



Welcoming international researchers, Saudi Arabia has forged worldwide collaborations that helped rapidly boost the country's science output.

SHARED KNOWLEDGE IS KEY TO A KINGDOM

International collaboration is yielding major breakthroughs and an increase in quality output.

BY NADIA EL-AWADY

Institutions in Saudi Arabia are casting their nets far in search of collaborative research partners. In 2015 scientists affiliated with Saudi institutions co-authored papers with counterparts from 89 countries in journals included in the Nature Index.

The bulk of these collaborations are with global research powerhouses, rather than with close regional neighbours. The three countries with which Saudi Arabia collaborated most between 2012 and 2015 are the United States, China and — after overtaking Germany in 2015 — the United Kingdom. In the index, Saudi collaborations with all of its top 10 international partners have increased in recent years. Joint research with the US grew

the most, but Saudi research outputs with China have also nearly tripled during that period, as measured by collaboration score, which tallies the sum of all of the Kingdom's bilateral research collaborations.

Saudi Arabia's growing involvement in international collaboration follows its growth in overall output in the Nature Index, in particular in chemistry and the physical sciences. The country's favoured collaborators don't always follow the broader pattern when subject areas are considered in detail. In chemistry, for example, Germany is still its second-largest collaborator after the United States, ahead of China and Canada.

LEADING INSTITUTIONS, DIFFERENT PATTERNS

The two key players in Saudi Arabia's rising international collaborations are King

Abdulaziz University (KAU) on Saudi Arabia's west coast in Jeddah and its closest competitor, King Abdullah University of Science and Technology (KAUST), located about 135km north of Jeddah in Thuwal.

KAU collaborations with US institutions made up 49% of all collaboration scores between Saudi Arabia and US institutions in 2015, while its collaborations with Chinese and UK institutions represented 54% and 21% of collaboration scores between Saudi

institutions and their counterparts in these countries. Collaborations involving KAUST, meanwhile, represent 27%, 23% and 44% of collaboration

"It has to be complementary. You don't want someone riding on the back of somebody else."

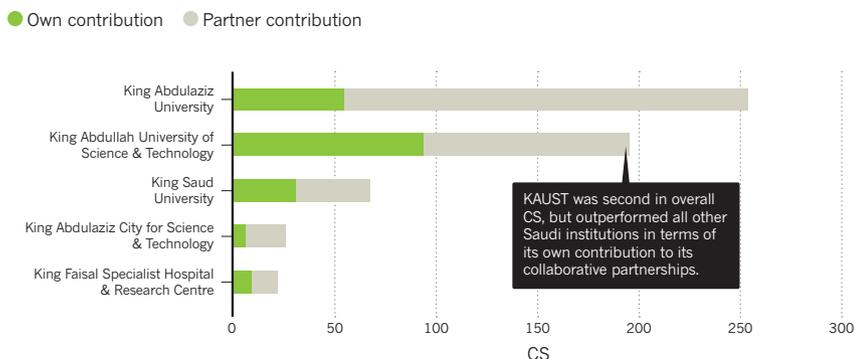
ANASTASIA KHRENOVA/KAUST



Many of KAUST's international collaborations address regional challenges, such as synthetic membranes research for water purification at the Advanced Membranes and Porous Materials Center.

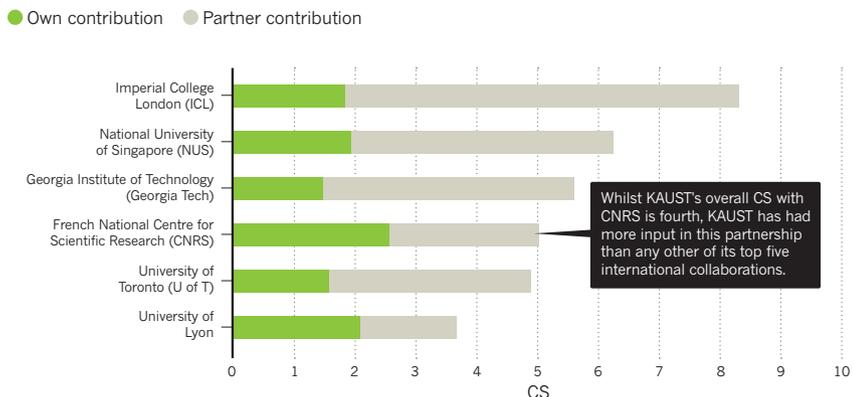
SAUDI ARABIA'S TOP COLLABORATING INSTITUTIONS

KAU led in terms of overall CS in 2015. The bar graph shows Saudi Arabia's top five institutions in 2015 by CS.



KAUST'S TOP FIVE INTERNATIONAL PARTNERSHIPS

KAUST has formed bilateral collaborations with 414 international partners in 2015.



university's research centres are also encouraged to spend 20% of their budgets externally to bring expertise that may be lacking at the young university.

Under its new collaboration model, KAUST is now funding six highly multidisciplinary programmes on sensors research. "We are not only setting up a worthwhile scientific programme," says Fréchet, "but we are helping to broaden our own people. We make them think out of the box. We make them think about something they have never thought about before, because it's not in their field."

Looking at chemistry, the index shows that KAUST's collaboration score with UK institutions — which represent the third largest group after the US and France — increased from 2.5 in 2012 to 10.8 in 2015. In 2015, KAUST's top UK collaborator by far in chemistry was Imperial College London (ICL). In 2015 the data show that this partnership with ICL is KAUST's top partnership overall that year.

"Now we are an ongoing institution we are trying to make sure that our researchers can choose who they work with."

King Saud University (KSU) in the capital, Riyadh, the country's third-largest contributor to the index, is not an exception to the country's research trends. In 2015, however, it increased its collaboration with Russian institutions, making that country its collaboration partner of choice behind China and the US. Its top three collaborating institutions were Fudan University in China, the Russian Academy of Sciences (RAS) and Novosibirsk State University (NSU), both of which are in Russia.

Materials chemist, Ahmed Elzatahry, is prominent in KSU's collaboration with Fudan University. Elzatahry developed a relationship with Dongyuan Zhao, one of the world's top scientists in the field of mesoporous materials, in 2010 when Elzatahry was working in Egypt. When he moved to KSU in 2012, he took his research relationship with Zhao with him. This relationship has led to Elzatahry co-authoring several papers with Zhao, co-supervisions of PhD theses for KSU students, and an ongoing collaboration between KSU and Zhao that continues even though Elzatahry has recently moved on to Qatar University.

KSU clearly sees benefits to working with their counterparts on the international stage. Like their more prominent counterparts, most of the other 18 Saudi institutions whose international collaborations led to index publications have seen both their overall index output and their collaboration scores increase. The policy seems to have paid back for Saudi Arabia, which is likely to continue its pursuit of international partners as it works to boost its science output. ■