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Accelerating Saudi Arabia's biotechnology sector

**Four enablers to
support a Saudi
biotech hub**



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About the authors

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The global biotechnology industry continues to grow rapidly, touching areas as varied as human health, agriculture, resource recovery, and recycling. As it shapes the next era of human development, biotechnology will drive substantial economic growth around the globe, especially in those countries with the talent, resources, and infrastructure to support it.

Saudi Arabia is well positioned to become a globally competitive biotechnology hub. Over the next decade, Saudi Arabia has the potential to become a leading biotechnology hub that will generate significant economic opportunity.

Solid investments and a streamlined regulatory framework have already laid the foundation; it is time to take targeted initiatives to support the next level of development. Saudi government ministries and private industry can now use four enablers to gain momentum and elevate Saudi Arabia on the global biotechnology stage. These are to:

- invest more public and private funding in commercialization
- expand human capital and the talent pipeline
- develop state-of-the-art infrastructure
- create a strong framework of regulation and incentives

THE GROWING POTENTIAL FOR A SAUDI BIOTECHNOLOGY HUB

Biotechnology has risen to the top of national agendas in the post-pandemic era. PwC forecasts that mergers and acquisitions in the U.S. pharmaceuticals and life sciences sector alone could reach US\$225 billion to US\$275 billion in 2023.¹

Biotechnology harnesses cellular and biological processes to develop products and technologies used in our everyday lives. The sector has grown globally over the past couple of decades owing to its potential to transform human health and its wide applicability across sectors, including health, agriculture, and chemicals. The green agenda has also brought to the fore applications such as resource recovery, recycling, and hazardous waste disposal.

These applications will shape the next era of human development, having an impact as significant as that of the computer revolution.

Despite the global growth and potential of this field, the Middle East still lacks a world-class self-sustaining biotech innovation hub. As a key player in the Middle East and the Organization of Islamic Cooperation, Saudi Arabia is well positioned to develop an industry-leading and globally competitive biotech ecosystem. Several growing biotech communities, including Riyadh, the western coast near the King Abdullah University of Science and Technology (KAUST), and the futuristic city of NEOM, already demonstrate potential for growth as hubs.

There have been initial investments and efforts to coalesce the disparate efforts in Saudi Arabia's biotech sector. For example, flagship institutions, such as KAUST, King Faisal Specialist Hospital & Research Centre (KFSH&RC), King Abdullah International Medical Research Center (KAIMRC), King Saud University (KSU), and King Abdulaziz City for Science and Technology (KACST), have already made extensive investments in infrastructure. These institutions have acquired state-of-the-art labs and launched innovation initiatives, such as the Saudi Human Genome Program and the Ministry of Investment's work with the Ministry of Health and large pharmaceutical companies to conduct clinical trials in the country. These initiatives are designed to engage the private sector, support clinician-researchers, and encourage the commercialization of potential technologies.

An initiative called the National Biotechnology Strategy has also helped streamline Saudi Arabia's regulatory framework for trials, testing, and bioethics. Additionally, the National Committee for Bioethics continues to update its bioethics guidelines,² and the Saudi Food and Drug Authority recently supported Phase I clinical trials,³ offering a pathway for biosimilar approvals. Biotech-focused venture programs are also gaining traction. For example, biotechnology and healthcare investment company Dammam Valley launched its biotech startup program in 2022 in partnership with Imam Abdul Rahman bin Faisal University, Saudi Aramco, Future Investment Initiative Institute, Sadara Petrochemical Company, and the Ministry of Investment and Ministry of Industry.

FOUR ENABLERS TO DRIVE BIOTECH DEVELOPMENT IN SAUDI ARABIA

Although these efforts lay the foundation for a biotech hub, several enablers will lead Saudi Arabia to drive further momentum in its development. We detail four major enablers below.

