The Role of Coherent Linkages in Fostering Innovation-Based Economies in the Gulf Cooperation Council Countries

Barry Jaruzelski, Chadi N. Moujaes, Rasheed Eltayeb, Hadi Raad, and **Hatem A. Samman,** Booz & Company

Developed countries around the world with strong innovation cultures have succeeded by linking people, capital, and research to introduce novelty and create economic value. These countries have an effective integrated network of stakeholders that foster an environment that can transform ideas into successful outcomes. The web of stakeholders acts as a vibrant innovation ecosystem. This system, rather than specific institutions focused on a single discipline, spurs widespread economic activity, drives efficiency and productivity, and increases overall standards of living. Countries with strong innovation capabilities have resilient economies that can withstand periodic economic shocks to individual sectors.

In recent years, the countries of the Gulf Cooperation Council (GCC)—Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE)—have embarked on a series of reforms and initiatives targeted at immediate challenges within their innovation systems. These challenges include need to cultivate human capital and to promote research and development (R&D). These countries are also developing traditional sectors (such as oil and gas, petrochemicals, basic industries, and water desalination) and nascent ones (including aerospace, healthcare, and renewable energy). The GCC has made significant progress in a relatively short time.

To ensure further progress in these efforts, the GCC countries must now institute a national model that establishes coherent linkages in their innovation systems. This involves forging strong ties among all stakeholders in the innovation ecosystem (which encompasses policies, operations, and all stakeholders). This is vital for the GCC states, which have rich natural resource endowments, large governments, and a need to diversify their economic base. Policymakers in the GCC are well aware that the resource endowment is finite. They know that they need to invest the current windfall wisely in developing knowledge-based economies.

The crucial mechanism required is an innovation-promotion entity. This body establishes and develops the necessary linkages, coordinates policy, convenes stakeholders, and drives the national agenda.

Key elements for promoting innovation

The GCC needs to foster innovation to diversify its economic base, reduce its dependence on hydrocarbons, and create opportunities for its large number of young citizens.

- The GCC has made marked strides in creating innovation-based economies. However, it still lags behind developed countries and has room to improve its global rankings by creating vibrant, entrepreneurship-friendly environments.
- Overall, the GCC needs to forge ties that bring together all the stakeholders in the innovation ecosystem—academics, regulators, multinational companies, and entrepreneurs among them—in a cohesive, targeted program aimed at fostering innovation.
- The creation of coherent links is vital to establishing an innovation economy. The process must involve an innovation-promotion entity that fuses policies, stakeholders, and operations into a focused effort.

Transitioning to an innovation economy

There are three reasons GCC countries must move towards innovation-based growth: economic diversification, demographics and the engagement of youth, and globalization.

Economic diversification

GCC countries realize that sustainable long-term economic development hinges on their ability to decrease reliance on hydrocarbon income and to widen their economic base. The GCC countries must become innovative. They have to respond promptly to current and expected demands for goods and services if they are to diversify their economies in a competitive manner.

Over the past decade, GCC countries have developed non-oil sectors. The UAE has lowered its dependence on hydrocarbon exports and, to a lesser extent, on hydrocarbon income. Kuwait's hydrocarbon export dependence has also dropped; Oman and Qatar too are less reliant on hydrocarbons for their official revenues. Nevertheless, oil and gas continue to dominate in the region. Over the period from 1990 to 1999, for example, with the exception of Bahrain, hydrocarbon revenue accounted for 80% of revenue and exports of goods and services in the GCC. In the following decade from 2000 to 2009, hydrocarbons accounted for close to 90% of revenue and 80% of exports, making the economies in the region more vulnerable to external shocks.[1]

There is ample room for growth and development of the private sector—the source of innovation in developed and emerging economies. In the past, private businesses faced challenges that did not position them to play this role. The government provided generous assistance—such as subsidized energy—to promote the private sector with an eye towards exports. An unintended consequence was that improvements in private-sector competitiveness and productivity stalled. Firms focused excessively on domestic demand. They faced limited domestic competition and no international competition. Recent changes are starting to address this legacy. In the meantime, however, the GCC continues to depend on imports for numerous economic activities. Among the sectors that rely on imported products are manufacturing, food, chemicals, and industrial solutions providers. Saudi Arabia, for example, is among the top 15 importers of pharmaceuticals worldwide. The UAE is in a similar position with transportation services.[2]

By taking the correct approach, the GCC economies can leverage their hydrocarbon endowment to invest in people and knowledge creation, and so secure a broader economic base. Such investments will enhance the competitiveness of non-oil sectors while reducing the need for imported expertise and materials.

Demographics and the engagement of youth

The population of the GCC in coming decades will continue to be predominantly young, in contrast to other high-income countries. By 2030, for example, 42 to 49% of Saudi Arabia's population will be under the age of 30, down from a remarkable 57% today. By contrast, 55 to 60% of Japanese will be 50 and older.[3]

There is a need to harness the energy and creativity of this youthful population and direct it towards entrepreneurship and innovation. Without such initiatives, the economy will continue to be highly dependent on imports. In addition, the GCC will have to rely on an increasing number of skilled expatriates.

Globalization

The integration of the global economy will largely benefit those countries with innovative individuals, systems, and cultures, and with favourable conditions for business operations. These are the countries that will attract foreign investors and corporations. They will gain from investment inflows and corporate exposure in terms of economic capabilities and competitiveness.

Foreign investment is particularly important. Multinational corporations' investments have been instrumental in transferring business and technology expertise. Much inbound investment in the GCC is destined for the oil and gas sector. However, some governments are providing incentives to attract funds into other sectors. Such measures include exemption from customs duties and flexibility in foreign ownership of local ventures and property. The result has been a steep rise in foreign direct investment into such countries as Saudi Arabia. That investment is increasingly entering less traditional sectors such as telecommunications and finance.

