

RESEARCH ARTICLE

# Critical Factors in Promoting Sustainable Innovation in Bahrain

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**Abstract:** Despite many initiatives to help foster innovation over the last decade, Bahrain has yet to realise its full potential, indicated by low levels of published research, patent registrations, and entrepreneurial activities. The COVID-19 pandemic highlighted the importance of sustainable innovation for economic recovery. This study aimed to identify the critical factors needed to stimulate innovation, as well as any barriers. Using a case study approach, emerging findings from an online survey of participants from a range of private and government organizations were explored through in-depth interviews with selected "innovation influencers". It was found that the economic and cultural environments in Bahrain favor a conservative approach to innovation, with the opening of new market opportunities with existing products the most reported form applied. The need for a sustainable economic recovery post-pandemic has raised awareness of the importance of innovation in all its forms. The environmental factors influencing innovation are charted in an ecosystem model, with effective leadership and a national strategy identified as key components. The Innovation Ecosystem derived from this case study of Bahrain has wider applicability as a benchmarking framework. By mapping the local context against framework elements, identified gaps can usefully inform a sustainable innovation strategy at both a national and organizational level.

**Keywords:** Sustainable innovation, Innovation ecosystem, Bahrain

## 1. Introduction

In the aftermath of the COVID-19 pandemic, with rising inflation fuelled by Russia's invasion of Ukraine, innovation needs to drive business sustainability through economic uncertainty. Lockdowns imposed to contain

infection resulted in the accelerated use of technology, enabling many people to work and learn from home. Containment impacted business, forcing closures, job losses, and massive supply chain disruption.

COVID-19 demonstrated the dangers of high levels

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of dependence on a few global trading partners. Recent events in the Baltic region have underscored these risks, accelerating the push for self-sufficiency<sup>[1]</sup>. Likewise, awareness of the need for greater sustainability is increasing, as evidence linking pandemics, deforestation, climate change, and environmental deterioration is promulgated<sup>[2]</sup>. So as business resumes, a “green” recovery is being advocated<sup>[3]</sup>, increasing productivity and cost savings by using locally sourced products and reducing waste. Sustainable economic recovery requires a global reset in the conduct of business—it necessitates innovation by both governments and private sector companies. Such an approach, where innovation incorporates consideration of the impact on the physical, social, and economic environment is known as sustainable innovation, or “eco-innovation”<sup>[4]</sup>.

For countries such as Bahrain, which lacks natural resources and has a small but growing population, the capacity to innovate is vital for post-COVID economic recovery and future sustainability. This investigation sought to identify the critical factors needed to promote sustainable innovation. These findings were collated to model the innovation ecosystem in Bahrain. This “Innovation Ecosystem” has potential international application as a benchmarking framework that can be used to build innovation capacity.

## 2. Innovation

In the wake of pandemic containment measures came business closures and job losses, with unemployment reaching 55M (8.4%) by April 2020<sup>[5]</sup>. There was a direct correlation between the stringency of lockdown measures and business closures sector-wide<sup>[6]</sup>, with small to medium enterprises (SMEs) harder hit than corporates<sup>[7]</sup>. However, while undermining global economies, the pandemic also brought new opportunities. The profits of pharmaceutical companies sky-rocketed, boosted by the production of vaccines and personal protective equipment. Technological companies expanded, driven by increased demand for digital products and services, especially in banking, entertainment, and retail. Surviving companies demonstrated agility, finding innovative solutions to pandemic challenges. But what is innovation, and how do we build capacity for it?

From a business perspective, innovation is the way an enterprise adds value to its operations, through “a new and a better product or service or a new and a more efficient or less costly way of producing, delivering, or using that product or service”<sup>[8]</sup>. Schumpeter’s seminal conceptualization combined leadership and entrepreneurial<sup>①</sup> perspec-

tives, defining innovation as the commercialization of all new combinations based on the application of new materials or components, the introduction of new processes, the opening of new markets, and/or the introduction of new organizational forms<sup>[9]</sup>. The OECD’s conceptualization incorporates the set of activities designed to foster innovative products or services, defining innovation as: “the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations”<sup>[10]</sup>. More recently, innovation has been differentiated from invention, with invention referring to the creation of a brand-new product or device. In contrast, innovation is “the creation of a new (to the market or the world), viable (creating value for clients, stakeholders, and the organization itself) business offering (ideally going beyond products to platforms, business models and client experience)”<sup>[11]</sup>.

These definitions emphasize the multi-dimensionality of the concept, which has evolved to match the needs of society and the changing means of production. Seeking to capture the inter-relationships between these dimensions has given rise to the notion of the “innovation ecosystem”, defined as “the evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors”<sup>[12]</sup>. These “actors” are the entrepreneurs who “create value by exploiting some form of change”, in their drive to profit by risk and initiative<sup>[13]</sup>.

In summary, innovation in today’s knowledge-based economy takes many forms, from new distribution models and types of business collaborations (such as mergers and acquisitions) to new products and customer experience practices. Indeed, the need for comprehensive engagement in knowledge transfer, such as the sharing of the requirements for adapting ICT innovative practices across nations, was signaled by the United Nations<sup>[14]</sup>, as a key driver in accelerating progress toward Sustainable Development Goals (SDG). Where innovation moves beyond new ideas to incorporate sustainability considerations (environmental, social, financial), it is termed sustainable innovation, or alternatively “eco-innovation”<sup>[4]</sup>. Charter and Clark’s analysis of the notion derived from three years of conference papers showed that “sustainable innovation is not just about new concepts but is about the commercialization of technologies, products, and services and about entrepreneurship”<sup>[4]</sup>.

Emergent thinking focuses on the sustainability of entrepreneurship as a driver of long-term economic success. Schaltegger and Wagner<sup>[15]</sup> characterize “sustainable entrepreneurship” as contributing “to solving societal and envi-

① While intrapreneurship is sometimes used to describe the commercialization of innovation within an existing organization<sup>[39]</sup>, entrepreneurship, which typically refers to new business ventures, will be used as the overarching term in this paper.

ronmental problems through the realization of a successful business.” A balance of financial, social, and ecological dimensions is needed to promote sustainable development using “business model thinking”<sup>[16]</sup>, an approach that facilitates transitioning from a traditional, single-dimension approach toward an integrated, multi-dimensional system<sup>[17]</sup>.

However, a major critique of the innovation literature is that it “has ignored the small businesses, so that its core concepts and basic assumptions should be reviewed in an inclusive approach”<sup>[9]</sup>. This is a particularly important point for Bahrain, where the SME sector is seen as the “life-blood” of innovation<sup>[18]</sup>, forming 98.8 percent of the Kingdom’s businesses, 80 percent of employment opportunities, and more than 60 percent of GDP in 2012. Although lower today, estimated at around 28 percent, the Economic Development Board (EDB) maintains that “SMEs have proven to be a key pillar in the economic diversification strategy, and also play a major role in job creation and have emerged as an increasingly significant contributor to national GDP”<sup>[18]</sup>.

In this age of accelerated change Zeleny highlights the need for innovation to be both continuous and adequate. Innovation holds the key to success, as we “search for the new roads towards reliable entrepreneurship and management”<sup>[19]</sup>. As Price explains, it is in an organization’s best interests “to be socially responsible and innovative because it’s these things that ensure sustainability”<sup>[20]</sup>. For smaller countries such as Bahrain, which lacks natural resources and has a small population, the capacity to innovate is critical not only to global competitiveness but to developing a sustainable economy.

Given the importance and complexity of the notion of sustainable entrepreneurship, is its driving role in economic well-being adequately understood? More importantly, is innovation able to be harnessed and effectively applied in this

way? Many countries have been grappling with these questions, notably Norway<sup>[17]</sup>, Canada<sup>[21]</sup>, and Turkey<sup>[22]</sup>, stressing the importance of mapping the actors and agencies, and having a clear innovation strategy. This investigation aims to address these same questions with respect to Bahrain.

The driving questions for this investigation were:

- I. What are the critical factors needed to stimulate innovation?
- II. What are the barriers stymieing innovation?
- III. What strategies can help build innovation capacity to support sustainable economic growth and development?

### 3. Method

#### 3.1 Research Design

The exploratory nature of this investigation suggested a case study approach, revealing the factors influencing innovation through immersion in one case. To understand complex phenomena, Stake recommends making studies of people and operations at different sites<sup>[23]</sup>, so a range of organizations was canvased to provide cross-sector perspectives on innovation.

The first stage was a documentary analysis to identify what was already known about the Kingdom’s innovation ecosystem. The authors contributed “insider knowledge” about innovation and sustainability as entrepreneurs, and small business owners, which assisted in the development of the research questions.

Pandemic containment imposed methodological limitations because of social-distancing requirements. COVID-19 had accelerated the use of digital technology, so an online survey, followed by in-depth ZOOM interviews was the practical approach adopted. The research design is shown in Figure 1.

