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Research, development, and innovation talent in Qatar

The policy and program landscape

Mehdi Shiva, James Besse, Stella Harrison,
Miguel Subosa, Ishita Puri,
Abdellahi Hussein, Sara Zikri

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Executive Summary

Qatar has set out an ambitious vision to become a global hub for research, development, and innovation (RDI), recognizing that human capital is the foundation of a knowledge-based economy. Against this backdrop, this study examines Qatar's RDI talent landscape, reviews international approaches to developing, attracting, and retaining skilled professionals, and identifies key gaps and opportunities.

Globally, countries are competing intensely for high-skilled labor as technological change accelerates and populations age. RDI talent—researchers, scientists, engineers, technicians, and innovators—has become a vital strategic asset underpinning productivity and competitiveness. Governments around the world are therefore reforming their education systems, visa regimes, and research institutions to strengthen their ability to develop, attract, and retain such talent. Successful RDI ecosystems typically depend on close coordination between government, academia, and industry—the so-called "Triple Helix"—to ensure that education, research, and innovation are aligned with national and market needs.

Qatar's RDI ecosystem has evolved rapidly over the past decade. Between 2012 and 2021, gross expenditure on research and development rose from 0.48% to 0.68% of GDP, though this remains below the Organisation for Economic Co-operation and Development (OECD) average of 2.7%. The higher-education sector accounts for most RDI spending, while the business sector contributes just 13%, indicating scope for greater private-sector participation. The RDI workforce is predominantly expatriate, with around 80% of RDI personnel being non-nationals. Only about 7% of Qataris hold Science, Technology, Engineering, and Mathematics (STEM) qualifications, compared with 19% among expatriates. While educational outcomes have improved and tertiary enrollment has expanded, performance in international assessments remains below OECD averages, and public-sector employment continues to dominate among nationals.

To address these challenges, Qatar has introduced a range of initiatives that broadly mirror international good practice. Scholarships, sponsorships, and mentorship programs have expanded by around 50% over the past decade, providing early exposure to science, technology, and innovation. Institutions such as Qatar Foundation, Hamad Bin Khalifa University, and Sidra Medicine offer research placements and professional development for students, while the Qatar Science and Technology Park (QSTP) and the Qatar Development Bank (QDB) foster innovation and entrepreneurship through incubation, training, and venture funding. National policy initiatives, such as the new Job Nationalization Law, aim to align education with labor-market priorities and increase participation of nationals in the private sector.

Attracting global talent is also a key policy focus. The forthcoming Mustaqel Residency Visa represents a significant reform, providing renewable five-year residence to highly skilled individuals and entrepreneurs in priority areas, including RDI, without requiring pre-arranged sponsorship. Complementary initiatives, such as the Alchemist Doha Fund

and the Technology Development Grant, encourage international start-ups to establish operations in Qatar. Labor mobility and working conditions have further improved since the termination of the Kafala system in 2020. Nevertheless, challenges persist: limited post-fellowship employment continuity, short visa durations, and constrained academic career pathways hinder the retention of skilled researchers and innovators.

Qatar's vision for 2030 is to build a future-ready workforce, with 46% of total employment in skilled occupations, 20% of nationals working in the private or semi-private sectors, and at least 18% of graduates in STEM disciplines. Achieving these targets will require deepening collaboration between academia and industry, diversifying RDI funding, and strengthening career progression and residency frameworks for both local and international professionals. Sustained investment in research infrastructure, combined with coherent policy coordination across sectors, will be critical to transforming Qatar's growing potential into long-term capability.

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Abbreviations

AI	Artificial Intelligence
BERD	Business Expenditure on R&D
COE	Centers of Excellence
EU	European Union
FAFSA	Free Application for Federal Student Aid
FWCI	Field Weighted Citation Impact
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GERD	Gross Expenditure on Research and Development
GTGI	Global Talent Competitiveness Index
GTS	Global Talent Stream
HBKU	Hamad Bin Khalifa University
IT	Information Technology
LFS	Labour Force Survey
MOEHE	Ministry of Education and Higher Education
NDS3	Third National Development Strategy
OECD	Organisation for Economic Co-operation and Development
PACIME	Programs in Support of Science in Mexico
PISA	Programme for International Student Assessment
QC	Quantum Computing
QCRI	Qatar Computing Research Institute
QRDI	Qatar Research, Development, and Innovation
QNV 2030	Qatar National Vision 2030
QDB	Qatar Development Bank
QSTP	Qatar Science and Technology Park

R&D	Research and Development
RDI	Research, Development, and Innovation
R&I	Research and Innovation
RSEs	Researchers, Scientists, and Engineers
SMEs	Small and Medium-Sized Enterprises
STEM	Science, Technology, Engineering, and Mathematics
SUV	Start-up Visa
TDG	Technology Development Grant
UAE	United Arab Emirates
UKRI	United Kingdom Research and Innovation
USDT	University of Doha for Science and Technology

Chapter 1. **Introduction**

1.1. Aims and objectives

This landscape report draws on a wide range of international policies and programs for strengthening research, development and innovation (RDI) talent ecosystems to inform an assessment of Qatar's RDI talent landscape. To this end, the present study lays out the various policies and programs aimed at the country's RDI labor force, and identifies gaps in the current RDI talent landscape. In addition, Qatar's RDI talent landscape is analyzed alongside approaches taken by other countries, with the study identifying measures that may be applicable to the Qatari context.

This study will:

Examine RDI talent policies and programs across different countries.

Compile the most recent statistics regarding RDI talent in Qatar.

Identify existing policies and programs in Qatar that aim to develop, attract, and retain RDI talent.

To fulfill these objectives, this report begins by defining critical concepts, including setting an operational definition for "RDI talent." After laying out definitions, the report examines common international approaches to strengthening RDI talent, which informs the identification of thematic policy clusters. These thematic policy clusters serve as the conceptual framework through which Qatar's own policies and programs related to RDI talent are analyzed.

After laying out international policies and programs aimed at strengthening RDI talent, the report then maps out Qatar's RDI ecosystem. It begins by summarizing key statistics on Qatar's RDI workforce, using data from multiple sources to provide context. The report then details the broad range of policies and programs within Qatar that aim to develop, attract, and retain local and international RDI talent. Finally, in light of the evidence examined—both for Qatar and for other countries—the report highlights policy gaps within Qatar's RDI talent policy and program landscape in comparison to other countries. In doing so, the study remains mindful of Qatar's contextual specificities and deliberately refrains from making one-size-fits-all recommendations.

1.2. Background

Access to technology and innovation has always been of interest to nations at different levels of economic development, given how technology and innovation can bolster productivity, and productivity gains can improve a country's wealth and social welfare.[1, 2] In recent years, the focus has been on technologies such as Quantum Computing (QC) and Artificial Intelligence (AI), owing to their potential to increase efficiency and strengthen economic and military capabilities.[3, 4] No amount of investment in RDI, however, can lead to sustainable development and economic growth without a skilled labor force and adequate human capital.[5, 6] Accordingly, developing, attracting, and retaining RDI talent has become the focal point of international competition across nations.

The last decade has thus seen a "war for talent," with companies and countries competing for high-skilled labor as they face the prospects of declining populations and a lack of workers in key areas.[7, 8] In 2023, 71%

of CEOs surveyed by Deloitte cited talent shortages as the top external challenge to meeting their business objectives.[9] Furthermore, a shortage of workers in key sectors such as information technology (IT) has led to concerns around the health and growth of these sectors, alongside the broader economy.[10, 11] As well as high-skilled labor, there has also been strong competition for and concerns regarding the demand for medium-skilled workers and people with vocational and technical qualifications, including but not limited to nurses, technicians, and software professionals.[12]

In addition, this war for talent has prompted concerns around human capital flight (more commonly called "brain drain"), which is understood as the large-scale movement of highly skilled workers from one country (or region) to another. For instance, "[a]s of 2010, nearly one out of every six countries in the world saw more than 20 percent of their high-skilled population emigrate abroad."[13] Brain drain can present adverse effects, especially on developing countries, by prompting labor shortages and changes to the occupational structure of developing countries' labor force.[14, 15]

The incidence of brain drain varies significantly across countries. While most Arab countries have high rates of brain drain—with Egypt often described as having the highest incidence among the said countries—countries of the Gulf Cooperation Council (GCC) are an exception.[16] On the Fragile States Index, for instance, which gives countries a score based on "human flight and brain drain," Qatar comes in 8th place out of 179 countries, with a higher score indicating lower incidence of human flight and brain drain.[17] Other GCC countries perform similarly well, with Oman in 10th place, the United Arab Emirates (UAE) in 19th place, Kuwait in 23rd place, Saudi Arabia in 26th place, and Bahrain in 31st place.

In contrast to negative notions surrounding brain drain and human capital flight, some researchers contend that the emigration of skilled labor yields net positive outcomes for both sending and receiving countries, arguing that skilled migration generates "brain gain" instead of "brain drain."[18, 19, 20, 21] Researchers have noted how opportunities for high-skilled migration have in fact led to increases in sending countries' human capital, for example, directly contradicting the notion of skilled migration leading to brain drain.[22, 23] Furthermore, remittances from migrant workers have been found to contribute toward improving living standards of households in sending countries.[24, 25] Relatedly, certain researchers forward the notion of "brain circulation," recognizing that many individuals who spend time studying or working overseas may return to their countries of origin, bringing with them new competencies and international professional networks that are advantageous to the returning individual's country of origin.[26]

Regardless of the debate around human capital flight, skilled migration remains a reality, and as such, researchers have sought to identify push and pull factors for labor migration.[27, 28, 29, 30] Push factors are incentives or motivations for migration from one country to another. These include but are not limited to precarious employment (such as unstable or short-term contracts), long working hours (which may be perceived as undesirable), low pay, limited professional development opportunities, and discriminatory or unfair hiring practices, as well as sociopolitical issues such as violence, political corruption, and economic instability. Pull factors are social, political, and economic features that make a country attractive for inward migration. These include economic prosperity, employment opportunities, opportunities for start-ups, political stability, quality of life, welcoming attitudes toward immigrants, favorable and easy-to-navigate visa processes (including for family members), high-quality healthcare, and an existing presence of diaspora communities. Addressing the factors that motivate international migration is critical to creating a competitive environment to attract skilled labor migrants.[31]

Qatar has ambitious goals with respect to increasing its RDI talent in the coming years in line with its Third National Development Strategy (NDS3) and QRDI's 2030 Strategy. According to the latter, the country aims for "an increase in the RDI talent pool to some 20,000 RSEs [Researchers, Scientists, and Engineers] by 2030" (assuming that 2.8% of the total government revenue is spent on RDI), alongside a range of other targets outlined below.[32] Given existing capacity and resources—that is, being a wealthy country with a small population—it is expected that a major portion of Qatar's RDI-related human capital will be sourced from overseas.[33] Alongside this targeted increase in RDI staff, QRDI's strategy includes the following RDI objectives:

- Generate high-quality research outputs, as measured by high Field Weighted Citation Impact (FWCI) and h-index, and high number of granted patents.[34]
- Improve scientific collaboration.
- Increase the number of RDI start-ups.
- Increase engagement of multinational corporations with the Qatari RDI ecosystem.
- Prepare Qatar's K–12 and undergraduate students to pursue RDI careers.
- Develop, attract, and retain qualified RSEs and product development talent to drive research excellence and product development in Qatar.
- Develop, attract, and retain qualified innovation talent, and create an innovation mindset in public- and private-sector institutions to deploy innovation and drive new innovative ventures in Qatar.