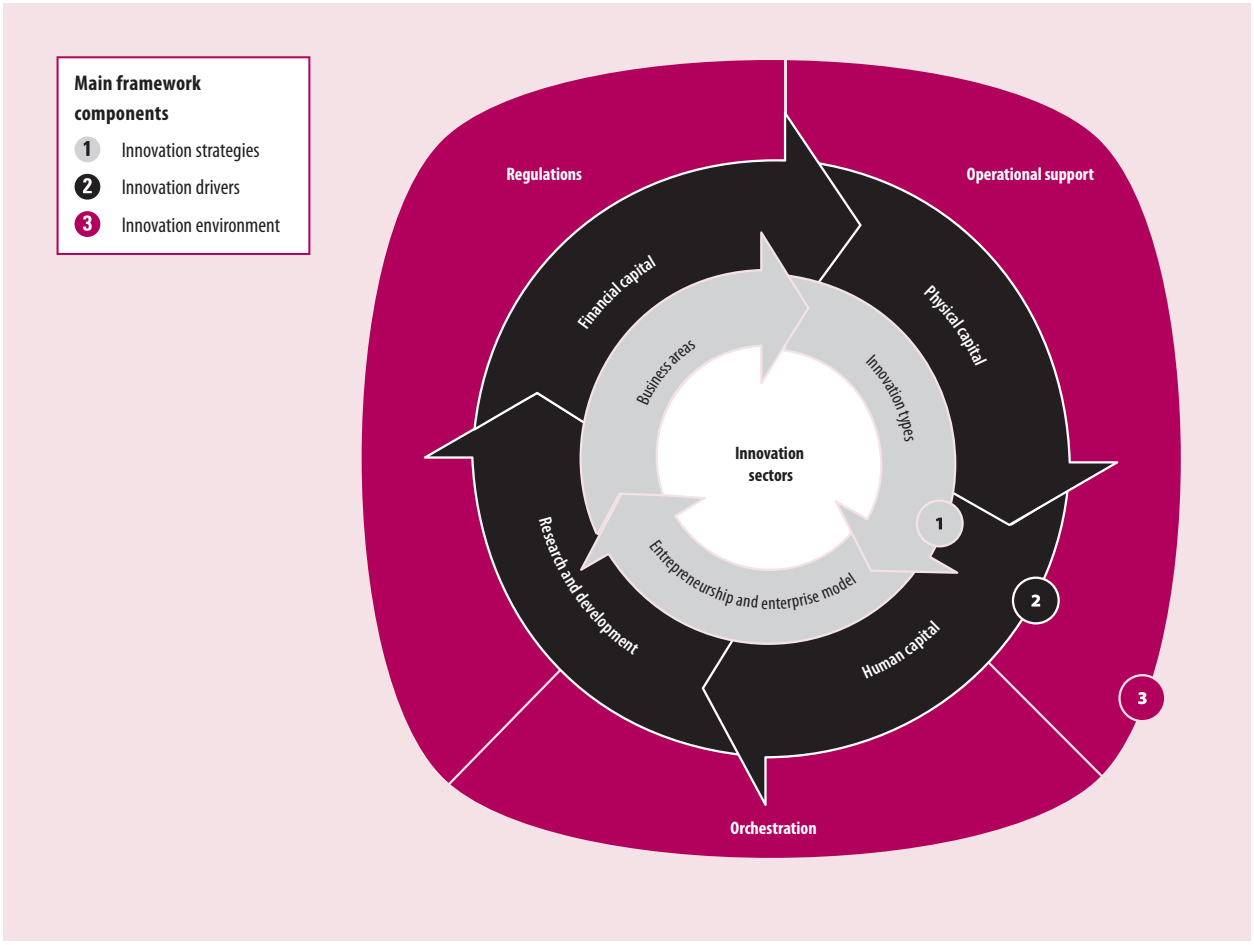
Strengthening innovation linkages in the Gulf Cooperation Council

GCC countries realize that creating innovation-led economies means proceeding in an established sequence. The steps below mainly describe the successful approaches of the Republic of Korea; Singapore; and Taiwan, Province of China. Following these examples, as well as those from other developed economies, GCC states will journey through the following three major stages:

1. Economic growth primarily driven by the relative abundance and comparative advantage of financial or human capital.
2. Accumulation of factors of production (financial and human capital) that provide higher value-added in existing products and services.
3. Additions to the value chain stemming from new technologies and ideas that lead to growth in the production of innovative products and services.

Some GCC countries already have begun this journey. They have opened technology and research clusters in recent years. These

Figure 1: Innovation policy framework



Source: Booz & Company analysis.

facilities aim to bring together various stakeholders and facilities such as universities, private-sector institutions, multinational corporations, and the public sector. Their goal is to foster collaboration on research and to leverage knowledge of the local market. Today several promising clusters have either been completed or are under construction in the GCC. These include the King Abdullah Bin Abdulaziz Science Park in Saudi Arabia, the Centre of Excellence for Applied Research and Training (CERT) in the UAE, the Knowledge Oasis Muscat in Oman, and the Qatar Science & Technology Park.

The next critical step is to assemble the different parts of the innovation landscape so that they cohere in a synergistic, holistic partnership. The overall policy agenda is an essential element, because it links policies to their respective components. Equally essential is the establishment of supporting institutional models to link stakeholders at the institutional and operational levels.