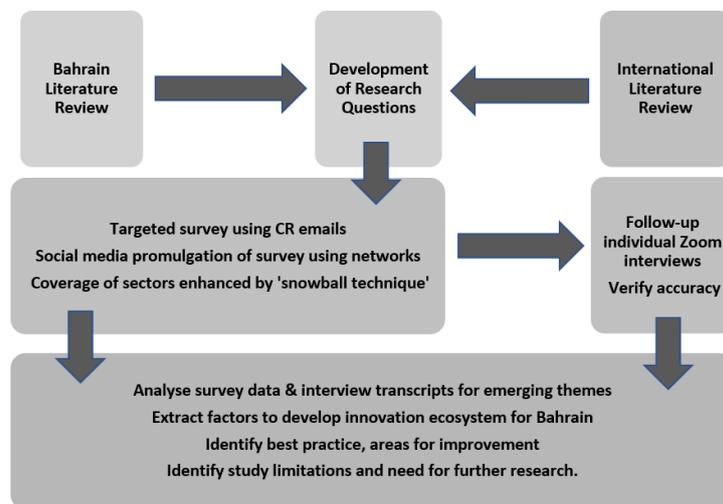


Figure 1. Research design

### 3.2 Timeline

Survey data were collected between 23 October 2020 and 1 February 2021. Bahrain's COVID-19 infection rates peaked during this period, giving rise to stricter containment measures that impacted both the methodology and how people felt about where the country was headed. Interviews to discuss emerging findings were held in mid-2021.

### 3.3 Survey

The survey examined the six main factors identified within innovation literature <sup>[24]</sup> using a mix of closed and open-ended questions. SurveyMonkey, an ICT specialized platform, enabled participants to directly enter data using any internet-enabled device. Survey links were firstly sent by email to CR holders and then, to ensure sector coverage, to targeted business associates via social media.

### 3.4 Semi-structured Zoom Interviews

Interviews were conducted to verify and explore in more depth, the emerging findings from the survey. The ZOOM meeting application was utilized for follow-up interviews because it was free, reliable, interactive, and familiar. A purposeful sample was made, with four "innovation influencers" selected for their entrepreneurship knowledge and experience. A ZOOM guide for the semi-structured interviews ensured coverage of the main issues emerging from the survey. A naturalistic approach was taken, allowing the interviewees to focus on the aspects of innovation that they considered the most important. With permission, interviews were recorded unobtrusively using inbuilt ZOOM functionality and transcribed automatically using Otter.ai. Analysis was done by both the researcher conducting the interview and another author reading the transcripts, with joint discussion to confirm the themes.

### 3.5 Analysis, Reporting, and Confidentiality

Quantitative analysis of survey data yielded percentages of responses by sub-indicators. Qualitative analysis of open-ended survey responses and ZOOM transcripts applied a grounded theory approach, allowing themes to emerge. Following the guidance in Glaser and Strauss' seminal publication <sup>[25]</sup>, field work and case study literature were utilized to identify reoccurring ideas, reading, and rereading transcripts and documents to search for patterns and trends. Given the small number of participants in this study, a manual search was conducted for keywords and phrases to support the identified themes that emerged in the first reading. Three researchers compared their find-

ings from these data to triangulate the findings.

Given the size of Bahrain, steps to preserve confidentiality needed to be well-considered. Therefore, reports do not name participants or organizations and for further protection, slices of narrative from different sources are spliced together to form a narrative-style report.

From the documentary analysis, survey, and interviews, the most important factors that influence innovation in Bahrain were identified and placed within an ecological framework. Derived from the biological sciences, ecosystem diagrams are ways of conceptualizing the complex interconnectedness of relationships, with the first business application attributed to Moore <sup>[26]</sup>.

### 3.6 Generalisability and Reliability

Drawing on the personal experiences of innovators and entrepreneurs from Bahrain enabled rich stories to be developed within this case study. Using an online survey and virtual interviews had the advantage of being able to engage participants within the comfort and security of their own environment, hence improving the trustworthiness of the findings. Whilst the online survey had a disappointing response rate that might lead some to question the reliability of findings, greater confidence is afforded by the follow-up interviews that provided a powerful way to hear people's stories, exchange ideas, and consolidate learning about innovation <sup>[27]</sup>.

Whilst it can be argued that case study lacks representativeness, the typically rich stories enable a deeper understanding of the situation than is provided by other methods. Case studies are contextually situated, so what works best in one country, may not be appropriate in another. It will therefore be up to the reader to take from this case study what seems relevant to apply to their organization.

## 4. Bahrain Case Study

The results of an analysis of documents and the findings from a survey and semi-structured interviews are discussed to provide an overview of the state of innovation in Bahrain.

### 4.1 Context: Results of Documentary Analysis

Analysis of documentation available in the case study site enabled a picture of the context to be developed. Bahrain has prospered since it became a constitutional monarchy in 2002. Bahrain's Gross Domestic Product (GDP) rose from \$US 28.78 B in 2011 to \$US 38.47 B in 2019 on the back of oil-based industries, energy-dependent

manufacturing, and financial services <sup>[28]</sup>. Growth rates slowed in 2019 (1.8% in GDP/capita) due to oil volatility <sup>[29]</sup>. This decline brought into high relief an insufficiently diversified economy and inadequate levels of innovation. Bahrain’s *Economic Vision 2030* recognizes these challenges as the Kingdom seeks to:

- Transform the Bahraini economy by focusing on developing the quality and number of jobs for Bahrainis and improving job-seeker skills.
- Compete in an increasingly global marketplace by encouraging innovation and developing new and growing sectors in the economy.
- Exploit the unprecedented growth opportunities as the GCC continues to develop.

The arrival of COVID-19 exacerbated economic uncertainty, resulting in GDP declining further (4.09% in Q4 of 2020 and 2.11% in Q1 of 2021 <sup>[28]</sup>). The total number of registered entities decreased slightly (0.32% in Q1 of 2020), and business start-ups declined <sup>[30]</sup>. Though seemingly small, these signs of economic decline reinforced the need for this investigation.

The COVID-19 pandemic highlighted the importance of innovation for sustainable economic recovery. Despite many initiatives to help foster innovation, such as *Global Entrepreneurship Week*, Bahrain has not yet realized its full potential. This is indicated by a dearth of scientific research publications, poor university rankings <sup>[31]</sup>, low patent registrations (six in 2019 <sup>[32]</sup>), and the level and scale of entrepreneurial activities. Labor Market Regulatory Authority business start-up registrations indicate an overall downward trend since 2016 <sup>[30]</sup>, despite Tamkeen’s BD700M investment to promote entrepreneurship and support business development <sup>[33]</sup>.

Since 2013, when Bahrain was ranked 67<sup>th</sup> in the Global Innovation Index (GII), its Innovation Profile ranking has declined significantly. By 2020 Bahrain ranked 79<sup>th</sup> out of 131 nations <sup>[34]</sup>, putting it behind the region’s lead-

ing innovators, UAE (34<sup>th</sup>), and neighbor Saudi Arabia (66<sup>th</sup>).

A breakdown of Bahrain’s pillar rankings is shown in Table 2. As a high-income, oil-rich country, Bahrain is expected to score better, but its inputs (particularly institutions and infrastructure) are not well-converted to innovation outputs. There is inadequate monitoring to gauge return on investment, with seven GII areas not meeting minimum coverage at the sub-pillar level <sup>[34]</sup>. Inadequate monitoring is also evidenced in Tamkeen’s reports <sup>[30]</sup>, which focus on metrics such as funds released, without evaluating the impact and outcomes of training and start-up investments. Similarly, since the Higher Education Council (HEC) approved the National Strategy for Higher Education and Scientific Research in 2014 <sup>[35]</sup>, scant attention has been given to how research can support economic development through innovation, apart from identifying the need for collaboration with prestigious international universities, and increased research funding.

Whilst the COVID-19 pandemic highlighted the importance of innovation for sustainable economic recovery, there was little research about innovation in Bahrain. A paucity of recent data about the state of innovation in general, and the factors necessary to promote sustainable innovation, suggested an urgent need for this study. This investigation seeks to fill this gap in the literature, thereby informing Bahrain’s future development of an innovation-led, sustainable economy.

## 4.2 Survey Results

### 4.2.1 Population

The population was well-represented with coverage of most economic sectors (Appendix A) and entities at all stages of the business cycle (Figure 2). In reporting, the number of respondents (N) is 58 unless otherwise specified. Only the main findings are presented.