The NDS3 outlines a set of targets to be achieved by 2030, some of which are directly relevant to RDI talent, such as:

- 50% of total RSE talent in businesses.
- >46% total workforce in skilled and high-skilled jobs.
- >20% Qatari workforce in private and semi-private sectors.
- >18% of students graduating in STEM fields.
- Patent-to-GDP (in bn PPP$) ratio of 2.9.
- Publication-to-GDP (in bn PPP$) ratio of 44.
- Innovation output-to-input ratio of 0.64 on Global Innovation Index (GII).
- Rank in the top 30 on GII.

To achieve these targets, Qatar will contend in a fiercely competitive global marketplace for highly skilled workers.

1.3. What is RDI talent?

"RDI talent" refers to people with the skills necessary to undertake activities to advance research and move innovation forward. This definition of RDI talent is based on our synthesis of the following definitions of research and development (R&D) and research and innovation (R&I):

- The OECD's Frascati Manual identifies the following features of R&D activities: (i) novelty, in the sense of being oriented toward the creation of new knowledge; (ii) creativity, in the sense of being non-routine; (iii) uncertainty about the outcome of the activity; (iv) systematicity in how the activity is conducted; and (v) transferability or reproducibility, in the sense of results being able to be recreated by others and applied in other domains.[35] In current research and practice, the Frascati Manual's definition is widely accepted:

institutions including but not limited to the World Bank,[36] the US National Science Foundation,[37] and UNESCO[38] use it in their measurement of RDI talent.

- The United Kingdom Research and Innovation (UKRI)'s survey of the UK's R&I workforce classifies someone as performing R&I work if they describe their work as entailing "any of the following[…]: generate new knowledge, for example by doing research or scientific studies; apply scientific or technical knowledge to a particular organisation; design, test or develop new or significantly improved products or processes; introduce new technologies to a market; help firms to adopt or apply new technologies; lead or manage teams or projects that do any of the above."[39]

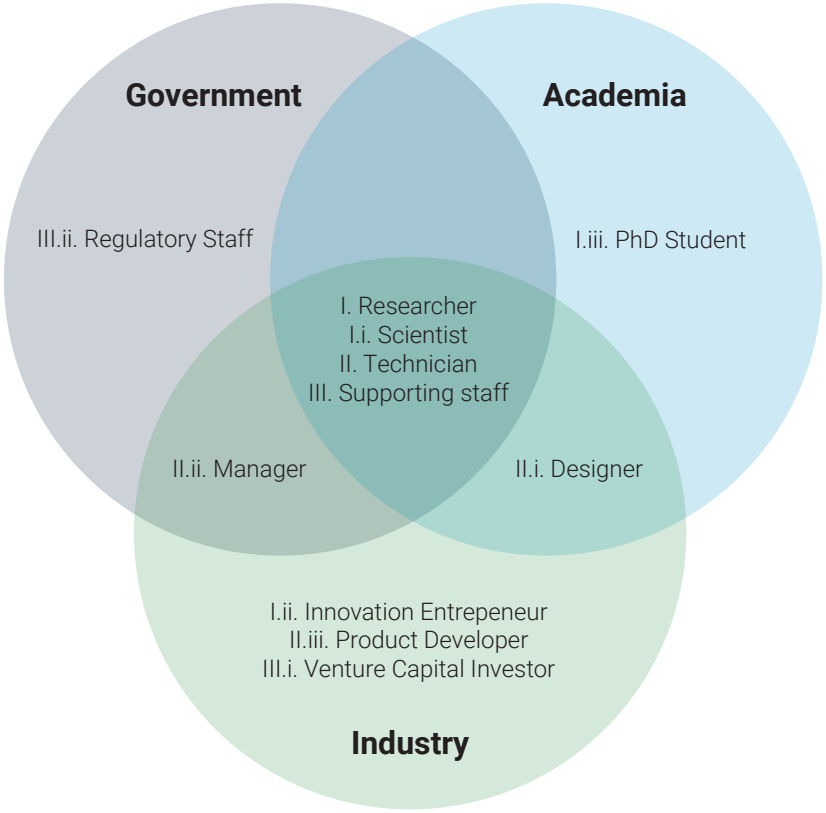
Innovation is a related term, involving the commercial introduction of new products and processes, often but not always resulting from research and development.[40, 41] Activities to advance or support the process of innovation, such as pre-production development, routine tests, and industrial design for production, may fall within the scope of RDI if they involve the development of new or significantly improved products or processes.[42]

RDI talent therefore broadly refers to people with skills necessary to undertake R&D work or advance or support the process of innovation. This includes personnel of various kinds in the fields of natural sciences (e.g. mathematics, computer and information sciences, and physical sciences), engineering and technology (e.g. civil engineering, electrical engineering, and information engineering), medical and health sciences (e.g. basic medicine, clinical medicine, and health sciences), agricultural and veterinary sciences (e.g. agriculture, forestry, and veterinary science), social sciences (e.g. psychology, economics, and education), and humanities and the arts (e.g. history, archaeology, and languages).[43]

Within these domains, personnel are categorized by function as either researchers, technicians, or supporting staff,[44] working across the government, academia, and industry sectors.[45] Their specific titles and roles may vary depending on the context and sector. Researchers focused on STEM, for example, are often referred to as scientists, and may operate across sectors. Those primarily engaged in higher education and still in the process of earning a doctorate are typically considered PhD students, although not all of their activities (e.g. coursework) are considered RDI activities.[46] Researchers involved in the commercialization of research may sometimes be labelled as innovation entrepreneurs. Similarly, designers and managers contributing to RDI are often considered technicians with specialized skills tailored to specific contexts, as are product developers, who focus on pre-production and production stages. Finally, given the importance of funding, finance, and regulation in RDI, venture capital investors and regulatory support staff dedicated to RDI may be categorized as supporting staff. Figure 1 below provides a basic illustration of this framework; the labels and titles provided here are, however, not exhaustive, and may vary across different settings and cultural contexts

As such, this report adopts a broader definition of RDI talent—as laid out in Box 1 below—which includes the three function groups outlined above and extends beyond the narrower scope of RSEs.

Figure 1: RDI functions and some of the role titles across sectors



Box 1. Operational definition of RDI talent

RDI talent refers to individuals with the skills required to undertake R&D work or to support the process of innovation. These individuals may function as researchers, technicians, or supporting staff across the government, academia, and industry sectors, working in any of the following fields:

- Natural sciences (e.g. mathematics, computer and information sciences, and physical sciences).
- Engineering and technology (e.g. civil engineering, electrical engineering, and information engineering).
- Medical and health sciences (e.g. basic medicine, clinical medicine, and health sciences).
- Agricultural and veterinary sciences (e.g. agriculture, forestry, and veterinary science).
- Social sciences (e.g. psychology, economics, and education).
- Humanities and the arts (e.g. history, archaeology, and languages).

1.4 Methods

This section provides an overview of the methods used in this landscape report. The study has extensively mapped the RDI landscape globally and in Qatar through a targeted literature review using evidence collected from various research databases, including but not limited to Google Scholar, Web of Science, and Scopus. Table 1 below provides examples of keywords that were combined in different ways to conduct the search. Note, however, that the keywords presented in Table 1 are not meant to be an exhaustive list.

Table 1: Example keywords for evidence review

Focus	Employment and higher education	Type of policy or program
STEM	Workforce	Talent sourcing
Research and innovation	Labor force	Talent acquisition
Research and development	Labor market	Foreign talent
Research, development, and innovation	Employment	Overseas talent
R&I	Human capital	Skilled migrant
R&D	Higher education	Workforce development
RDI	University	Workforce nationalization
Research	Entrepreneur	Human resource development
Innovation	Start-up	Talent retention

Search strings would be composed of various permutations of the keywords in Table 1, as well as other relevant keywords not indicated therein. Below are some examples of search strings—also not meant to be an exhaustive list—that would have been used during the search process:

- STEM workforce talent acquisition policies and programs
- R&D labor force overseas talent policies and programs
- RDI workforce talent retention policies and programs
- STEM entrepreneur human resource development policies and programs
- R&D higher education skilled migrant policies and programs.

This keyword-driven search process was supplemented by a targeted evidence search for gray literature regarding existing RDI programs hosted in relevant international databases. These databases included but were not limited to the World Bank, OECD, and Policy Commons.

A similar approach was adopted for mapping Qatar's RDI talent landscape. To identify additional sources—and ensure an extensive review of Qatar's RDI talent policies and programs—the research team combed through the references section of relevant publications discovered in the initial database searches. Literature identified through this process was used to trace the evolution of Qatar's policy strategies for strengthening RDI talent, as well as identify principal trends in Qatar's RDI ecosystem. Official documents published by the government of Qatar were also consulted, including but not limited to: (i) strategy documents; (ii) press releases by government ministries; and (iii) department websites for information on active schemes and programs. This was supported by statistical evidence from Qatar's National Planning Council, formerly known as the Planning and Statistics Authority, as well as a review of gray literature.

Relevant policies and programs on RDI talent—in both Qatar and other countries—were then categorized under different thematic clusters. These thematic clusters are discussed in subsequent sections.