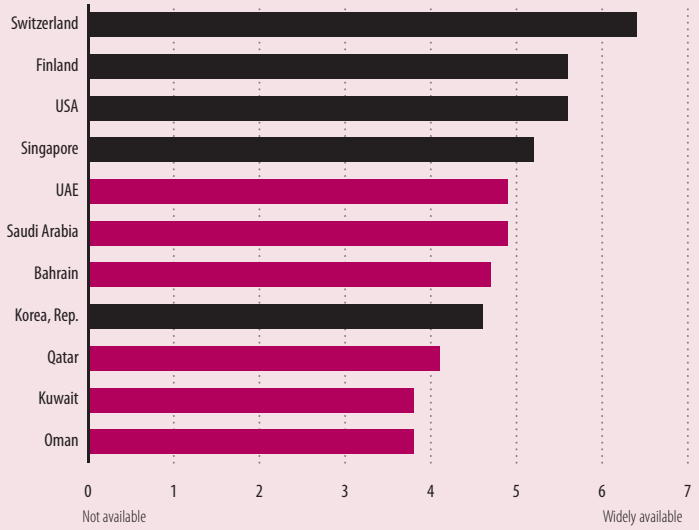
These linkages animate the ecosystem. They align cross-cutting policies and coordinate the efforts of all stakeholders, thereby driving the innovation process (see Figure 1).

The innovation policy framework has three main components. First and foremost are the innovation strategies that are set within economic sectors and that drive creativity in specific business areas (the inner circle in Figure 1). These strategies are set in motion by an enterprise model led by entrepreneurs, national entities, or a combination of the two. Each sector has different requirements for innovation and requires a different institutional setup. Some sectors are driven by entrepreneurship and start-ups. Other sectors require investments to be made by established large companies or national champions. The focus in the region has been on fostering entrepreneurship,

Figure 2: Innovation capabilities in GCC and selected developed countries

2a: Local availability of specialized research and training services

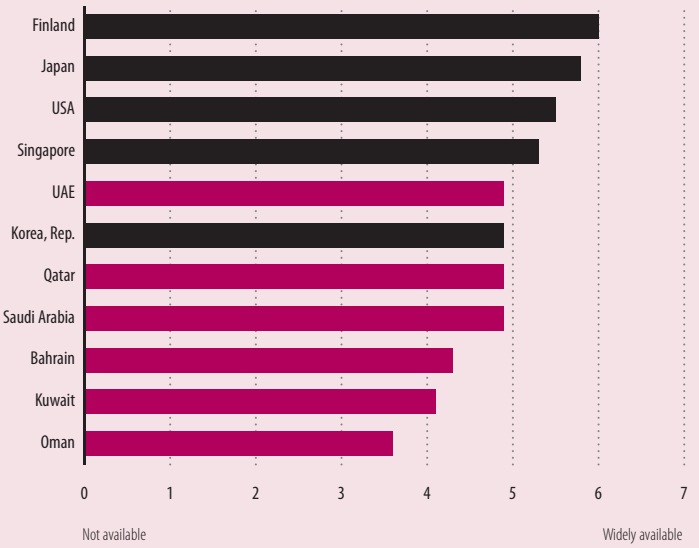
In your country, to what extent are high-quality, specialized training services available? [1 = not at all available; 7 = widely available]



	Rank (out of 142)	Score
Switzerland	1	6.4
Finland	10	5.6
USA	11	5.6
Singapore	19	5.2
UAE	28	4.9
Saudi Arabia	29	4.9
Bahrain	35	4.7
Korea, Rep.	39	4.6
Qatar	67	4.1
Kuwait	86	3.8
Oman	90	3.8

2b: Availability of scientists and engineers

To what extent are scientists and engineers available in your country? [1 = not at all available; 7 = widely available]



	Rank (out of 142)	Score
Finland	1	6.0
Japan	2	5.8
USA	4	5.5
Singapore	12	5.3
UAE	18	4.9
Korea, Rep.	23	4.9
Qatar	24	4.9
Saudi Arabia	26	4.9
Bahrain	55	4.3
Kuwait	65	4.1
Oman	99	3.6

Source: World Economic Forum, Executive Opinion Survey, 2010–2011.

which is good. However, the role of large firms seems to have been downplayed.

The next component of the policy framework is the innovation drivers—a set of policies that encompass all sectors and address financial capital, physical capital, human capital, and R&D (the middle circle in Figure 1). The last piece of the framework involves the innovation environment—the policies that aim to make the socioeconomic arena conducive to generating new ideas (the outer circle in Figure 1).

A clearly identified institution must have ownership of each of these three policy framework components and be accountable for implementation. The institutional model framework is the assembly of the stakeholders; their mandate is to cooperate to define and implement policies. The model links all of the stakeholders in the ecosystem (including academic and R&D centres, financial organizations, businesses, and government institutions) through dedicated agencies for promotion, funding, and orchestration.

The next challenge for the GCC is to ensure that the complex web of links among stakeholders is effective and spurs new ideas. These links can emerge within the framework that GCC states have created over the past decade. The GCC thus far has focused on framing the policy agenda and putting in place strategies and policies to develop the drivers and the environment.

Linking innovation policies

A crucial step in moving to an innovation-based economy is creating a balance of human, physical, and financial resources. Policies geared to the development of innovation drivers are necessary but not sufficient. Such policies also must align with laws and regulations that can provide the correct conditions for inventive ideas to flourish. This is an area of great opportunity for the GCC states. They can elevate their policy agenda framework, which will help such drivers as human capital and R&D reach levels comparable to those of advanced economies (see Figure 2). The GCC states can also link related policies more effectively to their respective components of strategy, drivers, and the environment.

The GCC has lagged behind innovation economies for the simple reason that many sectors in the region are at early stages of development. They either have not had the time to show results or do not yet have a comprehensive strategy.

The GCC states can do more in terms of R&D spending relative to GDP. The latest available figures show, for example, that Kuwait's R&D expenditure as a percentage of GDP was a mere 0.11% in 2009 (down from 0.21% in 1997) while that of Saudi Arabia was 0.08% in 2009 (up from 0.06% in 2003).[4] From a private-sector perspective, the lack of competition has removed a strong incentive to seek a business advantage through R&D. Equally important, many GCC companies are hesitant to invest in R&D because of their national regulatory and legal frameworks. The GCC countries have made significant efforts to improve this environment—for example, by enhancing intellectual property (IP) protection. A more comprehensive legislative approach would advance matters further (see Box 1).