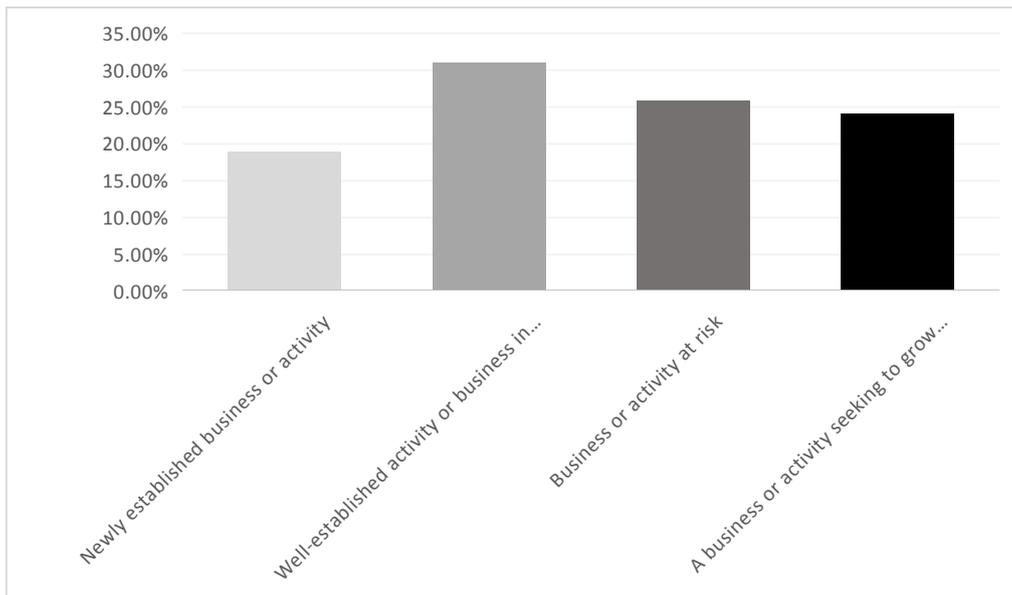
**Table 1.** Seven GII Pillar Ranks for Bahrain 2021

Country	Overall GII rank	Institutions	Human Capital & Research	Infrastructure	Market Sophistication	Business Sophistication	Knowledge Technology Outputs	Creative outputs
Bahrain	79	51	84	43	80	86	86	98

Grey indicates Bahrain belongs to the second to best performers group, corresponding to ranks 33<sup>rd</sup> to 65<sup>th</sup>. Adapted from the Global Innovation Index Database, <sup>[34]</sup>.

**Table 2.** Interview Themes

Innovation in Bahrain	Education & Research	Family	Ecosystem & funding	Organizational infrastructure & skills gaps	COVID-19
<p>Influencer-2: <i>It's about understanding the concept. If you use all available information to come up with a new idea, a new process, new growth, new market segment, this is innovation.</i></p> <p>Influencer-3: <i>There's another issue about the mindset, you know, putting the spotlight on success stories and leading by example, and that we don't have, unfortunately.</i></p> <p>Influencer-4: <i>The platform in Bahrain is not ready for them.</i></p>	<p>Influencer-1: <i>Innovation, it's low, mainly related to education style. They don't push you into thinking outside of the books. Without research, without the educational level we'll be gapping.</i></p>	<p>Influencer 2: <i>If you have a very supportive family, of course, that will contribute positively.</i></p>	<p>Influencer-4: <i>The ecosystem, it's not yet built up properly.</i></p> <p>Influencer-1: <i>Without investment and the proper, mature environment, it's very hard.</i></p>	<p>Influencer-2: <i>To gain value from any innovation form you must have the right infrastructure within the organization.</i></p> <p>Influencer-3: <i>Yes, there's a skills gap, but at the same time, there is potential.</i></p>	<p>Influencer-2: <i>It hit us severely. It fostered innovation adoption, it fostered innovation itself, it forced people out of their comfort zones. So, we can see it as a gift and a curse at the same time.</i></p>



**Figure 2.** Current State of the Business

**4.2.2 Short-term Priorities**

The most important factors in planning for the next two years are shown in Figure 3.

Growth in profitability and market share was the highest-rated, with the diversification of products or services closely followed by expansion into new market segments and improved efficiency. Given COVID's impact on international trade, it was unsurprising that only a few respondents were planning an expansion into offshore export of products or services in the short-term, though

future likelihood was indicated by higher ratings for compliance with local and/or international standards such as environmental. The prioritization of the implementation of new and/or disruptive technologies correlated with the pandemic's acceleration of technological development. Given recent cyberattacks on both private and government organizations, surprisingly few mentioned cybersecurity.

**4.2.3 Longer-term Strategies**

Longer-term strategies were somewhat different, re-

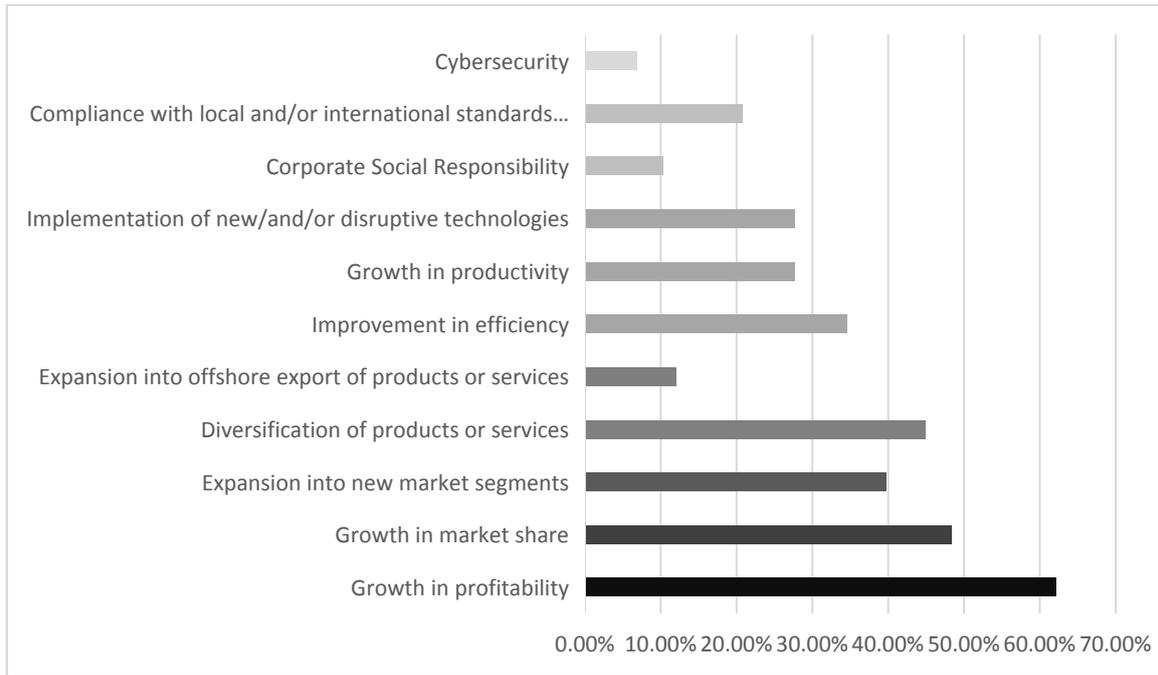


Figure 3. Short Term Priorities

flecting the need for investment in human resources and technology, with a focus on establishing a sound client base and network (Figure 4). Given these priorities, it was surprising that investment into targeted research and development was the lowest rated. However, more than a

third of respondents planned to implement internal strategies to capture creativity and innovation.

While the application of technology was down the list short term, it was top equal with increasing investment as a long-term strategy.

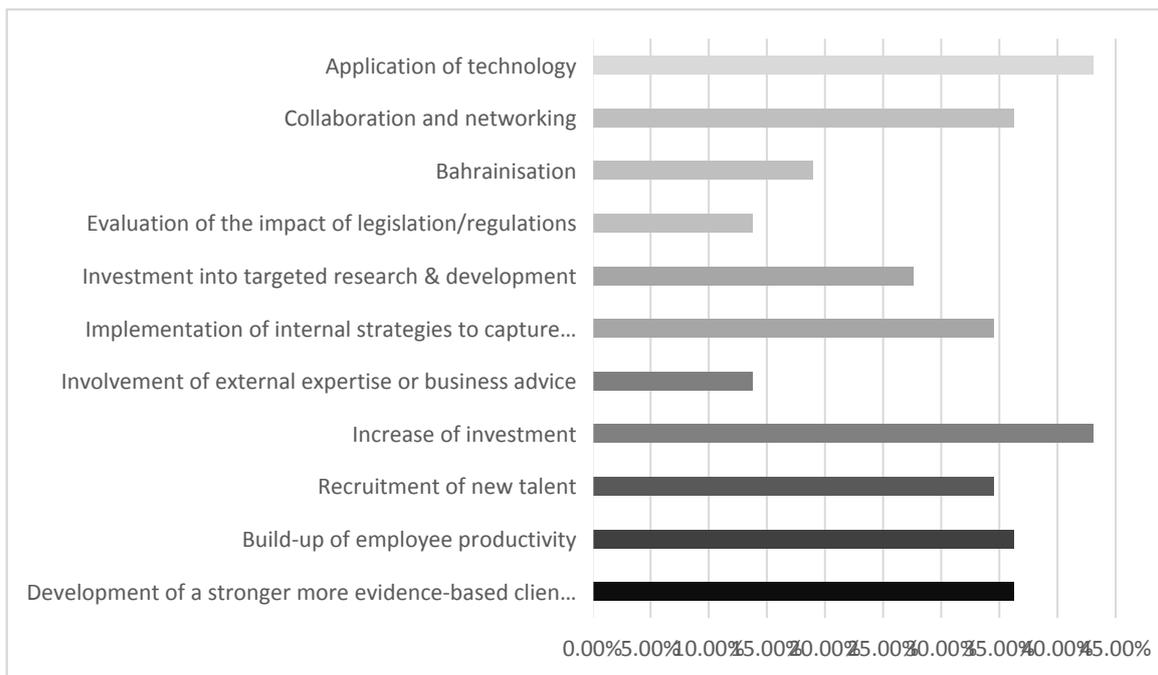


Figure 4. Long Term Strategies

#### 4.2.4 Forms of Innovation Applied

The most common form of innovation adopted by organizations was “Opening new market opportunities with existing products” (Figure 5), followed by “New, more efficient methods of production” such as:

- “More fuel economic equipment”
- “More efficient production machines”

Items relating to the application of technology featured commonly in the comments, (30%), often in the mix with other strategies. Responses such as: “Online services, remote office environment”; “Cloud operations”; “Virtual training”; and “Chatbot” reflected pandemic containment measures. Other innovations were “Holography, depth printing, and introducing innovative media solutions, immersive environments, and interactive systems”.