Chapter 2. **International approaches to strengthening the RDI talent pool**

This landscape report first reviews existing research on different countries' policy and program strategies for attracting overseas talent, as well as initiatives aiming to develop and retain local RDI workers. These policies are contextualized within the specific constraints of their respective local innovation systems.[47]

Indeed, the policies reviewed in this report often rest on the coordination of various organizations (e.g. science regulators, universities, immigration authorities, and local government), and are often enabled or constrained by complexities within country-specific contextual factors (e.g. an existing start-up ecosystem, internationally reputable universities, political priorities, a history of immigration, a large diaspora, a widely spoken language, existing funding mechanisms for science). Thus, while many of the policies outlined may offer potential for Qatar, it is essential to recognize that there is no one-size-fits-all solution: policies effective in one country may not yield the same results in another.

In this report, RDI policies are grouped into three categories: (i) Develop; (ii) Attract; and (iii) Retain.

These policy categories are understood in this report as follows:

Develop: Policies seeking to increase the number of people with skills in RDI, through education and training of people already living within a country.

Attract: Policies seeking to draw from the international pool of RDI talent by attracting people living outside a country's borders to immigrate and work in the country. These policies may be geared toward both non-nationals and nationals living abroad, and may involve different kinds of relocation (full-time, part-time, long-term, or short-term).

Retain: Policies seeking to prevent the outward migration of local RDI talent.

The remainder of this section delves into each of these policy categories within the broader policy context of various countries across the global landscape. It is worth noting that many of the policies discussed below may overlap across categories, addressing more than one policy area simultaneously.

2.1 International approaches to developing local RDI talent

This section outlines some of the policy strategies adopted by countries to develop local RDI talent, organized into two thematic clusters:

i. Incentives for existing and prospective research professionals.

ii. Training provision reforms within educational institutions.

2.1.1 Incentives for existing and prospective research professionals

Universities play an important role in RDI ecosystems, especially in developing human capital and promoting knowledge generation and exchange.[48] Given the critical role of universities in producing human capital for RDI ecosystems, many RDI talent development initiatives take place within institutions of higher education.

Scholarships, especially in the STEM disciplines, are a common incentive to help funnel prospective local talent toward careers in RDI. For instance, the United Arab Emirates University has the Chancellor's Fellowship for Graduate Students, prioritizing funding for the studies of STEM students.[49] There have also been university reforms designed to draw more students into RDI education.[50] Many of these reforms involve creating financial incentives for enrollment in STEM programs. In response to low enrollment in science and engineering disciplines, for example, Russia has made a number of university places in science and engineering courses free of charge, ostensibly creating an economic pull toward these programs.[51]

There are also other scholarship programs with the intention of strengthening students' research skills and expanding their networks through international exchange. These programs exist in a range of countries. In Canada, the Global Skills Opportunity program funds projects by Canadian universities that provide opportunities for international mobility of their students.[52]

Promoting research productivity is another policy lever that rests largely on universities. Given the documented link between research productivity and industry-level innovation,[53] research productivity therefore becomes an important consideration for policymakers aiming to bolster the RDI ecosystem. One of the ways in which countries incentivize research productivity is through fellowships, grants, and other awards that facilitate and reward the productivity of promising early-career researchers. Some grants, such as Switzerland's Young Professors Scheme (*SNF Förderungsprofessuren*), offer funding specifically for early-career researchers while others, like Germany's Wilhelm Leibniz Prize, Austria's Wittgenstein Prize, and the Netherlands' Spinoza Prize, require recipients to recruit, train, and mentor younger scientists in their research group. Furthermore, initiatives like Spain's Ramón y Cajal and Juan de la Cierva programs, which supply RDI centers with experienced and early-career researchers, respectively,[54] not only build researchers' industry-relevant skills but also facilitate knowledge transfer across research institutions. In other words, research awards are often used not only to promote research productivity but also to develop newer RDI talent. The success of such programs tends to be limited, however, if they are not paired with efforts to increase long-term career prospects for grant recipients (see Section 2.3).[55]

Some countries have implemented university reforms that seek to make scientific careers more attractive to newcomers. For instance, in a bid to expand scientific career pathways, Austria has introduced a tenure-track system—a system common in North American academia, whereby an academic takes an

apprenticeship-style position, followed by a performance review to determine their appointment as a full professor; this stands in contrast to the "habilitation" system, for which a post-doctoral qualification is the prerequisite to full professorship, more common in Central European academia. Additionally, reforms to Austria's academic hiring system allow universities to flexibly hire staff according to demand, without the need for job advertisement or examination.[56,57]

2.1.2 Training provision reforms within educational institutions

Modernizing training provision is another common policy strategy used by countries to help develop local RDI talent.[58] Modernization efforts can take the form of reorganizing universities to make them better suited to attract the right talent, focus on national priorities, and build bridges with institutions in other countries. One example is the Finnish Centers of Excellence (CoE) program, which awards the CoE status, and associated long-term funding, to research centers that demonstrate a high level of promise and achievement and whose research agendas align with national RDI priorities.[59] Singapore has set up a similar program, instituting CoEs with international partnerships, which has helped increase the range of educational opportunities available to students in RDI-related fields.[60, 61] Such efforts to modernize training provision in RDI-related disciplines may not only attract new local and international students to RDI-related degrees but also help retain said students.[62]

Curricular reforms and internationalization of doctoral schools are also common strategies. Some of these initiatives focus on applied learning opportunities (such as scholarships that provide work opportunities and skills required by industry), while others increase the amount of STEM training and mentorship available to current and prospective students.[63, 64, 65] For instance, Croatia has implemented new guidelines and learning outcomes, established quality-assurance processes, and created joint doctoral programs.[66] Poland, on the other hand, has sought to increase the international character of the country's doctoral schools as a means of upskilling local researchers and attracting researchers from abroad.[67] Some countries have also put in place systems of vocational schools focused on STEM careers as a means of addressing RDI talent shortages,[68] with South Korea being one example.[69]

Indeed, various countries have been implementing targeted programs to provide students with skills required by industry. Examples of these programs can be found in: (i) Kazakhstan, where training is developed in consultation with industry[70]; (ii) Malaysia, where scholarships are co-funded by the government and industry[71]; (iii) Slovenia, which implemented the Program for Young Researchers, giving graduate students funding for studies and applied research work[72, 73]; and (iv) France, where contracts made under the Industrial Agreements for Training Through Research program provide funding for doctoral programs, whereby a student is placed at a research laboratory for an applied research project.[74, 75] There are also programs focused on industry placements for students. Examples of this have been found in the US,[76] Israel,[77] and Malaysia.[78] In the case of Malaysia, for instance, the Talent Corporation under the country's Ministry of Human Resources offers many such programs.[79]

Programs targeted at students in secondary school exist as well. For instance, the Saudi Research Science Institute at King Abdullah University of Science and Technology offers a summer school where secondary-school students are given instruction in scientific research to encourage pursuing a STEM career.[80] Career guidance and mentorship aimed at secondary-school-aged children can also be used to encourage the uptake of RDI careers. For instance, the UAE offers a range of programs to develop local talent, including but not limited to: (i) the TKS Dubai Innovation Program, which

provides young people with mentorship and training so they can develop projects related to emerging technologies;[81] and (ii) the Professional and Practical Training Program, which assists students in their career development.[82]

2.2 International approaches to attracting overseas RDI talent

This section lays out a range of policies and programs implemented by different countries to attract foreign RDI talent. Policies and programs to attract RDI talent are grouped into the following thematic clusters:

i. Recognition of foreign qualifications.

ii. Targeted recruitment of overseas talent for RDI careers.

iii. Measures to promote return migration.

iv. Favorable visa schemes and immigration regimes.

These thematic clusters are examined in detail, highlighting and discussing examples across different countries.

2.2.1 Recognition of foreign qualifications

Simplifying the process for recognizing foreign qualifications is a crucial enabler of attracting and successfully utilizing foreign talent.[83] This is because it enables skilled professionals entering the country to work in the professions in which they have education and experience. Systems for recognizing foreign qualifications reduce, for instance, the administrative burden for skilled migrants. Such systems also remove the need for professionals to retrain in local educational institutions, which means that they can more immediately become economically active. This is an important measure, since access to employment that matches migrants' skillsets determines the extent to which skilled migrants can contribute to the host economy.[84] Furthermore, schemes to recognize foreign qualifications can encourage nationals who received education and training abroad to return to their home country.[85] In view of these benefits, some countries have established processes for recognizing qualifications obtained overseas.

Germany, for instance, instated the Recognition Act of 2012, which established the legal right to the recognition of foreign qualifications and put in place a fast-track procedure for obtaining skilled-worker visas.[86, 87, 88] Similarly, Denmark and Austria have enforced legal frameworks for recognizing foreign qualifications.[89] In the same vein, Canada has developed guidelines and tools for the recognition of foreign engineering degrees (including a database of foreign degrees and institutions), alongside processes to recognize overseas work experience.[90]

2.2.2 Targeted recruitment of overseas talent for RDI careers

To help internationalize their research workforce, some countries have implemented policies that provide grants for foreign nationals to migrate inward. For instance, in Luxembourg—a wealthy country with a relatively small population—the PEARL and ATTRACT fellowship programs aim to bring researchers from abroad into the local university system, as well as retain them after the conclusion of the fellowship.[91]

The PEARL program takes joint applications from an institution based in Luxembourg and a leading foreign academic, providing funding to bring the academic to the local institution to build a new research group and develop a research program of strategic importance to the country.[92] PEARL grant recipients are required to take up a permanent position at their host institution, while the host institution must commit to sustaining the resulting research group beyond the duration of the PEARL grant (including making efforts to obtain additional funding). The ATTRACT program offers grants to junior researchers from abroad to take up full-time tenured or tenure-track positions in Luxembourg-based institutions, where they can establish their research group.[93]

There have also been efforts to increase the enrollment of foreign students using a range of strategies, including by offering targeted fellowships, overseas recruitment, and international partnerships.[94, 95] South Korea, for instance, has put in place a scholarship program for foreign nationals studying in one of the country's universities, and encourages them to settle and work in the country after completing their studies.[96] In addition, countries like Finland are increasing the number of study programs taught in English to attract foreign students who might be enticed by the country's education system, job opportunities, or quality of life, but who might not speak the local language to a sufficient level of academic proficiency.[97] It is important to note, however, that these types of programs risk failure if they are not anchored on a larger RDI ecosystem with clear career pathways after completion of the relevant fellowships or study programs. Examples are provided in Section 2.4.