Invest more public and private funding in commercialization

Innovation in biotechnology requires significant patient capital. Such patient capital is especially important in the medical subsector, in which potential products must go through rigorous safety and efficacy clinical trials that can take as long as seven years.

Saudi Arabia has dedicated substantial funding for academic research and development (R&D). The country's total R&D expenditure in 2021 was SAR 14.5 billion (\$3.9 billion).⁴ KFSH&RC is funding biotech-related R&D, while KACST has supported multiple projects since 2008, with much of its effort going into life sciences.

However, many of these funds invest mainly in basic research, which limits investment in training and eventual commercialization of marketable products. The reasons are primarily a lack of an intellectual property (IP)-related entrepreneurship culture and a weak investor appetite for such ventures. Additionally, investments in biotechnology often take longer to realize returns, have a limited ability to become viable scientifically, and carry a substantial risk of failure. As a result, the region's private sector has focused mostly on the secondary manufacturing of generic pharmaceutical products rather than producing new biotech solutions.

Saudi Arabia now needs more private venture funding to help a vibrant biotech ecosystem take hold. Regional private investors, including investment funds, family offices, and banks, need further education on biotech investments' characteristics and risk profile, and how such investments can realize Saudi Arabia's ambitious Saudi Vision 2030. Investors also need a network of scientific advisors or global venture capital partnerships to support investors and assess the scientific basis of biotech innovation.

The current environment offers immense opportunities for Saudi Arabia to participate on a global scale given current valuations and the shortage of liquidity among high-potential biotech startups. In recent years, the Ministry of Investment of Saudi Arabia has been increasing efforts to engage with international biotech investors, offer them guidance and support, and facilitate their introductions to key players in the local ecosystem.⁵

Expand human capital and the talent pipeline

The biotech sector also requires highly skilled and knowledgeable talent, given its demanding innovative and technical requirements. Nearly half (47 percent) of entry-level jobs in the field require advanced degrees, compared with 27 percent in other industries.⁶ Although Saudi Arabia educates many healthcare professionals every year,⁷ there is a limited focus on the skill sets required to sustain a substantial biotech hub. These skills are necessary for such essential roles as physician–entrepreneurs, clinical researchers, trial administrators, IP specialists, and people with doctorates in bioengineering and related fields. Furthermore, career trajectories remain academically focused, particularly in public-sector institutes, which reward researchers for basic research output (such as publications and patent filings) rather than commercially viable or translational research.

To grow and maintain a robust talent pipeline, Saudi Arabia must attract a cadre of foreign talent. This requires developing a targeted set of incentives to attract founders, scientists, and researchers while improving the overall quality of life for individuals and their families. Recruiting this tier of innovators will create domestically recruited teams that can learn from the imported talent. Eventually, this approach should give rise to a generation of Saudi biotech founders.

To supply this eventual need, Saudi Arabia needs to channel significant investments into promoting world-class education, particularly in science, technology, engineering, and math (STEM). Both public and private universities will need to adapt their curricula and develop a wide range of international and industry partnerships to strengthen their core biotechnology offerings at the undergraduate, postgraduate, and continuing education levels. Shorter programs can also help the region quickly retrain workers and STEM graduates to meet the needs of biotech companies.

