arabia high scores in some areas, but knocks it down on others, including the soft-infrastructure variables of gender equity (in entrepreneurialism and workforce participation) and cultural acceptance of risk.<sup>33</sup> It is worth noting that Gulf economies do not yet rate in the top echelon in terms of IP development—at least in terms of how IP is conventionally tracked at global levels through patent, trademark, and industrial-design applications. As shown in table 2, WIPO did not rank any Gulf country better than thirty-second (Saudi Arabia) in total patent filings in 2013. Israel, the Middle East’s top performer, ranked sixteenth by this measure.

Of the indices listed in table 2, Arab Gulf countries perform most poorly on the Booz & Company index, consistently placing in the bottom third of global rankings. That study indicates that, while women have made progress toward economic empowerment, full participation is not achieved.<sup>34</sup> However, there is an interesting wrinkle. More women in the Gulf are seeking outlets as entrepreneurs, where they encounter fewer obstacles to aligning their skills and talents with their ambitions. Female Emirati entrepreneurs, for example, report low gender discrimination when it comes to running their own businesses. Arab Gulf countries therefore have a substantial opportunity to improve female workforce participation indirectly, through ensuring that women gain financial, technical, regulatory, and advisory support for start-up activities.

## Conclusion: Toward Knowledge Economies in the Gulf

The challenge for Arab Gulf countries going forward will be sustaining and expanding the successes they have enjoyed to date, and here there are no guarantees. The world’s most successful innovation hubs took decades to build, whether created from scratch like Silicon Valley, or through refashioning existing places as in Singapore. **Either way, long-term commitment to the knowledge economy is key.** To date, all signs point to the staying power of Arab Gulf leadership in this regard. However, the length of the gestation process inevitably requires close and sustained attention, at the highest levels of governance, to signs of progress or retreat. Future-oriented strategic plans like *UAE Vision 2021* and *Qatar National Vision 2030* are impressive achievements, but their success ultimately depends on translating visionary goals into effective investments and policies that, in turn, create self-replicating innovation ecosystems.

This observation leads to a second, and related, conclusion. Arab Gulf countries have the resources and the will to invest billions into hard infrastructure and financial architecture. Yet while these investments cost great sums of money and can be difficult to realize, they nonetheless represent the relatively easier part of a complex equation. The harder part is the creation of the knowledge economy’s soft infrastructure—the dimension of entrepreneurial culture involving creativity, expression, inclusion, disruption, and borrowing from global cultural flows. While there is no cookbook, **policymakers have to value soft infrastructure as much as hard infrastructure.** Building cultures that embrace risk taking is a good example. Arab Gulf societies are unenthusiastic about daring inventiveness, and they generally do not reward the failures that can ultimately lead to innovative breakthroughs; both cultural traits that feature prominently in knowledge economies. Arab residents, for example, account for a miniscule percentage of all patent applications filed with the United States Patent and Trademark Office (USPTO), the world’s largest and most important patenting body.<sup>35</sup> “We should support people who try and fail, and not condemn them,” says Maktoob founder Samih Toukan. “Our culture is about

31 Margareta Drzeniek Hanouz and Miroslav Dusek, “The Employment-Competitiveness Nexus in the Arab World: Findings from the Global Competitiveness Index 2012-2013,” in World Economic Forum, *The Arab World Competitiveness Report 2013* (Geneva: World Economic Forum, 2013), pp. 13-17.

32 On GII’s treatment of the UAE, see Cornell University, INSEAD, and WIPO, *The Global Innovation Index 2014: The Human Factor in Innovation* (Fountainebleau, Ithaca, and Geneva, 2014), chapter 6.

33 Zoltán J. Ács, László Szerb, and Erkkó Autio, *Global Entrepreneurship & Development Index 2014* (Washington, DC: Global Entrepreneurship and Development Institute, 2014), Saudi Arabia country page.

34 The arguments in this paragraph are adapted from Aguirre et al., 2012, p. 73.

35 Orient Planet PR & Marketing Communications and MADAR Research & Development, *Arab Knowledge Economy Report 2014* (Dubai, 2014), p. 20, <http://www.orientplanet.com/akereport2014.pdf>.

having very secure jobs but we need to support people to go out and create their own projects and companies.”<sup>36</sup>

Some observers go so far as to claim that innovation is primarily an organic phenomenon, rather than a designed one. Christopher Schroeder, author of the aforementioned *Startup Rising*, claims that grassroots entrepreneurialism in the wider Middle East is the most significant driver of regional innovation. It stands to reason that if talented people are at the core of the innovation process, then government policy ought to focus mostly on creating dynamic and livable places, in order to attract and retain the best talent from all over the world.