2.2.3 Measures to promote return migration

Countries that export a significant portion of their skilled labor force have put in place programs to encourage nationals working abroad to return to their country of origin.[98] For instance, Malaysia views its diaspora populations as an important talent pool and has implemented policies such as offering to finance the final year of university for nationals studying abroad if they agree to return to Malaysia after obtaining their degree.[99] With a similar objective, Italy uses a combination of tax incentives and a *Rientro dei cervelli* (literally, "reverse brain drain") fellowship program to encourage skilled nationals residing overseas to return to Italy to work in the RDI sector.[100] The Italian region of Umbria also implemented a program that created networking opportunities for Umbrian businesses and Italians living abroad, including business visits and conferences.[101] In addition, both Singapore[102] and Mexico[103] incentivize their nationals who are working in science and research fields abroad to return to their countries of origin through fellowship schemes. Given the competitiveness of the international labor market for skilled workers, and to continue benefiting from the labor of their skilled nationals, China has taken a different approach: allowing their nationals to work part-time within China alongside other jobs based overseas.[104, 105]

It is again important to note, however, that without long-term job prospects within the local RDI ecosystem, return migration may not persist over the longer term—that is, return migrants may decide to leave the country again for better opportunities abroad. Furthermore, if the country of origin cannot offer ample professional and research communities, equipment, and funding opportunities, returning skilled migrants may not be able to maximize their skills as they would in a better-resourced RDI ecosystem.[106]

2.2.4 Favorable visa schemes and immigration regimes

Most of the policies and programs described above are contingent on effective visa schemes and immigration processes. Across the countries documented in this report, stringent visa restrictions are among the main barriers to attracting talent from overseas. Such restrictions constrain the flow of skilled workers between countries, limit businesses' abilities to hire the best talent, and may curtail the stay of skilled workers who might otherwise want to remain and contribute to the local economy. Accompanying these stringent visa restrictions are challenges related to the recognition of foreign qualifications, as well as difficulties meeting language requirements for working and studying in the country. As such, there have been efforts across various countries to reform visa regimes to encourage skilled migration.[107]

For instance, while countries in Europe's Schengen Area already benefit from a robust visa-free regime that facilitates highly skilled migration from other Schengen countries, further efforts have been made to ease the

visa requirements for highly skilled migrants from outside the Schengen Area. Denmark has instated the Positive Lists for people with higher-education qualifications in areas of skilled work identified to be of high demand.[108] Germany has implemented a series of wide-ranging changes to their immigration laws under the Skilled Labor Migration Law, which lowered salary thresholds, expanded the list of shortage occupations, and introduced the Opportunity Card—a points-based visa system allowing migration on the basis of qualifications and skills rather than a job offer.[109] Similarly, Austria has reformed their immigration process for skilled workers, replacing their previous quota system with the Red-White-Red Card (RWR Card), for which eligibility is determined on a set of criteria related to skills, work experience, education, age, and English- and German-language proficiency.[110] France has established several visa routes aimed at attracting highly skilled workers, including the Talent Passport residence permit, which offers residence up to four years based on criteria such as employment contracts, education, investment, and professional reputation.[111] At the level of the European Union (EU), the EU Blue Card offers a simplified procedure for skilled workers, as well as allowing them to bring their family members and regulating the costs of immigration.

Similar immigration schemes have been deployed in countries outside the Schengen Area. For example, Singapore has a specific visa for tech workers,[112] while Israel has a visa program for entrepreneurs[113] and experts with skills in growing industries.[114] In addition, Canada has trialled a range of visa programs, including a Start-up Visa (SUV) and the Global Talent Stream (GTS)—both of which offer expedited visa processing for skilled workers and their families.[115] Similarly, the UK has a range of visa policies aimed at attracting skilled workers, including a dedicated Skilled Worker Route[116] and visas that allow graduates of select UK and international universities to work in the UK without a sponsoring employer for at least two years.[117, 118] In sum, the visa schemes described above address the most common impediments to the mobility of workers in the RDI sector, including but not limited to visa costs, long processing times, and restrictions on bringing family members.[119, 120]

Indeed, this landscape report has found that an effective visa regime is the cornerstone of a successful campaign to attract foreign talent. Visa restrictions deter skilled migration: they tie workers to specific employers, hinder the upskilling of international workers, limit long-term career growth, and at worst can deny entry to skilled foreign workers altogether.[121] Building a strong and globally competitive RDI ecosystem requires addressing these restrictions. After all, impediments to skilled immigration are also impediments to innovation, since skilled workers provide capacity for innovative firms.[122] Furthermore, as discussed in Section 2.4.4, favorable visa processes help not only to attract but also to retain skilled workers.[123]

2.2.5 Bolstering innovation by developing and attracting innovation professionals

Since research and innovation are interlinked, many policies aiming to develop, attract, and retain research professionals also apply to innovation professionals. Nevertheless, there are policies that distinctly target innovation professionals. These policies include the following:

i. Providing financial and professional support for university spinouts.

ii. Financing start-ups and other innovations through incubators and public funding.

iii. Implementing visa schemes specific to start-up founders and entrepreneurs.

Certain universities (such as Swiss polytechnic EPF Lausanne, the University of Edinburgh in the UK, and the Technical University of Denmark) have incubators that provide seed funding and support to staff members' start-up projects.[124, 125, 126, 127] Toward a similar end,

the UAE, specifically Dubai, has established programs to promote entrepreneurship education in universities, aiming to make universities hubs for the creation of new companies.[128] Such initiatives not only deepen the connection between universities and industry, but also improve academics' industrial and commercial skills.

Such policy strategies facilitate technology transfers between industry and academia, which in turn favor the development of RDI clusters. Regional RDI clusters, such as Silicon Valley in the US, are characterized by this smooth technology transfer between industry and academia, accompanied by efforts to provide infrastructure, access to capital, and an auspicious regulatory environment.[129]

In addition, some countries have programs seeking to attract entrepreneurs from abroad.[130] For instance, the Vienna Start-up Package, which was established in 2015 by the Vienna Business Agency, offers a month-long program for foreign start-ups to travel to Vienna to receive coaching and information about the city's start-up ecosystem; this program aims to encourage said start-ups to set up base in Vienna.[131] Similarly, the French government has implemented a range of programs to support local and foreign start-ups and entrepreneurs, as well as campaigns to promote the French business ecosystem.[132] One example is the French Tech 2030 program, which offers mentorship, promotion, financial support, and networking opportunities to tech companies.[133]

These types of programs are occasionally supported by start-up visa programs—such as those discussed in Section 2.2.4—which are intended to ease immigration barriers for entrepreneurs looking to relocate and do business within the implementing country. Examples include the Start-up Visa program in Canada,[134] the Innovation Visa in Israel,[135] and the Special Talent Residency, Gifted Residency, and Entrepreneur Residency in Saudi Arabia.[136] Such policies may see limited success, however, if the local business environment is not perceived as sufficiently attractive—an attractive business environment being characterized by factors such as political and economic stability, availability of finance, and availability of skilled labor[137]—or if there are large barriers to immigration, or too many difficulties entering the local regulatory environment from abroad (i.e. the need to adapt to new laws and regulations, language barriers, and other bureaucratic challenges).[138]

2.3 International approaches to retaining RDI talent

Finally, there are policies developed to retain RDI talent. These policies typically respond to pull factors from foreign countries, while seeking to address push factors locally. Such factors, as described earlier, may include economic concerns, career instability or stagnation, lack of funding or research opportunities, perceptions of discrimination or unfair treatment in the workplace, a lack of a healthy business ecosystem for start-ups, alongside other factors that should be routinely empirically evaluated. [139, 140]

Many programs designed to develop and attract RDI talent are also likely to help retain talent. For instance, there are policies that involve making scientific careers in the country more attractive. Doing so may ameliorate the perceived relative professional advantages of moving abroad and facilitate academic staff retention.

Policies to make scientific careers more attractive can take a variety of forms, and include policies from such as increased funding for researchers and university reform (e.g. investment in infrastructure and development of a tenure-track system). A promising example of such a policy is Austria's introduction of a tenure track, as mentioned in Section 2.1.1, which may help prevent the outward migration of academics by creating stable and clear career paths in their home

country. Similarly, China has increased and accelerated promotions for academic staff.[141]

Additionally, the fellowships mentioned in Section 2.2.2—if they successfully encourage long-term settlement (for instance, Luxembourg's efforts to attract foreign academics and South Korea's efforts to attract foreign students)—can help not only to attract but also to retain foreign RDI talent. Visa programs mentioned in Section 2.2.4 may also have such a benefit if they provide straightforward and attractive routes to long-term settlement for skilled professionals and entrepreneurs.

Moreover, as previously mentioned, some scholarships for international research placements require recipients to return to their home country for a specified duration afterward. For instance, the Bolashak scholarship program in Kazakhstan funds students for international study while also requiring them to return to the country for at least five years after their studies are complete, establishing an alumni network.[142] This ensures, at least for an initial period, the retention of RDI talent within the country.

Other policies, instead of seeking to ameliorate push factors, seek to strengthen the ties of their nationals living abroad to the country.[143] These policies grant rights to nationals living abroad that encourage engagement with the country's RDI ecosystem without requiring them to return. These include but are not limited to allowing multiple citizenship to discourage giving up one's citizenship for another, allowing expatriates to vote and hold property, and offering generous scholarships and fellowships to encourage nationals to return to the country for research stays.[144] China's policy of allowing its citizens the right to work part-time in the country while living abroad is a primary example.

Throughout this review, however, policies to retain RDI talent featured less frequently than policies to develop and attract RDI talent. Many of these initiatives to retain RDI talent may also rest on employers' decisions (e.g. employee compensation and benefits packages), which may explain the relatively limited number of government programs found in the landscape review. Speculatively, there may also be secondary benefits of policies in the "develop" category, or more general R&I policies, since strengthening the local RDI ecosystem may create incentives for locals to remain.

2.4 Summary of policies to develop, attract, and retain RDI talent

Table 2 below summarizes policy approaches used by different countries to develop, attract, and retain RDI talent. Examples are provided for each thematic category. These policies can be understood in terms of the Triple Helix Model, which highlights the relationships between government, academia, and industry.