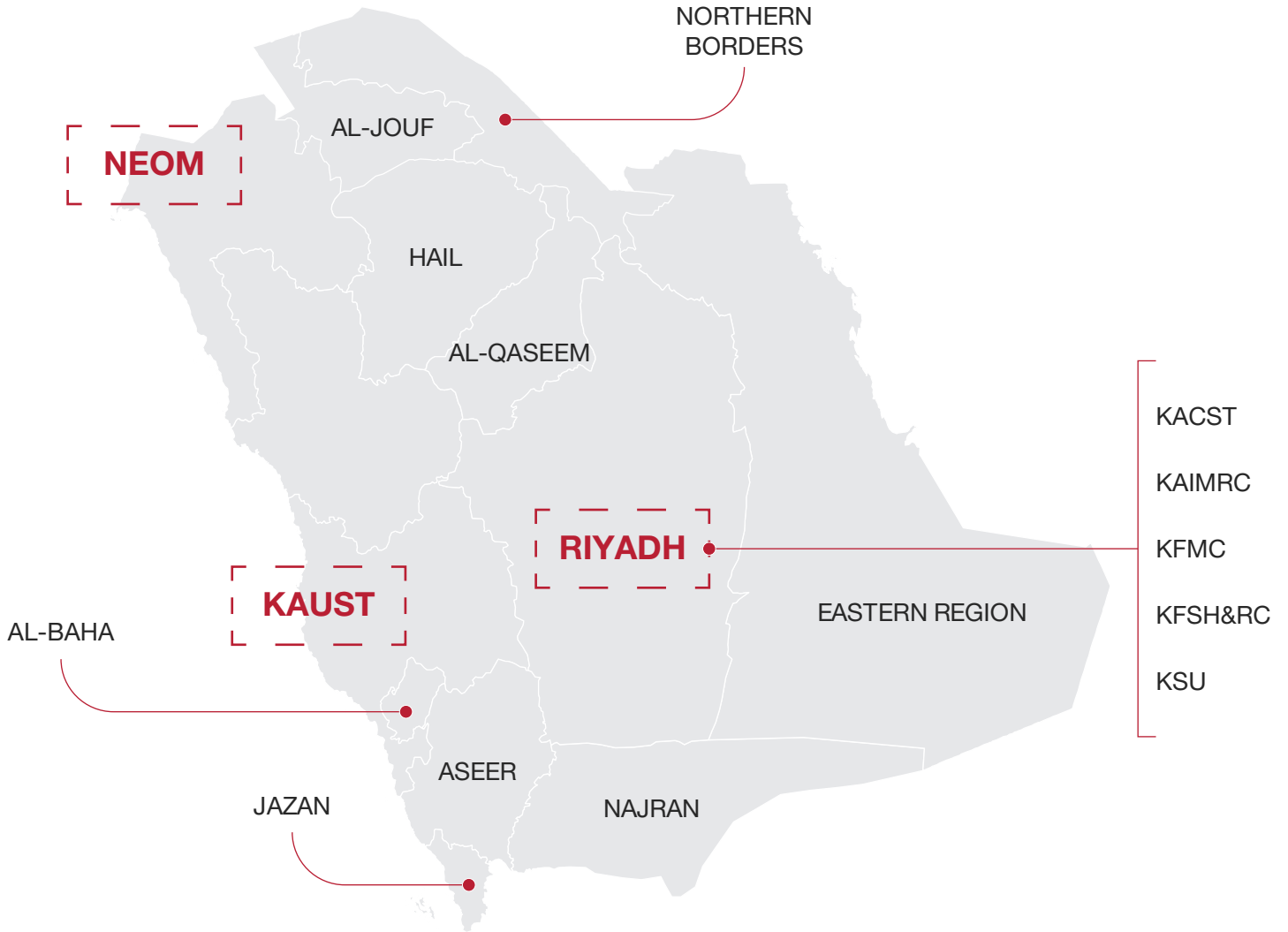
Develop state-of-the-art infrastructure

Saudi Arabia has made significant investments in developing infrastructure, including core labs and facilities. However, to sustain growth, the sector now needs an enhanced digital infrastructure, including internal networks, cloud computing, cybersecurity, advanced AI, analytics, and robotics.

Infrastructure investments have so far gone to leading institutes in Saudi Arabia, including KAUST, KSU, KAIMRC, and KFSH&RC. However, each has its own governance structure. Although these governance structures can foster prioritization and decentralized decision-making, they can also limit collaboration and result in relatively lower utilization of core and specialized equipment. Centralized bodies, such as the Research, Development and Innovation Authority; the Saudi National Institute of Health; and a future hub in Riyadh, can form a collaborative network across these assets that take full advantage of their infrastructure. (see *Exhibit 1, page 5*).

