UK Science & Innovation Network Country Snapshot:
Kingdom of Saudi Arabia

Science and Innovation Landscape in the Kingdom of Saudi Arabia (KSA)
(Global R&D and innovation rankings from GII 2017)

The Kingdom of Saudi Arabia (KSA) is the largest economy in the Arab world accounting for 25% of the Arab world’s Gross Domestic Product (GDP). More than 65% of the total KSA population (32.28 m) is under 30 years of age, with a per capita GDP of £54,000 which places it eighth in the world.

Saudi Arabia remains the world’s largest oil producer and has recently chosen to direct a good share of its revenue to improving education and scientific research. As part of the Vision 2030 under the patronage of H.E. King Salman bin Abdulaziz Al Saud, efforts are under-way to shift the country towards a knowledge-based economy, reducing the Kingdom’s reliance on fossil fuels. The authorities have recognised that scientific research in universities and national institutes contributes to the enhancement of social development, economic development and private sector partnerships.

These improvements are driven by a comprehensive national science strategy (The National Science, Technology, and Innovation Policy, NSTIP) to be implemented until 2030. This includes multiple strategic programs in efforts to increase the current GDP spend of 0.8% (2017) on research projects to 2% of GDP by 2030 along with vast investment into high-tech universities and cutting-edge laboratories, making Saudi Arabia the Arab region’s most prolific nation in scientific research output. Chemistry is the main driver of Saudi Arabia’s science boom, with chemistry-related papers making up two-thirds of the kingdom’s research output.

In recognition of the importance of strengthening the R&D ecosystem in Saudi Arabia by supporting universities and collaborating with different stakeholders, a total budget of SAR 6 billion has been allocated to this important program under the Ministry of Education. The government’s science priorities in line with Vision 2030 are: Petrochemicals (polymers & catalysts), Life Sciences & Health (biogenomics & nanobiology), Information Technology (machine learning & cyber security), Energy (renewables & storage, oil & gas), Water (Red sea, desalination, wastewater reuse) and Environment (pollution management, climate change, crowd management).

Significant progress in recent years can be tracked by some very clear insights below:

- In 2015, KSA issued 763 patents, and published more than 4700 citable publications. (KACST)
- King Abdulaziz City for Science and Technology (KACST) implemented NSTIP, which funded an impressive portfolio of over 1852 science and technology projects, awarded over 3.2 billion SAR to science projects (22.9% of the total funding went to medical research programs, and

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8.4% was used for research in environmental technologies).

- King Abdullah University of Science and Technology (KAUST) has a $20 billion endowment, allowing industry partnerships, high rates of patent licensing and product commercialization through its 10 research centres.
- In January 2018, KFUPM attained 7th place worldwide at the US patent office after filing 183 patents in 2017, surpassing prestigious institutions.
- In 2016, King Abdulaziz University (KAU) published 157 articles in international journals.
- In 2018, KAU secured the first position in the rankings for the top-10 MENA research universities by Times Higher Education.
- King Saud University (KSU) has established 10 centers and 4 institutes that are supporting research programmes, Nobel Laureates Programme, and a distinguished scientific fellowship programme.

Saudi Arabia’s current scientific research ecosystem involves a broad mix of stakeholders, ranging from:
- **Scientific government institutions:** King Abdulaziz City for Science & technology (KACST), supports and enhances applied scientific research programmes. KACST is the government’s regulatory arm in implementing the NSTIP.
- **Universities:** Five research universities are currently at the vanguard of Saudi Arabia’s growing research landscape; King Abdulaziz University, King Saud University, Umm Al Qura University, King Fahd University of Petroleum & Minerals, and in the lead is King Abdullah University of Science and Technology (KAUST).
  The universities have their established research centers that serve various disciplines (e.g. engineering, medical, environmental, etc.). Universities offer endowment funds with specific conditions for specialised subjects.
- **Private sector:** Large national corporations are engaging in partnerships with leading international universities and research institutes to produce cutting-edge scientific solutions. (e.g., Saudi Aramco, SABIC, and TAQNIA).
- **Independent research and development centers:** These centers serve specific industrial requirements (e.g. King Abdullah Petroleum Studies and Research Centre, KAPSARC).

### UK Science and Innovation in KSA

The UK is well positioned in KSA and seen as a preferred partner of choice for knowledge-transfer based joint ventures, after the US.

In July 2008, King Saud University (KSU) signed a research agreement with the United Kingdom (UK)’s University of Leeds, under which both partners jointly organise staff exchanges and joint research and PhD projects in the areas of nanoscience, technology and engineering.