There was only a little evidence of the need for greater business sustainability (7%), with “Diversifying and incorporating products that are more enviro-friendly and reducing hazardous emissions”; “Zero energy window”, and the “Introduction of new green and efficient technologies in the Kingdom”, reflecting a concern for the environment.

Examples such as “New drinks and food range” were not the standout initiatives typically associated with an active innovation culture. Indeed, 10 percent of the entities canvassed highlighted a lack of innovation (“Right now no innovation activity at all”).

#### 4.2.5 Innovation in the National Context

A majority (60%) of the (N=46) respondents assessed

innovation to be at a “low level” nationally, with Bahrain “Struggling to achieve innovation on the desired scale”. A few (16%) rated innovation as “medium level”, but with a qualifier typically added: “Moderate. Needs to be more aggressive”. When compared regionally and historically, Bahrain was thought by a similarly small number (16%) to be “Doing very well. Country has progressed rapidly since I first worked here in 1997”.

Whilst there were “pockets of innovation”, with evidence of “progress, especially in online business”, generally “adoption is slow”, affected by “many factors—social, economic, and political”:

- “Limited sadly, due to bureaucracy, rigid and out-dated policies, and processes in government and banks”.
- “Far behind in innovation and technology. Has no base for research and development”.
- “Mindset, a poor education system that is not up-to-date and dynamic to meet the huge demand for R&D and generate capable graduates who could reshape the future and fill the advanced gaps in the current society”.

Another important reason given to explain slow innovation adoption was that the concept “still is not understood properly. We need to create an innovation culture in our society and companies”. This was reinforced by the examples given. These were typically from the financial and education sectors, reflecting accelerated technology use during the pandemic:

- “The progress of online selling and purchasing”
- “Accredited online learning”

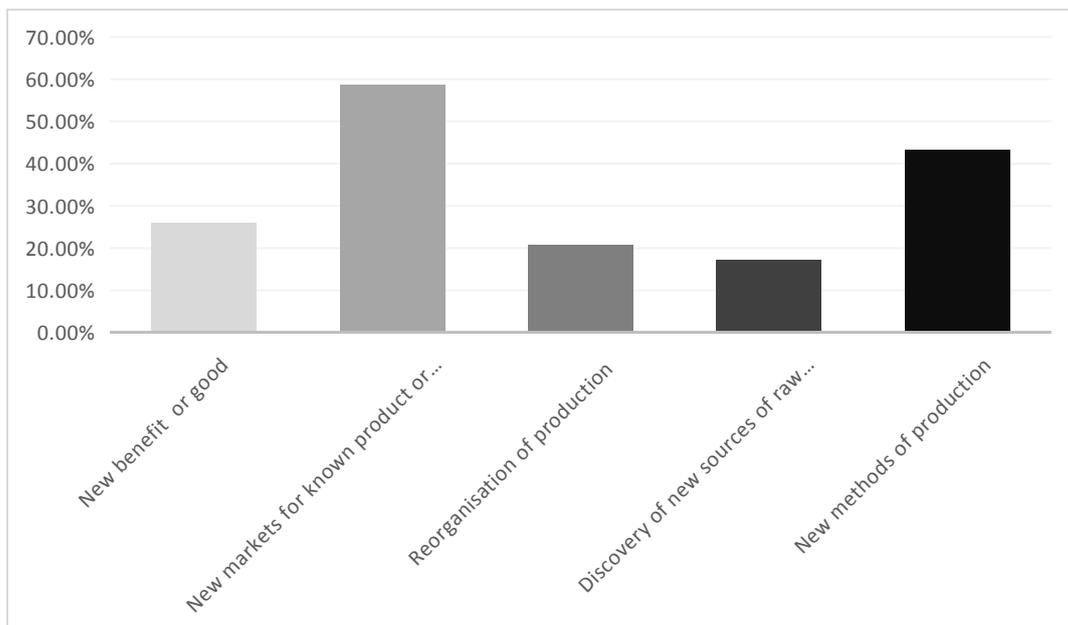


Figure 5. Innovations Applied in Bahrain Enterprises

A few suggested that building national innovation capacity required a focus on human resource development:

- “Greater Bahrainization, getting rid of expensive ex-pats past their used by dates”
- “Training and development for organizations”
- “Focus on young talent”

#### 4.2.6 Developing Enterprise and Innovation Skills

The vital role of leadership in promoting innovation and enterprise skills was highlighted by a third of respondents (33%). A fifth indicated the importance of a “school/education experience that promotes creativity and ideation” (21%) and of a “business environment that supports risk-taking” (19%). The “cultural context” (14%) and “parents/home environment” (7%), were seen as less influential in developing these skills.

#### 4.2.7 Barriers to Innovation in Bahrain

The major barriers to innovation are shown in Figure 6. While the availability of skilled personnel and government policy were the most highly rated, almost a third highlighted “insufficient market information” as stymying innovation, and it was this area that prompted the most comments:

- “Lack of the ‘how, what, and where’ regarding exporting such innovative products and services”.
- “Market size. If we consider Bahrain only, many projects get canceled when thinking of market size”.
- “Lack of successful creative innovation examples”.

The marketing information deficit was linked to con-

cerns regarding the volatility of the trading environment, which resulted in a lack of investor confidence and difficulties in ascertaining demand:

- “Lacklustre government policy is a fundamental challenge for innovation. Investor confidence in Bahrain’s volatile markets and demand uncertainties have made innovation push a risky endeavor.”

#### 4.2.8 Organizational Barriers

A large majority (89%) of participants reported that the barriers to national innovation were like those stymying innovation within organizations. Indeed, “government policy” received the most attention of all the factors (28%). Some recognized policy as “a large facilitating aspect for business” whereas others argued that government policies pose “a barrier to be productive”. It was thought that regulations are stymying new ventures (“so complex to open a business now in Bahrain”). Government agencies lacked responsiveness, resulting in a lack of suitably skilled Bahrainis for a few (9%):

- “Even when the experienced Bahrainis are available the bureaucratic system stops them being employed.”

For others the government policy was seen as creating an environment less attractive to both skilled labor and investors:

- “To innovate I will need to replace some staffing, and possibly bring in additional investors, but currently Bahrain is not attractive, in comparison with Dubai or Saudi.”

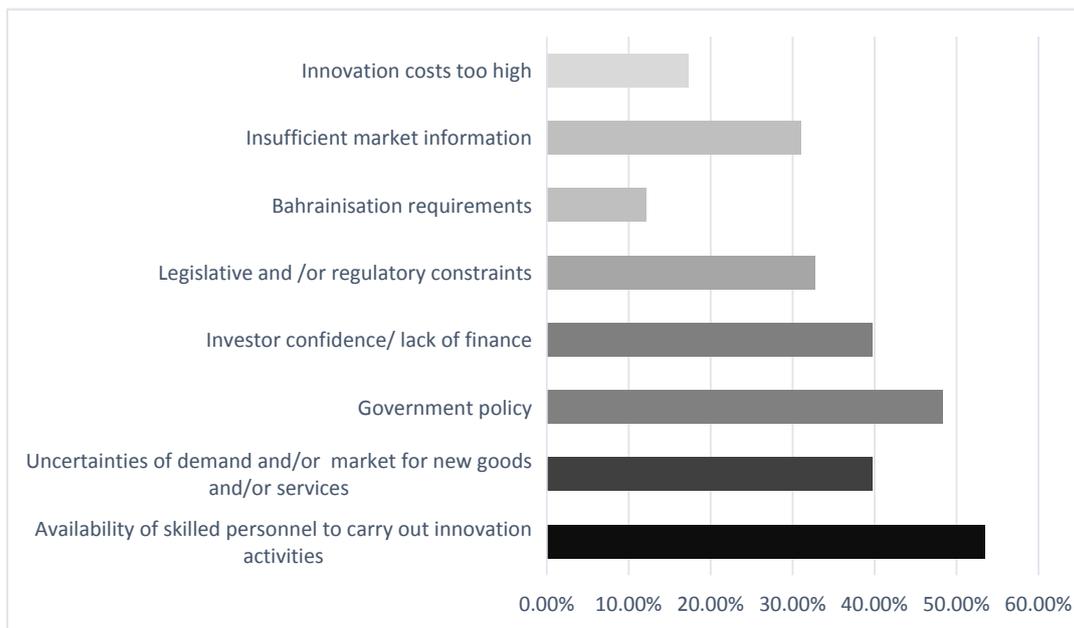


Figure 6. Innovation Barriers

Inadequate legislation covering intellectual property was also an issue:

- “Not enough government protection procedures to protect innovation”.