An overall strategy must also identify the critical sectors that will drive inventiveness if it is to forge effective links among the different aspects of the policy agenda. Each of these sectors, in turn, must establish a strategy that cascades down to its various business areas, assesses and identifies the key typology within them, and determines the characteristics of the associated enterprise model. Clarity on these sector-specific plans will allow relevant government stakeholders to formulate policies relating to financial and human capital, and research in science and technology.

In Sweden, for example, the government sets the overall policy and allocates the necessary budget to support it. In turn, the local authorities and the county councils set policies for regional innovation and identify target sectors in accordance with overall national policies. Relevant ministries (including the Ministry of Education, the Ministry of Enterprise, the Ministry of Energy and Communication, and the Ministry of Defence) set their respective policies in research and education to facilitate the implementation of the national strategy. Research and innovation policy councils support these efforts by providing advice and guidance to the government and ministries. Several other entities, such as the Swedish Research Council and the Swedish Governmental Agency for Innovation Systems (known as VINNOVA) provide funds for basic and industry research. Other groups, such as Almi Företagspartner, finance, provide advice, arrange contacts, and assist in business development for small and medium-sized enterprises to stimulate the formation of new companies and innovative activities. Universities and public and private research institutions perform research by coordinating with private businesses. The latter then conducts in-house R&D to develop products and services.

A final consideration is that GCC policy agendas should focus their efforts on national strengths,

Box 1: Strengthening the innovation environment in the United Arab Emirates

The public sector and commercial entities in the United Arab Emirates (UAE) have initiated an innovation strategy and supporting efforts. There is broad recognition within the UAE that the success of its strategy will depend on its drivers and on a supportive environment. Such an environment involves creating regulatory incentives for stakeholders, ensuring that entities have the necessary support services such as networking and marketing, and orchestrating the innovation agenda to provide effective interaction among all stakeholders.

Regulatory environment

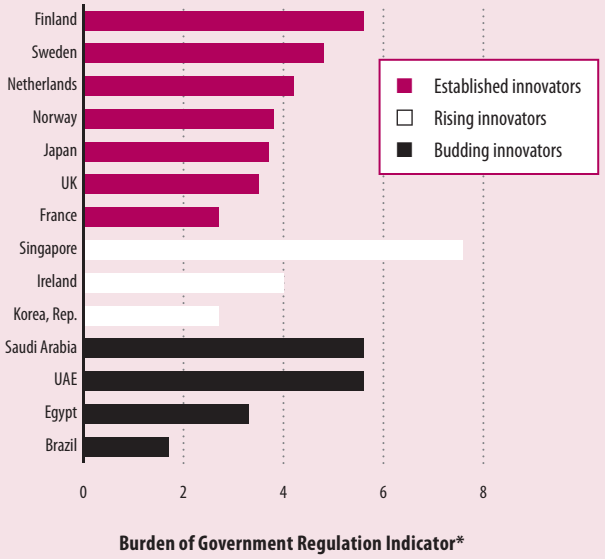
A comprehensive regulatory environment typically addresses several supporting aspects of innovation including intellectual property (IP) rights incentives specifically targeted at innovators and protective measures that improve investor confidence. In all three aspects, the UAE has made good progress, particularly on incentives regulation (see Figure 1.1).

- *Intellectual Property Rights*: The UAE is a member of the Paris Convention for the Protection of Industrial Property and has promulgated a patent law. IP legislation in the UAE can become even more comprehensive by covering a larger number of sectors.
- *Incentive Regulations*: The UAE compares favourably on implementing incentive regulations for firms in general, chiefly through the provision of tax exemptions, the absence of trade barriers, modern infrastructure, and freedom from foreign exchange controls. However, the UAE needs to enhance regulations that promote innovation.

Figure 1.1: Regulatory indicators for the United Arab Emirates and benchmark economies

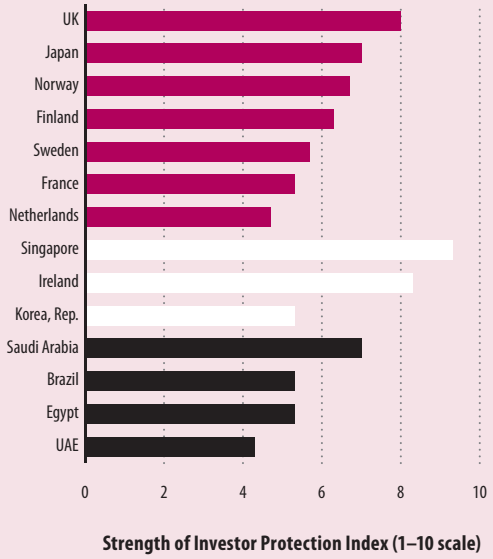
1.1a: Incentive regulations

How burdensome is it for businesses in your country to comply with governmental administrative requirements (e.g., permits, regulations, reporting)? [0 = extremely burdensome; 10 = not burdensome at all].



Burden of Government Regulation Indicator*

1.1b: Protective regulations



Strength of Investor Protection Index (1–10 scale)

Sources: 1.1a: World Economic Forum, Executive Opinion Survey 2010–2011. 1.1b: World Bank, Ease of Doing Business Index 2012, Doing Business 2012 (http://www.doingbusiness.org/)

Note: `Established Innovators' refers to countries that have long since put in place the structures needed to reach their innovation potential; `Rising Innovators' refers to countries that have established the structures needed to reach their innovation potential, and have risen rapidly to establish themselves as innovation leaders; `Budding Innovators' refers to countries beginning to explore plans to tap into their innovation potential and have started to put in place the structures needed to support their plans.