The Triple Helix Model conceptualizes innovation systems as a set of complex relationships and linkages across a range of actors, sometimes considered distinct.[145, 146, 147] The policies outlined in this document often cut across and reflect collaborative engagement between the three helices: government, academia, and industry. For instance, initiatives such as the modernization of research infrastructure and reforms to academic career pathways may involve investment or direction from both government and universities, while efforts to build RDI clusters (e.g. Silicon Valley or the Stockholm–Uppsala Life Science Cluster) involve smooth, continual knowledge exchange and technology transfer between actors in government, academia, and industry.[148]

As such, trying to distinguish whether a policy or program is mainly driven by government, academia, or industry would be, in many cases, an artificial exercise. After all, mature RDI ecosystems are characterized by concerted

action across these three domains. It is also important to note that, while policies and programs have been organized thematically, the boundaries between these thematic categories are porous—that is, many of the policies will contribute to more than one objective (i.e. develop, attract, retain).

Table 2: Overview of global RDI policies

Develop	**Scholarships to increase the number of RDI students and graduates** • Scholarships designed in partnership with industry to reflect needs. • Examples: Free places in university (Russia),[149] Bolashak scholarships (Kazakhstan), scholarships co-funded by government and industry (Malaysia), Chancellor's Fellowship for Graduate Students at United Arab Emirates University (UAE).[150] **International placements for students** • Programs that provide university students with international placements to improve their skills and build international networks. These can also contribute to talent mobility (e.g. onward migration or return migration, with the potential benefit of contributing acquired skills and expertise to a new country or one's country of origin).[151] • Examples: Bolashak scholarships (Kazakhstan), New Colombo Plan (Australia),[152] Global Skills Opportunity (Canada).[153] **Fellowships, grants, and awards for researchers** • Grants for researchers that provide research opportunities, reward achievement, and fund ongoing development of research programmes. • Examples: Young Professors Scheme (Switzerland),[154] Wilhelm Leibniz Prize (Germany),[155] Wittgenstein Award (Austria),[156] Spinoza Prize (Netherlands),[157] Ramón y Cajal and Juan de la Cierva programs (Spain). **Grants and support for university spinouts** • Programs within universities intended to provide funding and mentorship for university staff to develop their ideas into start-ups. • Examples: EPF Lausanne (Switzerland),[158] ON Accelerate (Australia),[159] Spin-off Fellowship (Austria),160 DTU Skylab (Denmark),[161] University Entrepreneurship Program (UAE).[162] **Modernizing and improving teaching approaches and curricula** • Programs to redesign or otherwise improve the quality of teaching in STEM subjects, for instance through new curricula or investment in teacher education. This can also include targeted programs to provide students with skills required by industry. • Examples: University Capacity Development Programme (South Africa), inquiry-based science education (Estonia, France, Ireland, Norway, Portugal, Slovakia),[163] hands-on research experiences (Saudi Research Science Institute, Saudi Arabia),[164] teacher education, which can be STEM-focused and implemented either early on or throughout one's career (Austria, Denmark, France, Ireland, Lithuania, Norway, Poland, Slovenia, Spain, Sweden and the UK),[165] Program for Young Researchers (Slovenia).[166] **Industry placements for students** • Programs to place students in companies related to their studies, increasing their practical experience and the flow of talent between the business and university sectors. • Examples: Exchange programs with industry (Malaysia), Northern New Mexico Climate Change Corps (USA), Accelerate Fellowship (Canada),[167] Professional and Practical Training Program (UAE).[168]

Attract

Legal recognition of degrees issued abroad to ease entry of foreigners into the workforce

- Laws and procedures (in some cases even online applications to simplify the process) that ensure foreigners' degrees are recognized locally. This allows skilled migrants to work in the field in which they have skills to contribute. Such programs ideally include procedures and outside bodies to ensure foreigners are treated fairly and the assessment of their qualifications meets established standards. They should also include participation from employers and professional bodies (e.g. industry associations for engineers, doctors, etc.).
- Examples: National-level laws and procedures that establish how to recognize foreign qualifications (Germany, Denmark, Austria), sub-national laws and procedures (Canada), fast-track scheme (Sweden), pre-migration recognition of qualifications (Australia), five-day online procedure to evaluate job seekers' credentials for employers (Norway), recognition of non-schooling competencies or qualifications of migrants without documentary evidence (France, Norway, Chile, Luxembourg, Sweden, Canada, etc.), bridging programs for cases of partial recognition of qualifications (Australia, Germany, Canada, Portugal, Sweden), bilateral agreements on the recognition of qualifications. [169, 170, 171]

Fellowships for foreign talent

- Fellowships that encourage skilled migrants (either foreign nationals or nationals living abroad) to take up academic positions. This can be targeted at specific countries.
- Examples: PEARL and ATTRACT fellowship programs (Luxembourg), the Program in Support of Science in Mexico (PACIME) and Institutional Consolidation Programme (PCI) (Mexico),[172] NHMRC Howard Florey Centenary Fellowships (Australia), Return Grants for Belgian Post-Docs (Belgium),[173] Exchange of International Researchers (Korea), Research Chairs Initiative (South Africa),[174] Ernst Mach Grant (Austria),[175] KAUST Global Fellowship Program for Early Career Researchers (Saudi Arabia).[176]

Higher-education incentives for foreign students

- Targeted fellowships and university reforms that attract foreign students.
- Examples: Increase the number of programs taught in English (Finland), international university partnerships (Portugal), scholarships for foreigners and efforts to increase post-study work and settlement (Korea).

Reform the academic system to create clearer and more attractive career pathways

- Programs that reform academic career paths to make them more attractive.
- Examples: Introduction of a tenure-track system and flexible hiring (Austria).

Funding and incubators for start-ups run by foreigners to encourage entry into the local market

- Programs that provide funding and mentorship for start-ups, with incentives and information to encourage relocating.
- Examples: GoAustria funding scheme (Austria),[177] StartupDelta (Netherlands).[178]

Entrepreneur visas to ease the entry of foreign start-ups into the local economy

- Preferential visa programs that support efforts to attract foreign start-ups.
- Examples: Start-up Visa (Canada),[179] Innovation Visa (Israel).[180]

Programs to encourage repatriation of nationals

- Programs that seek to provide incentives for nationals living abroad to return.
- Examples: "Reverse brain drain" program (Italy),[181] Returning Singaporean Scientists Scheme (Singapore),[182] allowing nationals to work part-time in home country while living abroad (China).[183]

Preferential visa programs

- Easy pathways for highly skilled people and their families to migrate, and to stay long-term.
- Examples: RWR Card (Austria), Global Talent Visa (Australia), Priority Lists (Denmark), Opportunity Card (Germany), Blue Card (EU), start-up visa schemes (Austria, Finland, Denmark, Netherlands, Spain, Estonia), Employment Pass and Tech Pass (Singapore), Global Impact Visa (New Zealand), Tech Visa (France), Skilled Worker Visa (UK).[184, 185, 186, 187, 188]

Retain

Scholarship with requirement to return to the country

- Scholarship programs that include requirements to return home after international study.
- Examples: Bolashak scholarships (Kazakhstan), Joint Japan/World Bank Graduate Scholarship Program (Japan), KAUST Gifted Student Program (Saudi Arabia).[189]

Note that some of the policies discussed in the "develop" and "attract" categories also contribute to retaining RDI talent. Examples of such policies and programs, which have already been discussed above, include the following:

- Grants and support for university spinouts (see **Develop**).
- Modernizing and improving teaching approaches and curricula (see **Develop**).
- Fellowships, grants, and awards for researchers (see **Develop**).
- Reform the academic system to create clearer and more attractive career pathways (see **Attract**).

For concrete country examples, please refer to the corresponding heading in the "develop" and "attract" categories.

Chapter 3. **Qatar's approach to strengthening its RDI talent pool**

Qatar's ambition to transition toward a knowledge-based economy is affected by a multitude of behavioral, sociocultural, policy, and business-related challenges. Sustained and proactive policy interventions are crucial to overcoming these challenges and creating the conditions needed for a thriving RDI ecosystem. Over the last few decades, Qatar has implemented numerous strategies, policies, and programs to this end. These include but are not limited to scholarships and sponsorships that encourage enrollment in STEM subjects, training and mentorship programs for students, workers, and innovators, diverse research funding strands, and workforce nationalization policies.

Section 3.1 provides an overview of Qatar's existing RDI ecosystem, including a mapping of key stakeholders in the sector. This information contextualizes subsequent sections, which lay out Qatar's policies and programs that aim to develop, attract, and retain RDI talent.

3.1 Overview of Qatar's RDI ecosystem

As an oil- and gas-producing Gulf Cooperation Council (GCC) country, Qatar is highly dependent on its hydrocarbon industry. In recent years, Qatar has implemented a range of policies aimed at diversifying its economy and reducing its reliance on natural resources. Such strategies—especially targeting improvements in local production and trade diversification—were significantly accelerated after the 2017 blockade, and played a key role in mitigating its negative effects.[190]

With a small population and declining fertility rates, however, the country is progressively more reliant on expatriates to boost economic development.[191] According to the Labor Force Sample Survey (Q4 2023), 91% of the population aged 15 and above, both economically active and inactive, are foreign nationals. Among the economically active population, as well as the employed, this figure exceeds 94%.[192] These demographic and socioeconomic characteristics are reflected in the country's RDI ecosystem.

In 2020, only 34% of all Qatari nationals held an undergraduate degree or above.[193] While this represents an increase from 20.3% in 2010, further advancement would be crucial to building a skilled and future-ready national workforce. Among those who hold higher-education degrees, the uptake of STEM disciplines is low: only 7% of Qatari citizens aged 15 and over have an educational specialization in STEM disciplines, compared to 19% among expatriates in the same age group.[194] Past studies have shown that STEM specializations are more common among expatriate students,[195] while Qatari students express a relatively low level of interest in STEM.[196] These patterns translate, at least to some extent, to Qatar's RDI workforce composition, of whom 79% were non-nationals in 2021.[197]

Tables 3 to 7 provide a snapshot of the available resources and personnel in Qatar's RDI ecosystem.