Where the factors affecting the Kingdom differed from those affecting the organization, it was because:

- “We have created an innovation culture within our business: open policy, access to management, with incentives”.
- “Each sector is bound by different sets of challenges [with] over-regulation of certain sectors or lack of investor confidence in some areas such as technology, AI”.

#### 4.2.9 Impact of COVID-19

The COVID-19 pandemic highlighted the importance of innovation for sustainable economic recovery. Most (95%) entities reported that they were “extremely” impacted by the pandemic, resulting in a “change of market demand and customer behavior causing constraints”, giving rise to “uncertainty and risk of investment”. It was the “fear of the unknown” that was most concerning. Government containment requirements “restricted movement, schools not opening, flights not operating,” “slowing” the economy, and “limiting” development.

The pandemic “affected the growth of most organizations including non-profit ones.” While all sectors were impacted, some were hit harder than others, with hospitality, “tourism, and oil and gas taking a tremendous blow”, and “many SMEs closing operations”.

New organizations, or those seeking to expand, were particularly disadvantaged in the quest for innovation during the pandemic:

- “As a new company, we are struggling”.
- “Customers were not available and new business generation was a challenge.”

There was a domino effect. As businesses struggled to survive there were “fewer work opportunities,” many jobless expatriates left the country, and consequently “real estate is decreased.”

While most respondents focused on the negative side, the more entrepreneurial saw the silver lining and focused on streamlining organizational systems (“It helped me focus on the productive actions.”), and new opportunities (“such as producing masks and other medical products”).

The pandemic “changed public opinion about remote work, forcing companies to deploy technology, streamlining processes from paper-based to digital.”

The overall impact is well-summarised by one respondent:

- “It has either crippled or bankrupted many SMEs, the lifeline of Bahrain’s economy. It exposed fundamental weaknesses in Bahrain’s economic model, being supply chain interruptions, dependence on turbulent oil markets, and lack of strong independent domestic industries capable of meeting basic market needs.”

Most frustratingly, company efforts to overcome containment problems were frustrated by a public sector ill-prepared for the shift to online trading: “government sectors which were not ready for digitalization are delaying development.”

Government policies, local regulations, and lack of preparedness are inherent weaknesses in Bahrain’s innovation ecosystem, a finding that is hugely significant for post-pandemic economic recovery. A clear innovation strategy is an essential component for sustainable growth and development, but here almost half of those surveyed (48.28%) suggested government policy was a barrier to innovation, stymying businesses’ attempts to adapt to rapidly changing conditions.

#### 4.2.10 Post-pandemic Recovery

Ways to stimulate an innovation-based recovery were identified (N=41), with the most favored strategy being to provide “support funds for innovative ideas” (21%).

Suggested steps were:

- Encourage innovation by providing funding through Tamkeen
- Give incentives for best innovative solutions
- Support centres like Flat-6 Lab and accelerator centres.

To free up the capital needed, the “suspension of some government fees” was suggested, with specific mention of “reducing...business set up costs,” “reducing taxes and returning to the previous rate of electricity charges.”

Government policy was again identified (10%) as one of the “barriers and obstacles”. Changes to “public policies that allow young entrepreneurs to fail fast and without personal consequence”, were recommended to “encourage risk-taking.” Some were optimistic (20%), as “Bahrain is innovative”, and “once COVID-pandemic is controlled, the market will come up slowly.” A few (5%) highlighted the leadership role SMEs could provide.

Ideas for an innovation-led economic recovery were (17%):

- having an innovative mindset and challenging yourself and your business model
- restructuring

- *developing new ways of doing things*
- [adopting] *new technologies as an investment.*

It was suggested that “*only through innovative services and industries*” could the economy recover, requiring the “*accommodation of new thinking and courage of supporting out-of-the-box ideas that serve regional customers.*” Bahrain needed to “*undertake transformation towards a knowledge-based economy.*” To make these changes required “*more information and awareness*”, “*getting more experienced Bahrainis involved and start listening to them*”, and “*to be ready with vision and leadership.*” A focus on “*productivity, measuring and improving, involving critical examination of processes and work methods, to eliminate wastes internally*” was advocated, in tandem with training and mentoring: “*adopting the new active generation in a great programme to enhance their skill to enter the market*”.

### 4.3 Findings from the Interviews

Semi-structured interviews with four “Innovation Influencers” provided a process to verify, and better understand, the findings from the survey. Selections (“*italics*”) from the narratives illustrate the key themes emerging, with illustrative evidence for each of these aspects provided in Table 1, with fuller details in Appendix B.

From an analysis of the interview transcripts the main themes identified were concerns about the state of innovation in Bahrain, the role of education and research, and of the family in promoting innovation. The importance of the ecosystem, particularly funding, was highlighted as a necessary prerequisite for innovation to occur. The organizational infrastructure and skills gaps were reported as barriers stymying innovation.

The interviews confirmed that, alongside a balanced ecosystem, a clear grasp of what constituted innovation was a prerequisite for post-pandemic economic recovery. Strong organizational infrastructure and effective management were identified as requirements to scale business at the organizational level, but there was little evidence provided of management strategies to promote innovation either within entities or on a national level. Little awareness of opportunities for a more sustainable, “green” recovery<sup>[2]</sup> was shown by three of the interviewees, but a fourth was very knowledgeable and spoke in-depth about specific energy-related projects.

The importance of leaders providing a clear vision, encouraging effective industry/university collaborations to promote research, and enacting policies to fill skills gaps,

was better understood from the interviews. The influencers’ stories exposed debate about innovation funding and suggested that the role of the family in developing innovation skills was not as significant as the role of education. While this aspect was not well-canvased, the importance of the need for key actors to develop an “*innovation mindset*” was reinforced.

## 5. Discussion

The views expressed by participants reflect a business environment under threat. This research was conducted at a time when Bahrain’s economy was facing a high degree of uncertainty caused by fluctuating oil prices, exacerbated by COVID-19 containment measures. Participants identified four economic impacts:

- I. Business closures in sectors dependant on face-to-face interaction, especially tourism and hospitality, with rising unemployment
- II. Accelerated uptake of technology in education and retail particularly, with increased working from home using virtual meeting applications
- III. Government unpreparedness for digitization and lack of timely support for e-commerce and other initiatives.
- IV. Lost market opportunities as innovators move offshore, unable to commercialize their ideas because of a lack of an effective ecosystem.

Both the survey results and interviews confirmed the catastrophic impact that the COVID-19 pandemic had on business continuity in Bahrain. The experience of resilient businesses highlighted the importance of innovation for sustainable economic recovery. The economic and cultural environment in Bahrain favors a conservative approach to innovation, with most survey participants identifying the opening of new market opportunities with existing products as the top innovation form implemented by their organization. This is because Bahraini typically lack the “*innovation mindset*” needed to develop or to invest in new products or services, or new forms of production. A few standout initiatives related to alternative energy, and more efficient community use of energy, were reported, but little awareness was shown of the opportunities for a “green” recovery post-pandemic as outlined by Coutts<sup>[2]</sup>. Given the push for a more sustainable future, more emphasis needs to be placed on different forms of innovation, especially changes to the business model to enhance productivity, and promote environmental accountability.

## 5.1 Critical Factors to Stimulate Innovation

### 5.1.1 Leadership

This investigation highlighted the importance of leadership in promoting a culture of innovation, both at organization and national levels. The importance of leaders using their success stories as a strategy to promote wider uptake of innovation was stressed by interviewees. Husain<sup>[36]</sup> recommended a similar approach when introducing corporate governance into the banking and finance sector, arguing that role-modeling provided by state-owned enterprises can pave the way for such transformational change.

### 5.1.2 Five Conditions Favoring Innovation

Data gathered from documentary analysis, the survey and interviews suggest that three of the five conditions that Koblerr, Schlotmann, and Grampp<sup>[11]</sup> identify as favoring innovation were evident in Bahrain in 2020:

- I. **Changing Demographics:** Bahrain's growing population is increasing local demand.
- II. **Industry Changes:** Brought about by decreased fuel consumption globally.
- III. **Economic Incongruities:** Logistics constraints posing supply issues and curtailing exports, accelerated by Russia's invasion of Ukraine.

There was some evidence of condition (IV) "New Knowledge", given the accelerated use of technology during COVID-19 containments, with businesses trading online where they could and more people working and learning from home.

There were "pockets of innovation" and the importance of the "innovation mindset" was reported in both the survey and interviews, but insufficiently prevalent to satisfy the fifth condition. The (V) "Changes in Perception" needed to allow the conversion of new ideas and scientific inventions into commercial realities were not widely evidenced, as discussed in the next section.

## 5.2 The Barriers to Innovation

### 5.2.1 Innovation Mindset

What the innovation influencers called the "innovation mindset," was insufficiently diffused across the business community, a problem rooted in Bahrain's education system. Participants suggest the misalignment of human capital with the needs of emerging markets underpins the Kingdom's tardiness in fully transitioning to a knowledge-based economy. Limited industry-university collaborations to support research and development inhibit the

acquisition of the new knowledge needed to stimulate scientific, technological, and social innovations.

### 5.2.2 Funding and an Enabling Innovation Structure

Innovation success depends on proving economic value<sup>[11]</sup> Koblerr, Schlotmann, and Grampp maintain, with long lead times and inadequate funding limiting innovation uptake within Bahrain. Interviews exposed the complexities of the funding debate. Funding for entrepreneurship was available through Tamkeen but monitoring was insufficient to assess return on investment.