THE LIFEBLOOD OF KNOWLEDGE ECONOMIES CONSISTS OF GLOBAL FLOWS OF INFORMATION, IDEAS, TECHNOLOGY, CAPITAL, AND PEOPLE.

But this insight raises a core dilemma, between swift and transformational social change on the one hand, and tradition and stability on the other. *Qatar's National Vision 2030* acknowledges that rapid economic development has “created intense strains between the old and new in almost every aspect of life,” that “greater freedoms and wider choices that accompany economic and social progress pose a challenge to deep-rooted social values highly cherished by society,” and that Qatar must weigh national identity and cohesion against the benefits from a large expatriate community (including a very large unskilled labor force, working primarily in construction and services).<sup>37</sup> While Arab Gulf officials might believe that they can engage in a high-wire balancing act indefinitely, pursuing the knowledge economy **will force a choice between competing societal visions**. The evolving role of women, addressed above, is a fitting example.

Immigration is another. Becoming a global hub means attracting expatriates, whose large numbers inevitably strain the host society. (Arab Gulf states are hardly alone here; Singapore’s success as a global hub has also made it dependent on expatriate workers, although not to as great an extent.)<sup>38</sup> As expatriates do not necessarily share the host society’s norms and values, they inevitably create fissures with respect to acceptable speech, norms, and behavior. Whether expatriates are treated fairly under the law is important in this respect, and quality-of-life issues such as freedom of expression will influence where talented people choose to live. As things now stand, expatriates in the Gulf are given little reason or opportunity to embed themselves in to the wider society. For example, Abu Dhabi—concerned about the cultural impact that integration would have on society—physically segregates housing for foreigners from that for citizens, and generally restricts land ownership by expatriates.<sup>39</sup>

Finally, any discussion of the Gulf must address regional security conditions. The glittering economies of some GCC countries exist within a difficult neighborhood that is beset by national, sectarian, or ethnic conflicts. Although Arab Gulf countries to date have managed to keep away the violence that has befallen countries to their north and northwest, they may not always remain so fortunate.

The security challenge illustrates the paradox that is at the center of innovation. The lifeblood of knowledge economies consists of global flows of information, ideas, technology, capital, and people. But at the same time, creating successful knowledge economies requires policymakers’ very close attention to highly localized conditions that enable these flows to intersect and recombine. In a security context, retaining a global reputation becomes a problem when physical security is not ensured. (As a thought experiment, imagine what would happen to Dubai’s global standing if a bomb were to go off in the emirate.) On the other hand, security challenges can unite people and push them to thrive, even within difficult contexts. As an example, New York City on 9/11 suffered one of the greatest single acts of terrorism in human history; yet it not only managed to absorb the blow, but continued to prosper as a global financial, corporate, and cultural hub. In this case, New

36 Quotations from Neil King, “Building an Entrepreneurial Ecosystem,” *Arabian Business*, March 30, 2013, <http://www.arabianbusiness.com/building-entrepreneurial-ecosystem-495633.html?page=0>.

37 Qatar National Vision 2030, <http://www.qatarnationalvision2030.com/definition/>.

38 Economic Strategies Committee, *Report of the Economic Strategies Committee: High Skilled People, Innovative Economy, Distinctive Global City* (Singapore: Economic Strategies Committee, 2010), p. 2. <http://www.mti.gov.sg/ResearchRoom/Documents/app.mti.gov.sg/data/pages/885/doc/ESC%20Full%20Report.pdf>.

39 Lawrence Crot, “Planning for Sustainability in Non-Democratic Polities: The Case of Masdar City,” *Urban Studies* vol. 50, no. 13, October 2013, pp. 2811-2812.

Yorkers' strong emotional attachment to their city and country proved to be a phenomenal source of strength.

While no one can forecast whether and how a similarly difficult period might unfold in the Gulf region, it nonetheless is wise for leaders to **adopt a long-term resiliency strategy** that aims to deepen inhabitants' attachment to place. Doing so will not be easy, if for no other reason than Arab Gulf societies have become so dependent on expatriate workers. Yet there may be no choice. The reality is that while knowledge economies depend on access to global flows of trade, finance, and talent, to succeed they also must consist of resilient places that people identify with and are willing to support and defend when conditions become difficult.





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