* The Burden of Government Regulation Indicator is rescaled from a scale of 1 to 7 to a scale of 0 to 10.

Box 1: Strengthening the innovation environment in the United Arab Emirates *(continued)*

The UAE can provide monetary incentives for undertaking research, hiring research personnel, and introducing environmentally friendly technologies—approaches taken in Singapore.

- *Protective Regulations*: Investor protection in the UAE must be enhanced if it is to become comparable to that of leading economies such as Singapore and Norway. The legal and regulatory systems in Singapore and Norway offer more protective measures. These include active bankruptcy laws, disclosure of information on transactions, and the liability of directors for damages caused. Shareholders can also launch lawsuits more easily.

Operations support

The UAE has operations support for innovation. The Technology Development Committee (TDC) plays a notable role in setting policy in Abu Dhabi. Similarly, the Khalifa Fund for Enterprise Development in Abu Dhabi provides funding for support systems—such as training and development—for entrepreneurs, and invests in specific projects. Overall, however, there is limited support for companies active in R&D and innovation. The UAE can expand assistance in three areas.

1. The UAE would benefit from a dedicated agency that provides support services specifically for innovators. Such services typically would include R&D funding, advisory support, matchmaking, and networking, as well as logistical support including marketing and promotion.
2. The UAE should increase the number of its incubators. The government can play a role in establishing and nurturing such incubators. In addition, entities such as CERT Technology Park in Abu Dhabi can provide mentoring and guidance to access the UAE market. They can help support innovative companies by transforming original ideas into economic value.
3. There should be a greater focus on innovation. A number of different entities, such as the Chamber of Commerce, offer support services such as matchmaking and networking for businesses. These efforts would be more powerful if they were coordinated with a specific focus on innovators.

Orchestration

In the UAE, orchestration can exist among most traditional and nascent sectors targeted for innovation. Having an entity charged with ensuring the orchestration of all these activities is critical for policies and initiatives to succeed. Orchestration involves coordinating the implementation of policies at the operational level, such as ensuring that funding is channelled to high-potential businesses and helping these businesses find investors and customers. Orchestration also means working with stakeholders in the landscape to identify and advocate new policies or policy revisions that will provide further support. The back-and-forth of orchestration provides continuous feedback that can improve policies.

The challenge in the UAE is that cross-stakeholder interaction is limited. It occurs typically through bilateral exchanges. Hence, the creation of an orchestration entity will produce engaged stakeholders connected precisely through the coherent linkages that result in a thriving ecosystem.

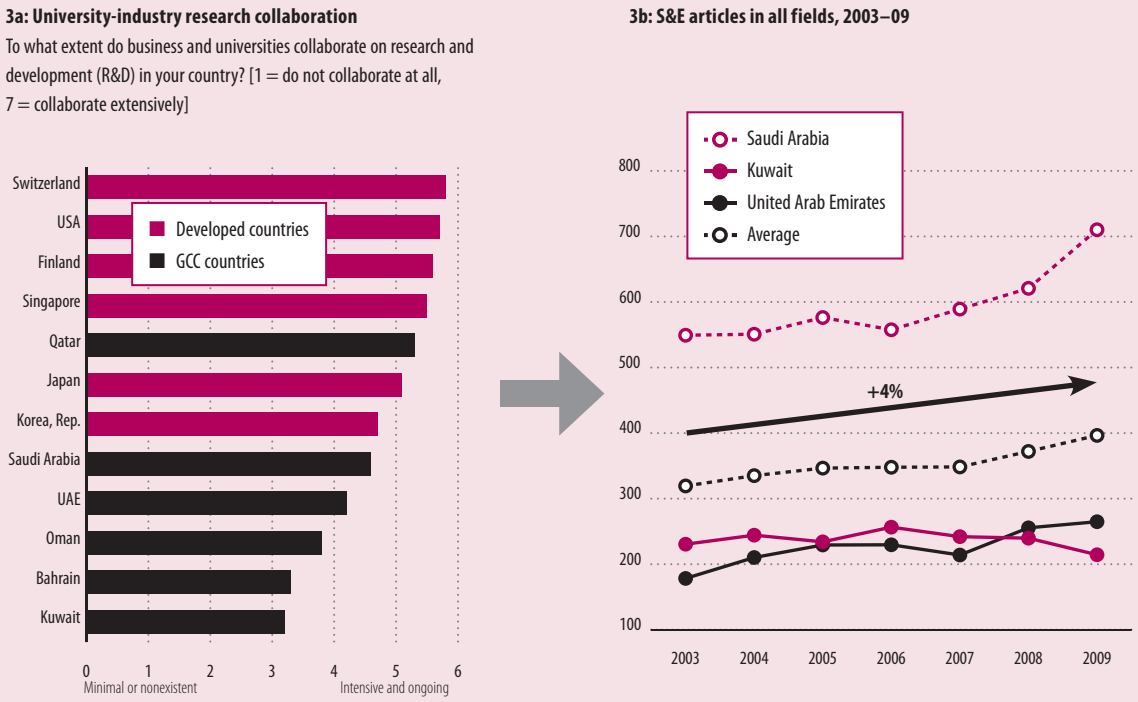
positioning their countries for competitive advantages as they develop their innovation strategies. For example, between 1978 and 1997, Singapore focused on the development of clusters in high value-added and mutually supporting industries such as electronics, petrochemicals, and engineering. The country thereby gained expertise and a competitive edge in electronics and high-tech products and services.

Linking innovation stakeholders

GCC countries have improved their stakeholder collaboration, according to the Executive Opinion Survey of the World Economic Forum in 2010-11 (see Figure 3). Saudi Arabia, for example, has risen from a ranking of 49 out of 130 countries in 2007 to 28 out of 142 in 2011 in terms of university-industry research collaboration. This is clear evidence of the strong initial impact of promotion entities such as the King Abdulaziz City for Science and Technology. These entities are strengthening and promoting effective links among stakeholders in the ecosystem. Such links may have resulted in positive outcomes, such as the increase in the number of research publications.