It was noted that investment in targeted research and development was the lowest-rated (28%) of respondents' top three long-term priorities, possibly reflecting the predominance of SMEs in the sample population. Despite Bahrain's reliance on the SME sector for a considerable proportion of its GDP, an effective enabling structure to support private sector innovation is absent. This may have contributed to recent declines in the SME sector's GDP contributions. While there are incubators and innovation hubs supporting innovation in some sectors, there were stories of individual innovators leaving Bahrain to access the mentorship and financial support needed to pilot their inventions and commercialize their ideas.

### 5.2.3 Innovation Strategy

Like their GCC counterparts, Bahrain evidenced a reliance on government initiatives to promote innovation, with little private sector involvement reported. Indeed, "Government policy" was both a positive and a negative. Seen as "a large facilitating aspect for business" by some, others claimed over-regulation hindered productivity and frustrated new ventures. A major omission was the lack of a well-communicated innovation strategy to support Bahrain's 2030 Vision.

## 5.3 Bahrain's Innovation Ecosystem

From the documentary analysis, survey, and interviews, the most important factors that influence innovation were identified and placed within an ecological framework (Figure 7). Bahrain's business innovation ecosystem is a dynamic structure of interconnected organizations that depend on each other for mutual survival.

### 5.3.1 Business Innovation Hub and Core Contributors

Central within the "Business Innovation Ecosystem" is the complex of relations between the organization and its immediate "setting" (the microsystem). The core contributors and direct suppliers that business has the power

to control are found here. The key players (actors) in the internal business environment are:

- I. **Suppliers:** Providing raw materials. Containment measures affecting distribution channels highlighted the criticality of suppliers in business start-up and continuity.
- II. **Consumers:** Purchasing goods or services. Consumer behavior changed with lockdown, highlighting the need for market research and effective customer engagement (use of media) to meet new requirements.
- III. **Competitors:** Disrupting the internal business environment, lifting customer expectations, and pressuring operational alignment.
- IV. **Financiers:** Finance is needed to start a new venture and fund expansion, using banks, private investors, or public shares.

### 5.3.2 External Environment

The outer external environment (macrosystem) comprises the uncontrollable factors that influence an organization’s innovation strategies, day-to-day decision-making, and overall performance. These major factors

(outer circle of Figure 7) include the economic context, demographics, social conditions, and technological changes. Linked with conservative Arab culture, establishing trusting relationships is critical in doing business in Bahrain. The historical experience, political philosophy, and cultural values are embedded in education provision, labor market policies, and regulations governing companies, State-owned-enterprises (SOEs), and Public-Private Partnerships (PPP).

### 5.3.3 Mediating Connections

Between the micro and macrosystems is the network of relationships that facilitate innovation. This dynamic zone (mesosystem) incorporates the transport and logistics essential for effective supply chains and the professional, scientific, and technical specialists that identify new markets, develop market share, and facilitate technology transfer. Leaders’ national strategy determines access to infrastructure, funding for incubators/labs to support entrepreneurship, and adequacy of collaborations and partnerships promoting research and development. Given skills shortages amidst rising unemployment, training is vital.

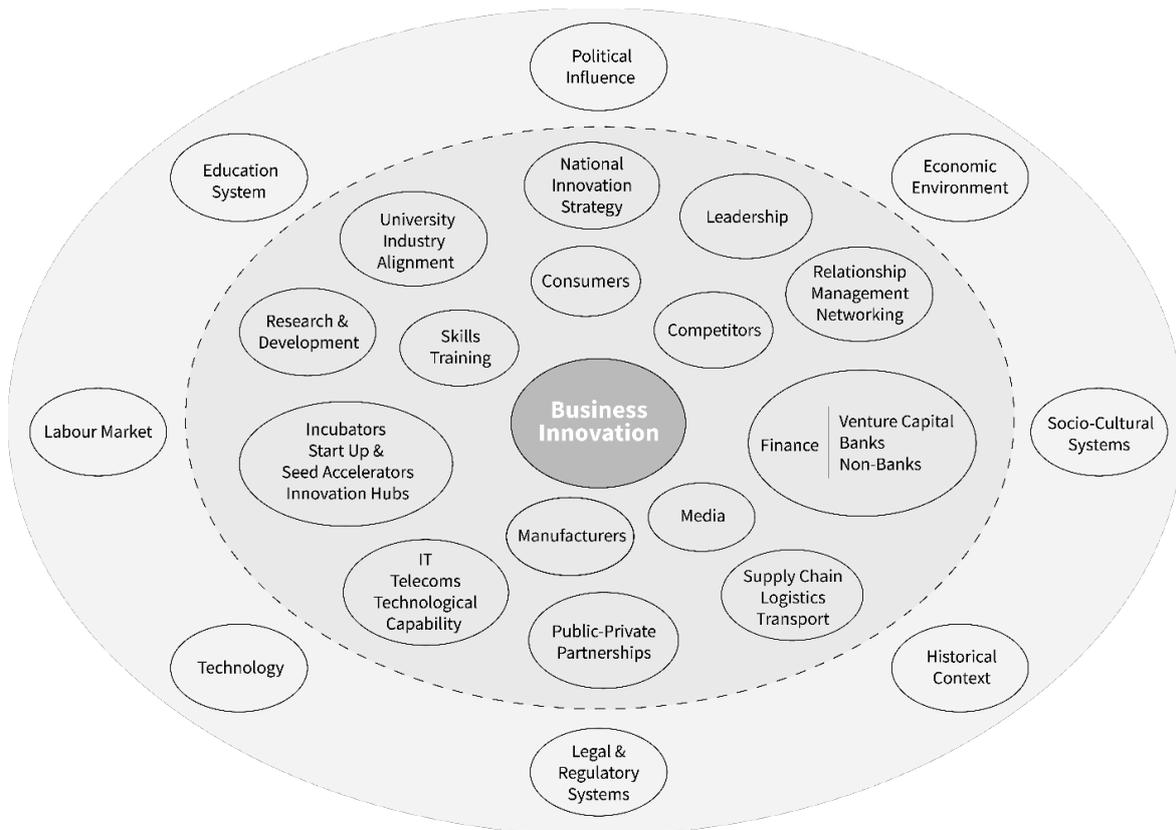


Figure 7. Innovation Ecosystem Model

### 5.3.4 Utility and Limitations of the Ecosystem Model

Ecosystem models show the approximate relationships of influencing factors, but the two-dimensional, static representation cannot capture dynamic interaction outputs. Despite this limitation, the Innovation Ecosystem Model has utility as a framework against which to assess whether the necessary elements for innovation are sufficient and effective. Any identified gaps from this analysis effectively inform innovation strategy.

A typical “Innovation Strategy” includes an innovation mission, supported by a detailed plan and budget to fund the forms of innovation that are priorities for the nation. The Innovation Strategy needs to be well-communicated and supported by policies designed to create an innovation culture across all economic sectors, and at every level. It is the key strategy that effective leaders use to drive innovation capacity and build capability.

### 5.4 Building Innovation Strategies to Support Sustainable Economic Development

This case study found that the pandemic-driven business closures, rising unemployment, and economic declines reported in the international literature also impacted Bahrain. Global over-dependence on trading partners saw a push for sustainability and self-sufficiency that raised awareness of the importance of innovation in all its forms. Two key learnings emerged for others aiming for sustainable economic growth and development. The first is the importance of leadership in the drive for innovation, and the second is the utility of the ecological framework as a benchmarking tool across industry sectors and regional boundaries.

#### 5.4.1 Leadership

This investigation highlighted the importance of leadership in promoting a culture of innovation within the context of ambitious growth and development agendas, both within organizations, nationally, and regionally. Whilst Vision 2030 is still relevant, Bahrain’s national-level leadership has yet to fully appreciate the power of the strategy-innovation interface<sup>[37]</sup>, especially in times of disruption. While the COVID-19 health crisis seems now more controlled, global anxiety is growing daily because Russia is invading Ukraine.

Currently, Bahraini businesses are focused on digitizing processes and structures within the existing business model, but Koblerr, Schlotmann, and Grampp maintain there is a need to re-design instead of reorganizing<sup>[11]</sup>, with shifts in the profit model requiring “a shift in the

leadership’s mental model.” Leaders need to exploit innovation opportunities in a more transformational way by employing multiple types of innovation. To ensure a more sustainable future, leaders need to consider the social and physical context in which they operate, not least of which is how to conduct effective client consultation, engage in cross-sector collaboration to share knowledge and ideas, and promote an internal culture of innovation and environmental responsibility. Leaders need to stimulate the development of the “*innovation mindset*”. How to encourage this transformational change warrants further research.

#### 5.4.2 The Ecosystem as a Benchmarking Framework

Although all the key elements appeared to be in place, Bahrain’s innovation ecosystem was reportedly “*not mature enough*.” Bahrain’s declining ranking in the GII supports the conclusion that the Kingdom’s business ecosystem is not yet adequately geared to promote knowledge-based innovations, so there is a need for further research to explore this aspect further.