EXHIBIT 1

Main existing and planned biotech infrastructure centers in Saudi Arabia by province



Note: KAUST = King Abdullah University of Science and Technology, KACST = King Abdulaziz City for Science and Technology, KAIMRC = King Abdullah International Medical Research Center, KFMC = King Fahad Medical City, KFSH&RC = King Faisal Specialist Hospital & Research Centre, KSU = King Saud University.
Source: Strategy&

Create a strong framework of regulation and incentives

A business-oriented regulatory and legal environment can be the main driver for growth in the biotech sector. Given that the ecosystem is still developing in the region, regulatory bodies must be proactive in understanding the sector's needs. Regulations should support innovation; protect patients, investors, and IP; and provide recourse for disputes.

Countries around the world are adopting new regulatory approaches to ensure streamlined processes that limit bureaucracy and change laws that are not fit for purpose. For instance, a shift from “regulate and forget” to “use responsive, iterative, and adaptive regulations” has succeeded in keeping pace with changes in biotech. Given the nature of biotech projects, global peers are moving from a one-size-fits-all approach to a data-driven approach using regulatory sandboxes and accelerators to support invention. Ultimately, international, national, and regional alignment needs to be reached on biotech regulations, processes, and frameworks to engage a wider set of players in the ecosystem and ensure test results are transferable and shareable.

In addition, Saudi Arabia needs a set of incentives on par with those of other global biotechnology hubs. Various ministries and authorities are working together to develop a variety of packages, including incentives such as expedited import permits, single-window business establishment procedures, streamlined hiring, and tax privileges. Many of these are still under development. However, there is a realization that given global competition for talent, Saudi Arabia needs to attract best-in-class international talent and companies to locate some of their operations in the country. One option would be to set up special economic zones, similar to the framework at KAUST, with specified exemptions for companies operating within the zone.

CONCLUSION

With its myriad applications and potential to help solve some of society's most pressing problems, biotech offers countries access to high-value innovations that will benefit society and propel economic growth.

A productive biotech ecosystem can contribute to significant economic diversification in Saudi Arabia and support the ambitions of Saudi Vision 2030. It is also an essential missing piece in tackling Saudi Arabia's issues in healthcare, food security, and other strategic interests. As a G20 economy, Saudi Arabia must undergo rapid biotech transformation in the coming years. These initiatives and enablers can help the country accelerate the pace of innovation and reap exponential benefits to solidify its status as a beacon for the region and the world.

ENDNOTES

1. PwC, “Pharmaceutical & Life Sciences: US Deals 2023 Outlook” (<https://www.pwc.com/us/en/industries/health-industries/library/pharma-life-sciences-deals-outlook.html>).
2. Research Compliance, King Abdullah University of Science and Technology (<https://researchcompliance.kaust.edu.sa/ibec/guidelines.html>).
3. King Abdullah International Medical Research Center kicked off the first Phase I clinical trial in Saudi Arabia in 2019, testing a potential vaccine against the Middle East respiratory syndrome coronavirus (MERS-CoV).
4. Kingdom of Saudi Arabia, General Authority for Statistics, “Research and Development Statistics survey 2021” (<https://tinyurl.com/3r37pt79>).
5. “Investment ministry signs 2 deals to enhance biotechnology, pharmaceutical sector in Saudi Arabia,” Arab News, January 27, 2023 (<https://arab.news/vszhw>).
6. CSBI and TEconomy Partners, “2021 Life Sciences Workforce Trends Report: Taking Stock of Industry Talent Dynamics Following a Disruptive Year,” 2021 (<https://www.thbi.com/2021-workforce-trends.pdf>).
7. Khalid Alnowibet et al., “Healthcare Human Resources: Trends and Demand in Saudi Arabia,” *Healthcare*, 2021 (doi:10.3390/healthcare9080955).

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