These impressive first steps should not lead to complacency. The main stakeholders in the innovation landscape in the GCC—such as government agencies, business, and academia—remain insufficiently connected. They have yet to coordinate in a fully effective and creative manner. Coordination among stakeholders often is limited to bilateral exchanges with little alignment among the innovation entities. For example, small, nascent enterprises remain isolated from the formal economy. In addition, many multinational corporations, such as those in the energy sector, are at

Figure 3: Research-industry collaboration: GCC and selected developed countries



Source: World Economic Forum, Executive Opinion Survey 2010–2011 (https://wefsurvey.org); National Science Foundation, National Center for Science and Engineering Statistics, and The Patent BoardTM, special tabulations (2011) from Thomson Reuters, SCI and SSCI; http://www.nsf.gov/statistics/seind12/append/c5/at05-27.xls; http://thomsonreuters.com/products_services/science/; http://data.worldbank.org/.

best weakly connected to national business organizations and academic institutions. In some GCC countries, such as Kuwait and Oman, collaboration between business enterprises and academia and research institutions at the national level has room for improvement.

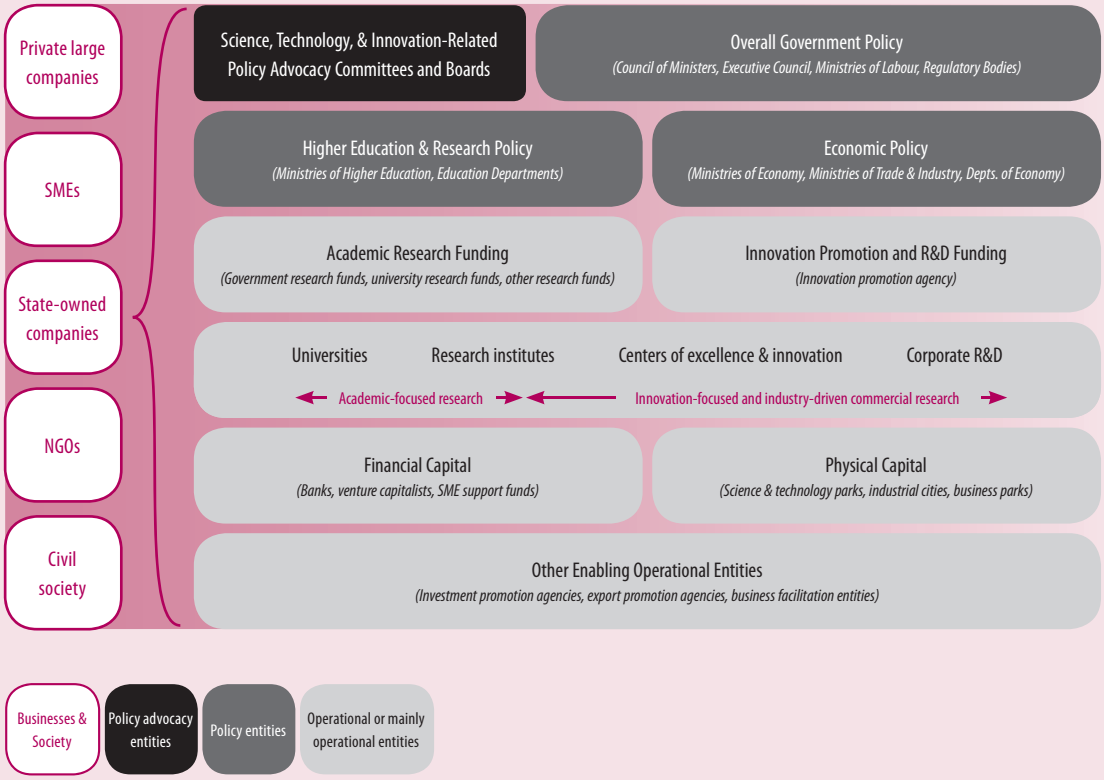
Coordination of activities among various stakeholders can improve significantly at the operational and institutional levels. Of particular importance are innovation promotion entities that coordinate the interactions between stakeholders and drive an overarching policy agenda. These entities would facilitate the creation and development of strong linkages throughout the ecosystem (see Figure 4).

The main role of the promotion entity is to identify policies that can improve the overall environment, promote those policies to their respective owner or stakeholders, and build networks among the most important leaders. In Norway, for example, Innovation Norway orchestrates all activities within the Norwegian national science, technology, and innovation model. Another example is that of Finland, where additional bodies have clearly defined roles. The Finnish Funding Agency for Technology and Innovation (known by its Finnish acronym Tekes) drives new ideas, while the Academy of Finland is responsible for managing most R&D activities.

Those creating the promotion entity should choose its leadership carefully. Animating the ecosystem is a complex, delicate task that requires continual adaptation. Policy makers and business leaders will need to monitor the leadership to ensure that it keeps pace with a rapidly changing environment, supports national initiatives, and effectively manages its organizations.[5]

The composition of the promotion entity's board is similarly important. A director of innovation should head the organization. That director should oversee a board comprised of representatives of stakeholders—especially the government, the private sector, and academia—to ensure

Figure 4: Conceptual framework for GCC innovation promotion entities



strong links between the promotion entities and operations.

GCC leaders across all societal and economic sectors should cooperate to ensure regional development of the main drivers of innovation. For example, the GCC has the potential to create an alliance among its economies that develops, attracts, and retains employees with the correct skill sets. Such an approach would also prevent the GCC states from crowding each other out at this critical early stage of developing their innovation ecosystem.