The innovation ecosystem model can be used as a benchmark to identify whether the factors and agencies required to stimulate innovation are sufficiently present within each sector’s operating environment at any time. The ecosystem model provides a framework against which to map the existence of key players and factors and to investigate the adequacy of relationships between these. A gap analysis highlights missing elements and weak links within the innovation ecosystem. Used rigorously, it provides a mechanism to stream the continuous innovation needed by both government agencies and private companies as they seek greater sustainability.

### 5.5 Methodological Issues

COVID-19 social-distancing requirements restricted the range of methods utilized, with online surveys resulting in low participation rates that typify this approach. There were 62 participants in this case study (58 survey respondents and 4 interviewees), and some might suggest that these numbers were not high enough to give confidence in the findings. There was a reasonable spread across the sectors, with a slight bias towards education, given the use of author-networks to disseminate the survey link. So, this approach may have unwittingly introduced a bias towards the value of education.

The timing of the survey may also have skewed people’s views about innovation. This research was conducted at a time when Bahrain’s economy was facing a high degree of uncertainty caused by the COVID-19 pandemic

and fluctuating oil prices. Confidentiality protocols were very necessary as there was a high level of fear of identification, particularly fear that any perceived criticism of the government's handling of COVID-19 could lead to job losses or curtailment of career opportunities. That many potential survey participants "clicked through" without answering, suggested that a "fear factor" was operating.

This context needs to be kept in mind when considering the findings about innovation. This study found a limited application of the different forms of innovation, but this may reflect the need to act cautiously in an environment under threat, rather than a lack of awareness of the various types of innovation that can add value to the business. Whilst it could be argued that, given different circumstances, Bahrain's innovation capacity and capability would have been more favorably rendered, the Tamkeen<sup>[30]</sup> and GII<sup>[34]</sup> data suggest not. Given the pandemic's unique circumstances, repeating this research during more settled times is recommended.

One of the barriers to doing business in Bahrain is access to up-to-date information. Collaboration is essential to share ideas in the knowledge economy, both to keep up with the rapid rate of change, but also because innovation often occurs at the edges of traditional disciplines. As many companies have changed personnel or closed since the pandemic, access to current CR data is highlighted as vital to improve response rates if this study is replicated. The 2019 announcement of collaboration between Bahrain's Information and eGovernment Authority to develop an employability skills portal will boost the labor market by creating a database that can be accessed by government entities, business owners, and job seekers<sup>[38]</sup>. Today the Labor Market Regulatory Authority's (LMRA) "Talent Portal" ([www.talentportal.bh](http://www.talentportal.bh)) connects those available for work (both residents and nationals) with prospective employers as a way of countering the effects of COVID-19. LMRA's initiative is a small step towards building an online labor market portal to generate "live data" to facilitate business growth and development. With the number of job losses increasing during the pandemic, and business recovery likely to be impacted by the recent Russian invasion of Ukraine, it is timely that such initiatives are coming to fruition.

Lastly, the linking of character traits to successful innovation is a controversial notion, not least of which is the fact that personality traits, and indeed types of innovations, have been found to change over time. However, given the importance of the "innovation mindset" highlighted in this study, this area warrants further investigation. Of particular interest is how prepared today's graduates feel

to take their place in an innovation-oriented marketplace, how they judge their innovativeness, and what educators can do to improve their competencies in this field.

## 6. Conclusions

The recent pandemic highlighted the importance of sustainable innovation, raising awareness of the need for a wider conceptualization of innovation in all its forms and consideration of the social, physical, and economic impacts of change. Indeed, the OECD had called for a global focus on innovation before the COVID-19 outbreak<sup>[10]</sup> because many countries were facing problems of economic stagnation or decline due to changing demographics. Aging populations, for example, limited the ability of some countries to meet the human resource requirements and levels of investment needed for continued economic growth.

The global health crisis posed by the pandemic has additionally brought many other challenges, such as food security, the supply of potable water, and the effects of climate change (such as floods and forest fires), which also require innovative solutions. But as the Bahrain case study shows, innovation does not just happen. In the model of sustainable innovation advocated for here, novel, and creative solutions arise out of environments and processes that are meticulously designed to facilitate ongoing innovation, while carefully considering any impact on the physical environment and social conditions.

Like its GCC counterparts in the region, past innovation initiatives in Bahrain have been timid and consistent with Arab culture, which favors conservative low-risk investments. Today's trading environment continues to be uncertain. The ongoing ramifications of COVID-19 and oil-price volatility, exacerbated by Russia's invasion of Ukraine, have raised awareness of the need for a sustainable economic recovery.

Bahrain's Vision 2030 is still relevant, with its focus on encouraging innovation and reducing dependence on oil through economic diversification and the addition of new growth sectors. But Bahrain does not yet have a well-communicated "Innovation Strategy" that translates the Vision 2030 goals into clearly prioritized strategies that foster sector alignment and incentivize collaboration to achieve continuous and reliable levels of entrepreneurship.

Accelerated by pandemic constraints, this study shows that interest in the application of technology is ramping up, though the main innovation thrust was opening new markets for existing products, with a focus on increasing business profitability. Given the push for a more sustain-

able future, more emphasis needs to be placed on different forms of innovation, especially to making changes to the business model if Bahrain is to develop greater self-reliance and environmental accountability. Such architectural innovation requires businesses to understand the market in which they plan to work, as the best innovations respond to the changing needs of customers and potential customers. As well, businesses need to consider the social and physical context in which they operate, not least of which is how to manage human resources effectively to build innovation capacity and capability within the organization. Market intelligence and the results of an environmental scan then need to be translated into plans and procedures at the enterprise level. Role-modeling by state-owned enterprises can pave the way for such transformational changes across all sectors.

A sustainable economy, supported by reliable and continuous entrepreneurship, requires government and private sector collaboration to support research and development, and appropriate seeding funding and infrastructure to test and incubate new projects. And based on the age-old premise that you measure what you value, ensuring a more sustainable future necessitates not only a re-evaluation of the way we think about and plan our business but also rigorous monitoring to ensure we do not harm the environment as we seek to be more innovative.

A key factor identified as essential to stimulating innovation is inspiring and dedicated leadership at both organizational and national levels, which necessitates a clear understanding of the many different forms of innovation. An innovation culture that leads to sustainable entrepreneurship requires exposure to the realities of the post-pandemic world and the “new normal” of the future. Leaders at all levels need to take responsibility for monitoring and analyzing trends and considering environmental as well as economic/profitability implications. Leaders need to recognize and convey the urgency and importance of innovation for a more sustainable future.

The innovation ecosystem framework (Figure 7) represents the dynamic inter-relationships between the components that this case study identified as necessary to build and maintain the innovation capacity needed to ensure sustainable entrepreneurship in Bahrain. Bahrain’s Ecosystem Model may have international applicability, as countries search for new roads toward reliable entrepreneurship and management as advocated by Zeleny<sup>[19]</sup>. Used as a benchmarking framework, the innovation ecosystem enables an evaluation of the status of innovation-promoting structures within any organization, sector, or

region to be undertaken, with identified gaps able to inform strategic plans to build innovation capacity. As economic, social, technological, political, and legal contexts differ widely across cultural and geographic divides, it is left to the reader to judge the applicability or otherwise of this benchmarking tool to their own situation.

## 6.1 Recommendations

This study concludes with a recommendation to develop and implement a National Innovation Strategy to support economic and environmental sustainability through continuous innovation.

### 6.1.1 Innovation Strategy

An effective Innovation Strategy comprises a common innovation mission, supported by a detailed plan and budget to create new value. It should include the forms of innovation that are priorities for the nation, accompanied by policies designed to create an innovation culture across all economic sectors, and at every level. An effective plan to implement the innovation strategy needs to focus on broadening the innovation approach, structuring, and resourcing the implementation, and monitoring and incentivizing progress. Involvement of the education sector is key to the development of sufficient local talent with the required competencies. Collaborative research partnerships are essential to generate sufficient and continuous innovation of different forms.

### 6.1.2 Steps at National Level

Steps in formulating such a strategy at National Level might include:

- I. Establishing the gaps in the innovation ecosystem by sector.
- II. Identifying the roles of government and the private sector in bringing about innovation.
- III. Providing a roadmap of the next steps in forging an innovative culture in Bahrain, including an innovation policy and strategic plan with goals and FAST<sup>®</sup> objectives that define responsibilities, timelines, and outcomes.
- IV. Monitoring implementation, progress, and impact and reviewing the innovation plan as needed.
- V. Supporting companies to become more proactive in taking opportunities to diversify through innovation by providing adequate technological infrastructure, legislation that encourages risk-taking,

© FAST — frequently discussed, ambitious, specific, and transparent.

and a wider range of incentives to collaborate internationally and share ideas.

- VI. Targeting investment to encourage innovation across the range of companies, rigorously monitoring impact to ensure goals are realized and targets met. PPP to seed identified innovation projects and free up cadre to allow state-owned-enterprises and private companies to share expertise.
- VII. Reviewing education provision in all cycles, incorporating learning experiences that develop the 21<sup>st</sup>-century skills, particularly the enterprise skills needed to prepare young people to become innovative thinkers, able to add value to their local communities and society, as well as contributing to the economic well being as both intrapreneurs and entrepreneurs.