The Imperial College London/KAUST Partnership in material science and chemical engineering supports the development of human resources and collaborative research.

KACST holds partnerships with Oxford University (The Oxford Petrochemical Research Centre, KOPRC) and Cambridge University (The Joint Research Centre for Advanced Materials and Manufacturing, CAMM).

King’s College London signed a Memorandum of Intent (MOI) with King Saud University in May 2015. Under the agreement, students from KSU have the opportunity to travel to King’s College to undertake
postgraduate studies, and King’s College supports the development of these students as teaching assistants and graduate teaching assistants.

The ‘Water & Energy’ Science Collaboration Symposium was held successfully at King Saud University in Riyadh in March 2016. The symposium brought together 14 UK researchers and 29 participants from KSA, serving as a platform for UK and Saudi researchers to develop joint research proposals.

The Science and Innovation Network (SIN) has supported the University of Leeds which is delivering a hosted MSc programme for the Exploration Department in Aramco.

SIN has supported the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) and made relevant introductions to aquaculture research institutes as well as regulatory authorities for Marine Sciences. As a result, CEFAS is working on technical cooperation agreements with the Gulf Cooperation Council – Secretariat General, the Ministry of Environment, Water, and Agriculture, and KAUST.

SIN is working closely with the Embassy to explore opportunities for collaboration across the full breadth of the ‘NEOM’ project, which was announced by the Crown prince during the Future Investment Summit held in October 2017. The $500 billion (£352 billion approx.) ‘Smart City’ will be entirely led by artificial intelligence. NEOM is a 26,500 sq mi transnational (KSA, Jordan, Egypt) economic zone on the north-western Red Sea Coast. The city is being designed on a futuristic model and will be serviced by humanoids, passenger drones, and equipped with fully automated onsite agri-tech, bio-tech, manufacturing and healthcare clusters. There is significant potential to pitch research, innovation, and commercial entities in the artificial intelligence, biotech, advanced manufacturing, and renewables space for the NEOM project.

SIN is working very closely with the recently established RDO (Research & Development Office) under the Ministry of Education (MOE). RDO developed the R&D program to directly fund research via public universities. SIN worked with the RDO to facilitate an inward UK visit during the summer of 2018 by key stakeholders, to learn more about the knowledge/technology-transfer model of the UK.

UK-Saudi strategic MoU on Clean Energy: During the recent visit of Saudi Crown Prince H.E. Mohammed Bin Salman to the UK, a bilateral MoU was signed on ‘Clean Energy’ which creates a framework for cooperation between the UK and KSA to facilitate their sharing of technical knowledge, advice, skills and expertise in the field of clean energy. Engagement will occur in areas including, but not limited to: energy efficiency, market reforms, smart grids, carbon capture and storage, and science, innovation & knowledge transfer.

UK-Saudi strategic MoU on Education: During that same visit, the UK and Saudi Arabia signed a bilateral MoU on ‘Education’, which creates a framework for cooperation in the fields of education and scientific research. The MoU aims to build and support cooperation to improve the level of education in KSA. Participants will hold a high-level annual UK-KSA Education Dialogue with senior representatives from both the UK and KSA. Other areas of cooperation include, but are not limited to: establishing private sector partnerships, promoting direct relationships between education and scientific institutions, and conduct research into education system reform in KSA.

SIN in KSA - recent success stories / forward look

In 2017, SIN-Gulf organised a series of regional Collaboration Science Symposia, in cooperation with BEIS and the British Council. The topics included: Clean and Renewable Energy in the UAE; Innovation in Muscat, Oman; Genomics and Precision Medicine, King Saud University, Riyadh; and Smart Cities, organised in partnership with the Masdar Institute in Abu Dhabi. Each event was attended by researchers from the UK and all six Gulf countries.
In November, SIN then organised a symposium on Cyber Security in Manchester, attended by 25 participants from the Gulf countries and 35 from the UK.

In March 2018, SIN, with BEIS and the British Council, again organised two regional events: a Symposium on Agritech, Aquaculture and Food Safety, that took place in Muscat, Oman, and a Symposium on Waste Water Management-Treatment and Reuse, which was held in Kuwait.

Institutional Links
The UK-Gulf Institutional Links programme was launched in 2016 to promote collaborative research partnerships between the UK and Gulf research institutions. It funded eight collaborative 2-year long projects for up to £400,000 each, to a total of £2.4 million, two of which were awarded to projects in collaboration between Kings Saud University and Loughborough University, and between King Abdullah University for Science & Technology and the University of Kent.

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