Table 3: Qatar's expenditure on RDI[198, 199]

Expenditure on RDI	Value	Source
Gross expenditure on research and development (GERD) as % of GDP in 2021	0.68%	Results of Research & Development Survey: State of Qatar 2021
Higher-education sector	65%	
Public sector	22%	
Business sector	13%	
GERD by type of research		
Basic research	32%	Results of Research & Development Survey: State of Qatar 2021
Applied research	55%	
Experimental development	13%	
Source of R&D funding in business sector in 2021		
Funded by government	16.8%	Results of Research & Development Survey: Status of Qatar 2021
Self-financed	63.5%	

Table 4: Education sector in Qatar[200, 201, 202, 203, 204]

Indicators: Education sector	Value	Source
Programme for International Student Assessment (PISA) results in 2022		
Qatar's average score in mathematics	414	
OECD average score in mathematics	472	
Qatar's average score in science	432	OECD's PISA 2022 Results
OECD average score in science	485	
Qatar's average score in reading	419	
OECD average score in reading	476	
Enrollment at tertiary level		
School enrollment at tertiary level in 2022	35%	World Bank Database
Students enrolled in universities in 2020–2021	41,000	Education in Qatar: Statistical Profile 2022
Demographics		
Share of Qatar's population with university degree and above (aged 15 and higher) in 2023	29%	
Qatari nationals with university degree as % of all nationals aged 15 and higher	38%	Qatar's Labor Force Sample Survey 2023
Non-nationals with university degree as % of all non-nationals aged 15 and higher	28%	
Share of Qatar's population specializing in RDI-relevant disciplines (aged 15 and higher) in 2020	18%	
Qatari nationals specializing in RDI-relevant disciplines as % of all nationals aged 15 and higher	7%	Qatar Census 2020 data. RDI-relevant disciplines are defined as per Census-described categories.[205]
Non-nationals specializing in RDI-relevant disciplines as % of all non-nationals aged 15 and higher	19%	
Males as % of Qatari nationals specializing in RDI-relevant disciplines	64%	

Table 5: Labor-market participation in Qatar[206]

Indicators: Labor-market participation	Value	Source
Population aged 15 and higher employed in 2023	2,179,447	Qatar's Labor Force Sample Survey 2023
Males as % of employed population	83%	
Females as % of employed population	17%	
Qatari nationals as % of employed population	6%	Qatar's Labor Force Sample Survey 2023
Non-nationals as % of employed population	94%	
Employed population by sector		
Share of employed persons working in public sector in 2020	11%	RAND Europe analysis of Qatar Census 2020 data. "Private sector" here uses Census definition. "Public sector" is defined as combination of two Census categories: (i) Ministry/Government department; and (ii) Government establishment/company.
Non-nationals as % of population employed in public sector	58%	
Share of employed persons working in private sector in 2020	79%	
Non-nationals as % of population employed in private sector	99%	
Share of employed Qatari nationals working in public sector	84%	

Table 6: RDI workforce in Qatar[207]

Indicators: RDI workforce	Value	Source
Total R&D personnel in 2021	5,628	Results of Research & Development Survey: Status of Qatar 2021
Qatari nationals as % of R&D personnel	20%	
Non-nationals as % of R&D personnel	80%	

Indicators: RDI workforce	Value	Source
R&D personnel by sector of employment		
Higher-education sector	51%	Results of Research & Development Survey: Status of Qatar 2021
Public sector	25%	
Business sector	24%	
R&D personnel by profession		
Researchers as % of total R&D personnel	61%	Results of Research & Development Survey: Status of Qatar 2021
Technicians as % of total R&D personnel	23%	
Support staff as % of total R&D personnel	16%	
R&D personnel by educational qualification		
% of Qatari personnel with postgraduate degrees (Master's and PhD)	39%	Results of Research & Development Survey: Status of Qatar 2021
% of expatriate personnel postgraduate degrees (Master's and PhD)	59%	
Growth in number of R&D personnel		
% increase in total R&D personnel since 2012	54%	

Table 7: Innovators and entrepreneurs in Qatar[208, 209, 210, 211]

Indicators: Innovators and entrepreneurs	Value	Source
Patents registered with Qatar Ministry of Commerce and Industry in 2021	587	Results of Research & Development Survey: Status of Qatar 2021
Share of workforce self-employed in 2023	0.06%	Qatar's Labor Force Sample Survey 2023
Total Early-Stage Entrepreneurial Activity in Qatar in 2023–2024*	14.26%	Global Entrepreneurship Monitor 2023–2024 report

Indicators: Innovators and entrepreneurs	Value	Source
Venture capital invested in Qatar (total value of deals between 2016 and 2023)	475 million Qatari Rial (130 million USD)**	2023 Qatar Venture Investment Report by Qatar Development Bank
Number of investors investing in Qatar's venture capital ecosystem in 2022	17	2022 Qatar Venture Investment Report by Qatar Development Bank
International investors as % of all investors	18%	

** The Total Early-Stage Entrepreneurial Activity represents proportion of Qatar's adult population engaging in new business ventures.*
*** Average annual exchange rate for 2023 was used to calculate nominal USD values.*

Several important patterns are at play in Qatar's RDI ecosystem. Gross expenditure on research and development (GERD) has been consistently growing in Qatar, increasing from 0.48% of its GDP in 2012 to 0.68% in 2021, as seen in Table 3.[212] However, it still remains below the averages for OECD (2.7%) and small advanced economies (2.8%).[213, 214]

Qatar's performance in the OECD's Programme for International Student Assessment (PISA) has also improved in recent years. The average score in science increased from 384 pts in 2012 to 432 pts in 2022, alongside a similar increase in the average mathematics score (376 pts in 2012 to 414 points in 2022).[215, 216] However, while this trend reflects well on educational reforms implemented in this period, Qatar's average scores, as seen in Table 4, are still below the OECD average. It is also worth noting that expatriate children scored better than Qatari students in PISA's mathematics and reading tests.[217]

According to past studies, this could partly be due to Qatar's K–12 education system, which lacks opportunities for students to meaningfully engage with mathematics and science subjects from a young age.[218] While higher education provides more avenues for hands-on exposure to STEM and RDI, Qatari students' participation in such programs remains relatively low.[219, 220]

Factors affecting uptake of STEM disciplines include differing levels of parental support, gender biases related to STEM careers, and citizens' preference toward government jobs.[221] Restrictions imposed by the COVID-19 pandemic further hindered students' ability to learn practical skills and apply scientific concepts, as educational institutions were compelled to adapt teaching and testing methods to online modalities.[222, 223]

The desirability of public-sector, as opposed to private-sector, employment, is another critical feature of the Qatari labor market. This trend is prevalent across several GCC countries and is well-documented in the literature, with high levels of public-sector employment resulting from a range of factors: studies cite the high salaries, prestige, and stability associated with such positions.[224, 225, 226] As seen in Table 5, this also applies to Qatar: 84% of all employed Qataris work in a government department or establishment, while expatriates comprise 99% of the total population employed in the private sector.[227]

Mirroring the wider GCC context, several factors contribute to this division in Qatar's workforce composition. First, the stark difference in average salaries across these sectors, as highlighted in Table 8, may at least partly account for the preference toward public-sector employment.

Table 8: Average monthly salary for paid employees in Qatar based on sector (2023)

Sector	Average monthly salary (in Qatari Rial)	Average monthly salary (in USD)*
Government department	31,628	8,678
Government company/ corporation	28,060	7,699
Private	7,789	2,137
National average	12,535	3,439

Source: Labor Force Sample Survey (2023).[228]
**Average annual exchange rate for 2023 was used to calculate nominal USD values.*

Furthermore, the latest quarterly Labor Force Sample Survey revealed that 69% of unemployed Qataris were unwilling to work in the private sector, citing the following reasons: (i) low wages; (ii) unsuitable working hours; (iii) lack of English-language skills; and (iv) social status.[229] As a result, they may wait for vacancies in a government agency, rather than work with a private employer.[230]

Qatar's recent development strategies recognize the importance of expanding STEM educational provision to reduce the gap in its labor market. However, past studies have demonstrated that, in comparison to expatriates, citizens are less likely to specialize in STEM subjects for the purpose of securing a job.[231, 232] In other words, young professionals may choose to specialize in disciplines with little private-sector demand, favoring fields that will help them obtain jobs in the government.

This misalignment between young professionals' career aspirations, their skillsets, and larger industry needs has influenced the extent to which businesses engage in RDI activities and cross-sectoral collaborations. For instance, the business sector accounted for only 13% of Qatar's GERD in 2021, decreasing from 25.8% in 2012. In comparison, the higher-education sector comprised 65% of the GERD in 2021. Qatar's R&D personnel are similarly concentrated in higher education, which employed 51% of all personnel, followed by government (25%) and business sectors (24%) in 2021.[233] This pattern contrasts with countries that have more advanced RDI ecosystems, where the business sector typically has the highest share of RDI expenditure. For example, in 2021, the business sector comprised 64.9% of OECD countries' GERD, on average.[234]

In addition, there are several institutional barriers to businesses' participation in RDI, including but not limited to: (i) difficulties negotiating contracts with RDI entities; (ii) unclear policies regarding intellectual property rights; (iii) insufficient time for the commercialization of RDI outputs; and (iv) limited opportunities for intersectoral collaboration.[235] These challenges have led to the underutilization and duplication of RDI resources, as well as limited interest in research careers.

Hence, strategy-driven policies and programs that systematically support the growth of RDI talent and activity have become an important priority for Qatar. The following national strategies are especially relevant: (i) the Qatar National Vision 2030; (b) the Qatar Research, Development, and Innovation Strategy 2030; and (iii) the NDS3.

Launched in July 2008, Qatar National Vision 2030 outlined the country's economic and social aspirations, as well as the human, social, economic, and environmental resources that would be needed to meet those aspirations. The National Vision has laid out improvements to educational systems and investments into training programs, workforce diversification, and recruitment of foreign workers as critical policy levers in strengthening Qatar's RDI sector.[236]

The Qatar Research, Development, and Innovation Strategy 2030 was launched in May 2020. It provides pioneering, sector-specific guidance for most RDI activities in the country and envisions three strategic goals related to bolstering Qatar's RDI talent pool: (i) improving K–12 education; (ii) improving undergraduate education; and (iii) implementing policies to develop, attract, and retain RSEs and innovators in Qatar.[237] This document also describes Qatar's objective of growing the total number of RSEs working in Qatar from 1,500 (at baseline in 2015) to 20,000 by 2030.[238] While ambitious, such a sharp increase in the number of RSEs is assumed to be achievable within the context of the QRDI 2030 Transformation Scenario. In this scenario, the government

raises its RDI funding to 2.8% of revenues, GERD is increased to 1.5% of GDP, and business expenditure on R&D (BERD) grows to comprise two-thirds of GERD, with the business and government sectors funding equal shares of GERD. These targets are aligned with figures from other small advanced economies.