Finally, the most challenging aspect will be to convene the myriad stakeholders and leverage their abilities through synergy. Promotion entities will succeed when they have created a common set of values and norms and have forged a culture that nurtures innovation in the GCC. This is not a form of economic nationalism. On the contrary, by developing national talent, the GCC countries can act as a magnet to foreign firms seeking new innovation hubs. A recent Booz & Company study found, for example, that one of the top cultural attributes cited by successful innovative companies is an attitude that is welcoming to ideas from the outside.[6]

Linking innovation operations

The promotion entity plays a major role in orchestrating the model at the operational level. It ensures that businesses have the financial, physical, and human capital to succeed. This entails establishing dedicated specialized bodies to focus on specific businesses and industries, such as aerospace or nanotechnology. This means having a group with the broad mandate of ensuring that these sectors are coordinated both with each other and with the national policy.

For example, an orchestrated effort can help a country focus and maximize the effectiveness of the total investments made in R&D. Advanced countries—including Sweden, Finland, and Japan—have a dedicated entity that oversees funding of innovation-based research to ensure that companies are not

Box 2: Saudi Arabia: Linking innovation operations

Saudi Arabia is making progress in certain leading indicators of innovation, such as industry-academic collaboration and the number of patents and research publications it produces. Still, it faces several challenges, including the development of drivers of innovation such as human capital, as well as limited opportunities for entrepreneurs. These factors have taken a toll on entrepreneurial activities and diversification of the economy. For example, in 2009 new business ownership and nascent enterprise rates in Saudi Arabia were only 1.9% and 2.9%, respectively, compared with those in Lebanon (8.8% and 6.7%, respectively) and the UAE (7.4% and 6.5%).[1] At the same time, government revenues from oil accounted for about 85% of total revenues, and PhD graduates (aged 25 to 29) out of every 100,000 were only 40 in number compared with 509 and 743 in Germany and Sweden, respectively.[2]

Linking research to commercial activities

Established in 1977 as a national centre for science and technology, King Abdulaziz City for Science and Technology (KACST) now is the leading government agency in Saudi Arabia championing innovation efforts. KACST aims to support the development of Saudi businesses by funding research through its Saudi Arabian Business Innovation Research programme. The centre also has launched incubators through its BADIR program (*badir* is an Arabic word meaning 'initiate') and plans to have 80 incubators across the country by 2025.

BADIR promotes the expansion of technology incubators through its National Technology Incubation Policy. BADIR activities cover vital enablers such as incubation, financing, and commercialization. The creation of incubators will help bridge the gap that currently exists between R&D on the one hand and production and commercialization initiatives on the other (Table 2.1). There are some encouraging preliminary

Figure 2.1: Preliminary results of the BADIR programme

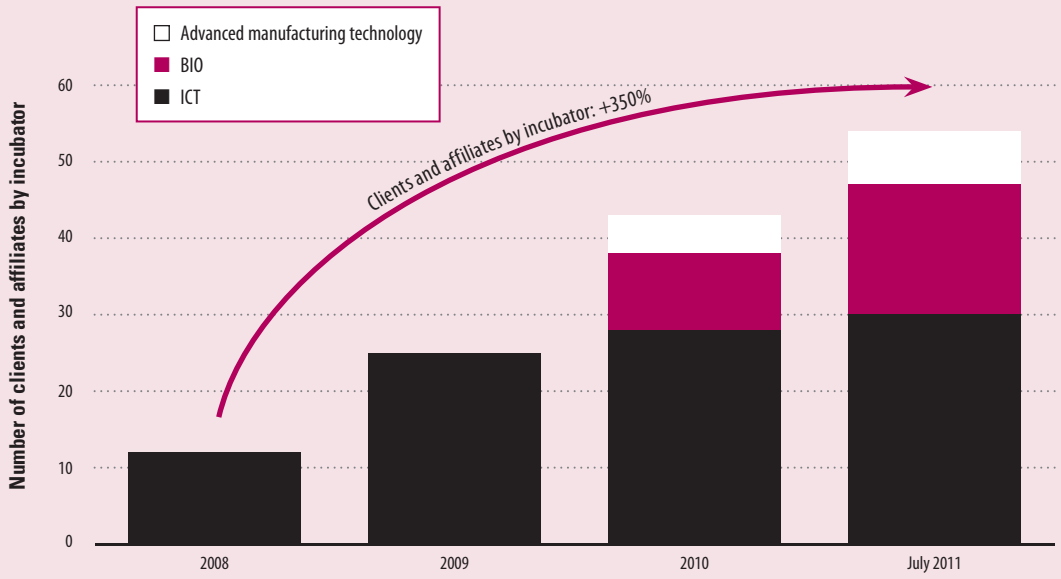


Table 2.1: BADIR incubator client status, 2011

	ICT	Advanced Manufacturing Technology	BIO	Total
Jobs created	182	9	50	241
Number of clients generating revenues	9	0	3	12
Number of clients generating profits	2	0	0	2

Source: BADIR monthly reports.

Box 2: Saudi Arabia: Linking innovation operations *(continued)*

signs. According to BADIR, the number of incubator clients increased by 350% between 2008 and 2011 (see Figure 2.1). Looking ahead to 2025, BADIR expects to generate 20,000 innovation-related jobs. Three recent BADIR success stories stand out:

- Ataalam provides a women's virtual learning environment through virtual classrooms and interactive whiteboards.
- S-me is a highly successful SMS-based social network for young Saudis, boasting some 600,000 members.
- ACE Biotech is a a medical manufacturer that aims to provide kits and reagents for polymerase chain reaction, DNA/RNA isolation, cloning, electrophoresis, and buffers.

Linking small enterprises to government operations

Within Saudi Arabia, start-up enterprises face several challenges, including their limited involvement with government operations. KACST has mechanisms to support incubated start-ups in partner search and networking activities, thereby providing additional assistance during the early stages of the start-up life cycle. KACST is also implementing processes that will select businesses to support government projects geared towards small enterprises. The centre will choose businesses based on their innovation potential.