### 6.1.3 Steps at Enterprise Level

At an enterprise level, it is recommended that leaders:

- I. Identify possible collaborative partners, such as universities or companies that can assist in research and development. This is particularly relevant for SMEs.
- II. Focus on research and development through talent acquisition and development of the 21<sup>st</sup>-century skills, such as enterprise skills, critical thinking, problem-solving, and resilience necessary for sustainable innovation.

### 6.2 Contributions

The COVID-19 pandemic favored agile businesses. The most innovative succeeded, whereas other businesses failed. Mapping out the actors and relationships in an ecosystem model has potential utility for Bahrain in developing the innovation strategy needed to drive an eco-friendly post-pandemic economic recovery. Bahrain seeks to build the continuous entrepreneurship needed for economic sustainability, but this can only be achieved by becoming more environmentally responsible, as well as more innovative.

The Innovation Ecosystem derived from this case study of Bahrain has wider applicability as a benchmarking framework. By mapping the local context against framework elements, identified gaps can usefully inform a sustainable innovation strategy at both a national and organizational level. As other countries also search for new

roads towards reliable entrepreneurship<sup>[19]</sup>, the Innovation Ecosystem Model can be used as a benchmarking tool to map whether the necessary elements for the establishment of adequate and continuous innovation are sufficient and effective. This framework enables an evaluation of the status of innovation-promoting structures to be undertaken. Identified gaps inform planning to build innovation capacity within SOEs and private companies and across industry sectors. At the national level, the Innovation Ecosystem Model has utility for leaders in formulating the strategy critical to direct and align innovation efforts.

However, while the sustainable innovation approach has appeal, supported by numerous reports about the importance of considering the social and physical impacts of change on the environment, there are risks that financial considerations will be given precedence. Continuing economic uncertainty due to COVID-19 and the Ukraine crisis has the potential to undermine any national innovation strategy. And at the company level, the reality is that investment in research and development is unlikely to take priority over payroll demands with rising inflation. Only through a determined leadership driving clear innovation strategies to build an active innovation ecosystem can the long-term benefits of sustainable innovation leading to continuous and reliable entrepreneurship be realized.

### Author Contributions

Conception: Ahmed Al-Ansari; Literature Review: Noor Coutts, Ahmed Al-Ansari, Hasan Almohsen; Methodology: Ahmed Al-Ansari, Noor Coutts; Data Collection: Survey-Dr Noor Coutts, Interviews-Ahmed Al-Ansari, Hasan Almohsen; Analysis & Interpretation: Noor Coutts, Ahmed Al-Ansari, Hasan Almohsen; Supervision & Preparation of the Manuscript: Noor Coutts.

### Conflict of Interest

No conflict of interest was reported by all authors.

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## Appendices

### Appendix A. Survey Respondents' Main Business or Activity

Sector (19 as identified by EDB categorization)	Responses	
	Number	Percentage
Construction	8	13.79%
–		13.79%
Manufacturing (Includes aluminum production & oil production)	8	6.90%
–		10.34%
Wholesale or Retail Trade	4	8.62%
–		3.45%
Information & Communications (Includes Telecommunications)	6	3.45%
–		13.79%
Banking, Finance and Insurance	5	27.59%
–		0.00%
Health Care (human health and social work)	2	1.72%
–		0.00%
Real Estate	8	0.00%
–		1.72%
Education	16	6.90%
–		12.07%
Mining & Quarrying (extraction crude oil)	0	3.45%
–		3.45%
Art, entertainment, sports & recreation	1	6.90%
–		12.07%
Supply of electricity, gas, steam and airconditioning	0	3.45%
–		3.45%
Water supply, sewage, waste-management & remediation activities	0	6.90%
–		12.07%
Transportation and Storage (includes logistics)	2	3.45%
–		3.45%
Agriculture, Animal Production & Fishing	1	6.90%
–		12.07%
Accommodation & Food Service activities	4	3.45%
–		3.45%
Professional, scientific & technical activities (includes legal & accounting; market research & advertising; consultancy)	7	6.90%
–		12.07%
Personal services (includes hairdressing, beauty)	2	3.45%
–		3.45%
Government, local authorities & public sector	2	6.90%
–		12.07%
Charitable or other Non-for-profit activities	4	

Reflecting a bias in the authors' social media networks used to send out survey links, 27 percent of the respondents worked in the education sector. Two main areas (oil and gas; electricity and water) unexpectedly showed as zero. Analysis of participant information indicated some were from these sectors, so this result seemed to reflect unclear instructions on how to code, rather than a lack of sector coverage. Bahrain's major industry, oil and gas refining, is coded under manufacturing.

## Appendix B: Interview Themes

### B.1 Innovation in Bahrain

- "It's about understanding the concept. If you use all available information to come up with a new idea, a new

*process, new growth, new market segment, this is innovation....What could drive innovation? That we have a genuine need to satisfy customers, internally and externally. So, we're talking about niche." (Influencer-2)*

- "There are two things, the resources, human and money, and the maturity of our vision, how clear the vision of the government is, and how advanced they are in implementing that vision." (Influencer-1)
- "We cannot say there is a gap or not without a framework, a standard. Do we have benchmarking in Bahrain innovation? Based on what? What's our KPI for innovation? So, we must define that further; then we can decide [whether] we have a skills gap or not." (Influencer-3)

- “We are like, into innovation from a long time.... banking and being the financial hub, the aluminium sector, the airlines. Bahraini were pioneers in starting these large sectors....but once we come to the SME sector, start-ups, the platform in Bahrain is not ready for them, is not furnished for them to take further steps to grow and to go global.” (Influencer-4)

## B.2 Education and research

- “Innovation, it’s low, mainly related to education style, it’s more of an old-style. Not open-minded. They don’t push you into thinking outside of the books. You just read, then go to the exam. We must invest in research, we have to push universities to do research, we have to push companies to invest in research. Without research, without the educational level we’ll be gapping. But when we have those two, then it will be a good environment which will attract investors. But it starts from education, then country support and pushes for innovation, then trying to bring and attract investors.” (Influencer-1)
- “Innovation is created from the early stages of education, from primary school, from even before that, and through workshops, activities, competitions, exhibitions, all that type of quality engagement. But unfortunately, we don’t have it.” (Influencer-3)
- “I know some Bahraini have done some, you know, innovative technology, especially when it comes to [clean energy], but their reception here in Bahrain was very weak, to be honest. So, they have been traveling overseas and people there will support them, give them more of what they require to confirm technology-wise, and see how it goes. Again, we come back to the ecosystem. [Research] is still in the very beginning stages.” (Influencer-4)

## B.3 Family

- “If you have a very supportive family, of course, that will contribute positively. [Innovators succeed] not because they are super-geniuses, because of other macro factors, such as the right family, which is training and education, or the right timing.” (Influencer 2)

## B.4 The ecosystem and funding

- “We have a sort of monitoring process, accelerators, here. To what extent do funds contribute positively or negatively? I can understand that we need a mechanism to ensure that there is funding to scale operations, but not to pre-seed. At an earlier stage no, go lean, test it, provide your best. Then we can talk about funding. We need to ensure it’s fair and accessible. So, you need an idea. You need people to believe in the idea. You need business models for materialising the idea. You need the ecosystem.”

(Influencer 2)

- “The ecosystem, it’s not yet built up properly.” (Influencer-4)
- “You need people who believe in innovation, invest in innovation, for the personnel to be, let’s say, part of that. Without investment and the proper, mature environment, it’s very hard’.” (Influencer-1)
- “So, there is [funding] but very little. Why? Because number one is mindset, investors don’t want to take risks, or they don’t have that long vision about innovation. What we have here are small traders, rather than entrepreneurs. They don’t care about innovation or innovative solutions.” (Influencer-3)

## B.5 Organizational infrastructure and skills gaps

- “To gain value from any innovation form you must have the right infrastructure within the organization. To have a scalable business, you need to have a well-sorted process. We are talking about adopting good managerial skills.” (Influencer-2)
- “Yes, there’s a skills gap, but at the same time, there is potential. There are very smart people here in Bahrain. There’s another issue about the mindset, you know, putting the spotlight on success stories and leading by example, and that we don’t have, unfortunately.” (Influencer-3)
- “Okay, we don’t have the expertise yet. But we have many innovators who are trying to do this...Some of them, they get picked up by international companies, and they go overseas because the platform is not ready for them here in Bahrain.” (Influencer-4)

## B.6 COVID-19

- “We are behind when it comes to digitizing our businesses a little bit, but with the pandemic, it’s kind of pushed us hard to speed up the development, even how companies do their business....it’s more efficient and what the customer wants.” (Influencer-1)
- “COVID, I think is the biggest nightmare in our maybe last 40 years....it hit us severely. It fostered innovation adoption, it fostered innovation itself, it forced people out of their comfort zones. So, we can see it as a gift and a curse at the same time.” (Influencer-2)
- “Initiatives that can be used as the nation’s recovery program will be educational, financial support, and regulations.... Leaders have to take that flag and say, yes, we have to go in this direction, leading Bahrain towards an innovation era, so that everybody is involved.” (Influencer-3)
- “People now are more familiar with technologies that were available before....really innovative ways of selling and dealing or engaging. On the other side, it was a big, big challenge for businesses to carry on. People who diversified, they could survive. (Influencer-4)