The NDS3 was released in January 2024 as the "final" overarching guidance for attaining the National Vision for 2030.[239] It presents seven strategic national outcomes, one of which is to build a *"future-ready workforce: Enable and develop citizens into globally competitive individuals and attract high-skilled expatriates as long-term partners in Qatar's transformation journey."*[240] The Strategy describes the following approaches to prepare Qatar's workforce: (i) capacity-building of Qatari nationals; (ii) diversification of the Qatari workforce; and (iii) implementation of educational reforms.

While the RDI ecosystem in Qatar consists of different public, private, and affiliated organizations, setting the direction of systemic change is broadly the shared responsibility of the following entities: (i) the Ministry of Education and Higher Education (MOEHE); (ii) the QRDI Council; and (iii) the Qatar Foundation for Education, Science, and Community Development. The Qatar Career Development Center, Qatar Fund for Development, and Qatar Development Bank offer ancillary support. In addition, various private entities offer support for start-ups, entrepreneurs, and innovators.

3.2 Policies and programs to develop local RDI talent within Qatar

This section discusses policies and programs implemented in Qatar to develop the local RDI talent pool. Policies and programs discussed in this section are organized along four thematic clusters:

i. Improving educational provision before and during university.

ii. Incentivizing RDI-related study.

iii. Implementing a quota system to facilitate local talent development.

iv. Encouraging innovation in the workplace.

3.2.1 Improving educational provision before and during university

Qatari residents are supported throughout K–12 education by way of an extensive network of public and private schools. Some schools have begun implementing new teaching methods to develop children's scientific thinking from an early age. For instance, Qatar Foundation for Education, Science, and Community Development (hereafter called "Qatar Foundation") Qatar Academy for Science and Technology is a "co-educational" school that provides secondary-school students with research and industry placement opportunities in the engineering, computer, and biomedical sciences.[241] Qatar University's Future Scientists Academy is another example; this one-week program provides hands-on learning opportunities for school students in fields of science and technology.[242]

Pre-university training and mentorship programs can also facilitate the transition from secondary to higher education. Providing students with research opportunities can offer practical exposure to professional environments, develop skills, and improve their retention in RDI-related fields of study.[243] Indeed, research experiences that combine real-world application of science and innovation with academic mentorship and networking opportunities have been shown to be beneficial for students in RDI-relevant

areas,[244] especially for students from minority backgrounds.[245] Furthermore, these types of experiences bolster students' awareness of professional pathways after completing their studies.[246]

To this end, Qatar has been implementing a range of pre-university programs to support the early development of its RDI talent. For instance, Qatar Foundation delivers the Academic Bridge Program for Qatari and international secondary-school graduates, offering foundational support in mathematics, science, computer skills, and English-language proficiency, as well as extracurricular engagement and career guidance.[247, 248] Through partnerships with select universities in Qatar, the program enables students to earn higher-education credits for completed courses.[249] To date, this program has benefited 2,500 students.[250]

Recognizing the impact of practical learning alongside academic study, the QRDI Council's Talent Development programs supplement initiatives implemented by individual universities. For example, the Undergraduate Research Experience Program offers funding for university faculty members to conduct research projects that are aligned with national priorities.[251] The Council has a similar scheme targeted at students in secondary school.[252] In addition, Qatar Science and Technology Park (QSTP) administers TechInsight, an internship program that aims to provide undergraduate and postgraduate students with practical experience in engaging with start-ups.[253]

A number of additional programs have been implemented by higher education institutions in Qatar. For instance, the Qatar Computing Research Institute (QCRI) at Hamad Bin Khalifa University (HBKU) offers education and training in computing, including programs such as summer internships for undergraduate students, a program for K–12 students, and a weekend program for children of all ages to expose them to computing. Another example is the Creative Space Summer Camp, which provides education in computing for primary- and middle-school students, including computer programming and robotics.[254] In addition, the QCRI hosted the Generative AI Hackathon, an initiative designed to provide hands-on experience in developing generative AI projects to teams of experts and enthusiasts, mentored by QCRI staff.[255]

Similarly, Sidra Medicine, a medical facility based in Doha's Education City and part of Qatar Foundation, offers a range of education programs related to their clinical and research work. For instance, the Introduction to Genomics Program gives secondary-school students the opportunity to shadow laboratory researchers. In addition, the Science Café is a monthly program open to the public to raise awareness around medical research and clinical care.

Weill Cornell Medicine, an American medical school based in Qatar, also offers programs to encourage the development of RDI talent, specifically in the area of medical research. For instance, its National Training Program offers paid research training for recent medical graduates, while another program funds HBKU students to do doctoral research at Cornell. These programs aim to increase the skills and employment opportunities of medical researchers, encouraging students to pursue PhDs in medicine.

Qatar University, another large research institution in the Qatari RDI ecosystem, hosts the National Science Promotion Program. This program funds seven STEM projects per year, submitted by researchers at the university and with opportunities for undergraduate and high-school students to work on the projects. It aims to provide students with hands-on experience of working with Qatar University staff members and research facilities, preparing them for further STEM education. Projects funded

by the center to date cover a wide range of topics, including the effects of air pollution, the development of novel medical treatments, and the development of photovoltaic cells.[256]

3.2.2 Incentivizing RDI-related study

Scholarships and sponsorships are another major policy instrument, aiming to reduce dropout during and after secondary school, as well as increase the uptake of STEM disciplines. Scholarships are offered by several RDI entities in Qatar to support academically talented students, with some being available only to Qatari nationals, others only to international students, and the rest to both populations.

These scholarships are often aligned with national priorities. For instance, the MOEHE uses a "Pathways" framework to develop local talent in strategic disciplines, with the following academic pathways being eligible for funding by MOEHE's In-Country Scholarship program[257]:

i. Science, Engineering, and Technology Pathway

ii. Healthcare and Medical Sciences Pathway

iii. Education and Education Sciences Pathway

iv. Vocational Pathway

v. Other field of study.

The Amiri Scholarship Program, one of the most prestigious scholarships in Qatar, is another example. This scholarship is open to national and international students wishing to study at the top twenty-four universities globally and four located in Education City.[258, 259] Moreover, a Scholarship Abroad program, which provides financial support to Qatari students seeking admission to the top 300 universities across the world, as well as an In-Country Scholarship, which finances the cost of tuition at higher-education institutions within Qatar, are available to Qatari citizens.[260]

Universities may also offer their own scholarships. For example, Qatar University offers a range of competitive and non-competitive scholarships. Competitive scholarships have several strands, most of which are open to all Qatari residents without any nationality requirement, one example being H.H. the Emir of Qatar's Scholarship for Academic Excellence.[261] The university also offers Talent and STEM Sponsorship Programs to help talented Qatari students develop advanced expertise in different fields, including RDI-related disciplines.[262] In addition, enrolled students may also receive need-based financial aid.[263] The University of Doha for Science and Technology (USDT) offers a range of scholarships to attract highly qualified students into degree programs, including the Amiri Scholarship and the Education Above All scholarship.[264, 265]

Universities in Education City also have their respective systems for calculating financial aid, including some federal loan options for home-country nationals. For instance, Georgetown University's Qatar campus offers need-based grants to selected applicants, as well as Free Application for Federal Student Aid (FAFSA) for US citizens studying in Qatar. These financial aid packages may be annually renewable.

Students can also apply for sponsorships from private and/or non-academic entities within Qatar. Applications to these sponsorships are managed outside the university admission process, but can be utilized in many higher-education institutions, such as UDST,[266] HBKU[267] and Northwestern University in Qatar.[268] For example, Qatar Airways runs a University Scholarship Program that financially supports Qatari nationals who have recently completed secondary school to enroll in undergraduate courses within or

outside Qatar. After graduation, scholarship recipients are absorbed into the Qatar Airways workforce through their Graduate Development Program.[269] Vodafone Qatar has a similar sponsorship scheme, which incorporates a four-week internship within the company.[270] Similarly, the Commercial Bank of Qatar offers student sponsorships for relevant higher-education qualifications, supplemented by professional networking opportunities and skill-development conferences.[271] Courses eligible for sponsorship are typically determined based on the sponsoring organizations' business needs, promoting alignment between university training and industry needs. It is worth noting, however, that there is no publicly accessible data on the number of privately sponsored students.

Scholarships and sponsorships incentivize enrollment and retention in RDI-related disciplines, which in turn builds national capability in scientific research and innovation.[272, 273] Given the benefits of such initiatives, there has been a significant increase in their availability in Qatar over the past decade. Between 2012 and 2020 the total number of scholarships grew from 2,000 to 3,000, with 80% of these awarded within Qatari institutions.[274] More than three-quarters of the scholarship recipients in this period were female, possibly indicating that these scholarships have made local university study more accessible to female students.[275]

In the same vein, the number of Qatari residents holding at least an undergraduate degree increased by over 250% between 2010 and 2020.[276] Qatar's gross enrollment ratio at tertiary level has also increased, from 12% in 2012 to 35% in 2022.[277] While it is difficult to attribute this trend entirely to scholarships and sponsorships, it is likely that these were important contributors.

3.2.3 Implementing a quota system to facilitate local talent development

Quota systems are a common policy instrument in GCC countries, given that a significant portion of the said countries' labor force is comprised of expatriate workers. To ensure that Qatari nationals have access to employment and professional development, the Qatari government requires that a given proportion of employees in an organization—the exact proportion varying across sectors and professions—should be citizens of the country.[278]

Quota systems have, however, faced criticism in the talent-development literature. Experts question their effectiveness, arguing that the focus on number of nationals employed diverts attention from workforce quality and professional development.[279] To be effective, a quota system should be accompanied by incentives for employers to upskill their workers. As such, professional development and training opportunities that align learning with industry needs and national priorities are critical to an effective quota system.[280]

To some extent, Qatar's new Job Nationalization Law describes the Ministry of Labor's policy directives for encouraging private-sector employment among nationals. It addresses some criticisms lobbied at quota systems by providing citizens with skill development, training, and financial support for higher education, as well as incentives for private companies to hire, train, and retain Qatari employees. The exact details of its implementation are yet to become available—although they may become available soon—but this new law, in any case, may be a valuable incentive for members of Qatar's workforce.[281, 282]

3.2.4 Encouraging innovation in the workplace

Innovation and entrepreneurship are cornerstones of a knowledge-based economy. Recognizing this, government agencies such as the QSTP, QRDI Council, and Qatar Development Bank provide mentorship, specialized training, incubation facilities, and infrastructure to start-ups at different levels of growth.