Government digitization initiatives such as e-health, e-education, and e-government can further strengthen links between small enterprises and government operations, opening up commercial opportunities for innovative products and services. The government's investment of US$1.3 billion in Yesser (the e-government program) is an important step forward. Other approaches can include the government stimulating the supply of goods and services generated by small businesses. This can be done through direct ownership, public-private partnerships, or financial incentives. The government can stoke demand for these small businesses through awareness and education, demand creation, or financial incentives. KACST's national outreach strategy aims to enhance public understanding of the application of science and the benefits of technology to the daily needs of consumers. Moreover, the government can use its buying power to reduce the price of innovative products and services for both public and private sectors.

Linking innovation promotion entities to innovation operations

In a recent Booz & Company survey, 66% of Saudis who identified themselves as entrepreneurs said that it was difficult to start a new business. Among the major reasons cited were limited access to funding (including domestic credit and venture capital) and limited access to industry experts and resources.

KACST initiatives to boost entrepreneurship in Saudi Arabia include the development of government support policies for start-ups; the introduction of entrepreneurship funds to support relatively risky new ventures; and entrepreneurship culture promotion such as business plan competitions, conferences, and events.

To help bridge the research-commercialization gap, the government recently founded the Saudi Company for Technological Development and Investment (known as Taqnia, meaning 'technology'). Taqnia seeks to build companies that will enable the commercialization of research, thereby nurturing domestic R&D. Taqnia will also develop the industrial base by enhancing links among industries to ensure relevant research. Further, it will invest directly in foreign ventures to transfer technology to the local market through partnerships.

Notes

1. GEM, 2010.
2. Saudi Ministry of Higher education (http://www.mohe.gov.sa/ar/Ministry/Deputy-Ministry-for-Planning-and-Information-affairs/HESC/Ehsaat/Pages/default.aspx); The Conference Board of Canada, 2007 (http://www.conferenceboard.ca/hcp/details/education/phd-graduates.aspx); and Booz & Company analysis.

competing with similar academic efforts for resources. A promotion entity can ensure that only relevant projects will get the required R&D funding, and academic groups can ensure the financing of university research.

An example of a well-structured promotion entity in the GCC is the Technology Development Committee (TDC) in Abu Dhabi. Its members include government representatives from the departments of economic development, education, finance, local municipalities, and local executive councils. In addition, the TDC includes representatives from the technology sector as well as economic development funds, linking those groups together.

The TDC advocates and champions innovation-related policies at the government level. It works with industry stakeholders to understand their R&D priorities and advocates policies that support their adoption. The TDC can also coordinate with the science and technology committee (set up as advisor to the Abu Dhabi government on initiatives for promoting science and technology education programmes and innovation) to ensure alignment between R&D and academic research policies, and prevents conflicts between their respective priorities. Governments throughout the region are creating similar entities (see Box 2).

Operational entities should be autonomous and accountable for their spending to solidify the link between innovation promotion entities and innovation operations. Often the promotion entity has the resources to fund businesses and R&D projects. In addition, the entity might be able to expand linkages by funding marketing and

promotion, networking and matchmaking, and incubation services.

Conclusion

GCC countries recognize the need for innovation as the main catalyst for achieving sustainable economic growth through economic diversification. As they advance in this direction, they must carefully follow the steps of successful economies such as Taiwan, Province of China; the Republic of Korea; and Singapore. These economies have progressed in their efforts over the course of many decades. Although the GCC may require a similar time frame, it has two major advantages. First, it can use its substantial resource endowment to finance carefully selected initiatives. Second, it can learn from the experiences of innovation leaders and replicate some of the ways they have engaged stakeholders.

Governments have an important role to play as the conveners of stakeholders and coordinators of efforts across all socioeconomic sectors, public and private. The GCC countries need to develop strong links among their policies, stakeholders, and operations. To translate policy mandates to the innovation landscape, the GCC will need to ensure that their promotion entities follow detailed design activities that engage and link the stakeholders. These links are the sinews of inventiveness, ensuring that a healthy and lively innovation ecosystem emerges.

Notes

1 Beidas et al., 2011, p. 13.

2 Prasad, 2009.

3 UN, 2011.

4 UNESCO Institute for Statistics, UIS online database , available at http://stats.uis.unesco.org.

5 See Wilson, 2012.

6 Jaruzelski et al, 2011.

References

Beidas-Strom, S., T. Rasmussen, and D. O. Robinson. 2011. *Gulf Cooperation Council Countries (GCC): Enhancing Economic Outcomes in an Uncertain Global Economy.* Washington, DC: International Monetary Fund, Middle East and Central Asia Dept. Available at http://www.imf.org/external/pubs/cat/longres.aspx?sk=25251.

Barry Jaruzelski, B., J. Loehr, and R. Holman. 2011. 'The Global Innovation 1000: Why Culture Is Key'. *strategy+business,* Winter 2011

GEM (Global Entrepreneurial Monitor). 2010. *GEM-MENA Regional Report, 2009.* Cairo: IDRC (International Development Research Centre).

Prasad, A. 2009. 'Trade and the New Economic Geography of the Middle East'. *Economic Note* No. 4. Dubai International Financial Centre (DIFC) Economics Team. Dubai: DIFC. Available at http://www.difc.ae/sites/default/files/Economic20Note20420-20FINAL20April2021_0.pdf.

UN (United Nations), Department of Economic and Social Affairs, Population Division. 2011. *World Population Prospects: The 2010 Revision.* CD-ROM Edition.

Wilson, E. J. III. 2012. 'How to Make a Region Innovative'. *strategy+business,* 28 February (Spring 2012). Available at http://www.strategy-business.com/article/12103?gko=ee74a.

World Economic Forum. 2011. *The Global Competitiveness Report 2011–2012.* Geneva: World Economic Forum.