QSTP provides various forms of support for start-ups at different stages of growth, from incubation to international expansion.[283, 284, 285, 286, 287] Furthermore, the QSTP International Talent Program seeks to encourage STEM entrepreneurs to set up base in Qatar by showcasing Qatar's RDI infrastructure, facilities, and ecosystem.[288] On the other hand, the QRDI Council provides specialized training to build capacity across different sectors and stakeholders; participants can include mid-management government officials, senior employees from large corporate entities, and leaders of small and medium-sized enterprises (SMEs).[289] Similarly, the Qatar Development Bank offers advisory, training, and consultancy services to help both new and more established businesses adopt more innovative ways of working,[290] as well as financial support for start-ups in the form of direct investments and seed funding.[291]

Some universities in Qatar also offer programs to encourage innovation and spinouts from their staff's R&D. For instance, HBKU runs a range of programs through their Innovation Center and Innovation Funds Office to support early-stage innovations arising from the university. They also run the HBKU Research and Development Corporation to support commercialization of innovations and maintain a catalogue of research talent.[292, 293, 294, 295]

It is also worth noting that some private organizations contribute to talent development in Qatar's RDI ecosystem. For instance, Innovation Café is a private company that offers training programs and networking opportunities for RSEs and entrepreneurs to connect with mentors, partners, and other businesses. Their activities also include bespoke services for aspiring and new entrepreneurs, assisting them with commercialization strategies, funding sources, and broader sectoral insights for their business ideas.[296]

This section has presented several policies that help develop Qatar's RDI talent. It is important to reiterate, however, that the boundaries between policies that aim to "develop," "attract," or "retain" RDI talent are porous. For instance, scholarships and innovation advisory services not only help to develop local RDI talent but also attract international students and RDI professionals. Nonetheless, attracting international talent remains an important priority for Qatar, and the next section discusses ways in which the country has tried to establish itself as a preferred destination for international RDI professionals.

3.3 Policies and programs to attract overseas RDI talent into Qatar

The national RDI talent strategy laid out by the government of Qatar is constrained by the country's limited human resources. As such, sourcing overseas talent is an important policy lever. Our evidence review has highlighted several factors that motivate the immigration of RSEs into Qatar. These include perceptions regarding Qatar's research performance, infrastructure and facilities, availability of research funding, and opportunities for research collaboration. This section explores these factors in more detail, followed by an exploration of Qatar's visa and immigration policies.

3.3.1 Factors motivating skilled migration into Qatar

Qatar's transition toward a knowledge-based economy is a top national priority, and this is reflected in the country's commitment to supporting RDI. There has been increased investment in applied and experimental research since 2018, expanding opportunities for foreign researchers to obtain financial support.[297] This is an especially pertinent development, as researchers in other countries may view this favorably as compared to the increased competitiveness for government funding in their current host or home countries.[298, 299]

In addition, Qatar has invested in developing the infrastructure required to advance RDI. These investments include new laboratory equipment, research and innovation hubs, incubators and accelerators, and the QSTP complex.[300] Furthermore, leveraging international media exposure during the FIFA World Cup in 2022, Qatar brought global attention to Education City as a technological and research hub.[301]

In addition to these broader expansions in RDI activity, Qatar has explicitly implemented policies and programs to attract foreign talent. These include scholarships for international students and incentives for new and established international start-ups. For instance, the Alchemist Doha fund was established to encourage global start-ups to set up base in Qatar.[302] The Technology Development Grant has a similar remit, funding international start-ups if they relocate to Qatar.[303] Likewise, the Qatar Development Bank provides advisory services to innovators and entrepreneurs of any nationality, provided they have a Qatari partner who is active and holds at least 51% of the project.[304] In addition, QSTP delivers the International Talent Program, a networking and professional development event targeted at foreign innovators and entrepreneurs held on-site at the QSTP complex.[305]

It is worth reiterating, however, that the success of any campaign to attract foreign talent will always be contingent on a country's immigration and visa policies. The ease and benefit of migrating to Qatar will ultimately determine whether overseas RDI professionals choose to relocate.

3.3.2 Qatar's visa and immigration policies

International student mobility is largely influenced by visa processes and their associated costs.[306] To facilitate student mobility, international applicants to several Qatari universities do not need to submit a separate visa application: students' residence permits are integrated within university admission processes, reducing the administrative burden on students.[307, 308] On the other hand, international RSEs seeking employment in Qatar require a sponsoring employer to obtain a residence permit, which will be valid for one to three years.[309]

In 2024, the Mustaqel Visa program was announced, aiming to welcome a larger range of global entrepreneurs, exceptional talent, and skilled migrants into Qatar.[310, 311] This visa was initiated by Jusour Manpower Solutions (hereafter called "Jusour"), a state-owned company, and backed by relevant government departments.[312] Although not yet launched, the Mustaqel visa nonetheless reflects Qatar's desire to liberalize its labor regulations to facilitate the recruitment and retention of global talent. First, this new visa scheme will have an extended five-year validity with

possibility of renewal. Secondly, it is designed to allow RSEs to enter the country without a job offer and to look for employment, provided they are endorsed by a government entity and can demonstrate adequate resources to support themselves financially.[313]

Skilled individuals in 13 priority areas, including RDI, are eligible for the Mustaqel visa. Entrepreneurs are eligible if they receive endorsement from a business incubator in Qatar and they make an investment of at least QAR 250,000.[314] Jusour runs several other programs that provide visa support to Qatari businesses, non-Qatari university graduates, and Qatar-based skilled workers seeking employment. For example, the Sahem Graduating Student Visa Extension Program provides a one-year extension to international graduates' student visas and enables them to apply for jobs in this period.[315]

It is important to note, however, that these new immigration policies must be considered in light of broader global mobility patterns and incentives for RDI professionals. In 2023, Qatar ranked 35th in INSEAD's Global Talent Competitiveness Index (GTGI),[316] representing a decrease from its 23rd rank in 2018.[317] Qatar also ranked much lower on the "Retain" component of GTGI (77th) in 2023.[318] Thus, while Qatar's policies for attracting global talent seem extensive, more attention must be accorded to RDI professionals' perceptions of the RDI ecosystem. Furthermore, efforts to retain said professionals within Qatar becomes an important consideration.

As such, the next section presents the existing evidence on the factors that determine whether RDI professionals choose to stay in—or depart from—Qatar. Recent sociopolitical developments in Qatar, which may influence the retention of RDI talent, are also discussed.

3.4 Drivers of RDI talent retention in Qatar

While developing and attracting local and overseas RDI talent are important priorities, Qatar also recognizes the need to prevent human capital flight and increase the retention of its RDI talent.[319] It is worth noting, however, that retaining RDI talent hinges not only on national employment and immigration policies but also on factors that are entirely within the remit of individual employers, such as employee benefits and working conditions. Given this, initiatives to promote the retention of RDI talent are more difficult to document. Nonetheless, this section discusses important reforms to Qatar's visa regime, working conditions for RSEs in Qatar, and Qatar's broader sociopolitical climate—all of which influence RDI workers' decision to remain in or depart from Qatar's RDI ecosystem.

Qatar was the first GCC country to terminate the Kafala system in 2020. In the Kafala system, employers exercised excessive control over workers, potentially leading to exploitation and a general lack of state protection.[320] With the termination of the Kafala system, foreign employees no longer require a No Objection Certificate from their previous employer before changing jobs.[321] This shift marks a transformative development in Qatar's workforce, making working conditions more favorable for skilled migrant workers.[322] The extended five-year validity of the aforementioned Mustaqel visa, with possibility of renewal, for talented individuals and entrepreneurs also aims to retain foreign RDI talent.

Nevertheless, challenges persist. Researchers continue to struggle with precarious employment, being effectively unemployed in between grant periods, placing their legal

residence within Qatar at risk. For instance, many postdoctoral researchers' residence permits expire shortly after the end of their research fellowships, leaving very little time to look for new employment. Hence, the QRDI 2030 Strategy recommends a visa extension in the cases of STEM graduates and early-career researchers to avoid the loss of RDI talent who have received training locally.[323]

The sociopolitical climate in Qatar also influences skilled workers' decision to emigrate, to stay, or to leave. For instance, recent developments in the country's RDI ecosystem—which have been discussed in this report—motivated several expatriate Qataris to return and work within Qatar.[324] Some may find certain cultural norms and laws unfamiliar or challenging, however, particularly when viewed from a Western perspective. For instance, while the 2022 FIFA World Cup highlighted Qatar's impressive infrastructural development, it also brought international attention to the country's labor practices and societal norms.[325, 326, 327] Additionally, regional political dynamics may influence talent attraction and retention. For instance, in early 2024 Texas A&M University announced plans to cease operations at its Education City campus by 2028,[328] citing regional instability as a contributing factor.[329, 330]

Thus, Qatar's ability to retain its local and international RDI talent depends on a wide range of factors, some of which are more implicit and sociopolitical in nature. Other determinants—as discussed in previous sections—include labor law reforms, job security, educational opportunities at leading universities, and favorable regulations for visa renewal and extensions.

Chapter 4. **Reflections**

3.5 Qatar's vision for its RDI workforce

Qatar envisions a major transition toward becoming a knowledge-based economy, as laid out in the NDS3. Strengthening RDI talent is recognized as an important enabler of this transition. The NDS3 describes a future-ready workforce by 2030, highlighting the following targets:

- More than 46% of the total workforce will be employed in skilled and highly skilled jobs.
- More than 20% of the Qatari workforce will be employed in the private and semi-private sectors.
- More than 18% of students will be graduates from STEM disciplines.
- Pupils will have an average PISA score of 483.

To attain these targets, Qatar looks to implement policies and programs that aim to develop local talent, attract international talent, and retain them within the country.

Immigration policy reform is an important lever of Qatar's workforce development strategy, with the country aiming to streamline existing visa issuance processes and implement new types of visas for international, highly skilled individuals. Alongside these immigration reforms, the country will also aim to develop its local workforce by providing incentives for companies to hire Qatari workers. The country also plans to further facilitate flexible ways of working, such as remote work arrangements, in an effort to promote worker mobility.

Improving education and training is also crucial to Qatar's vision. Upskilling programs, developed in conjunction with the private sector, will help create pathways for Qatari youth to work in priority economic sectors. Furthermore, scholarships and sponsorships for students looking to enroll in relevant disciplines will help promote careers in priority sectors. K–12 education is also recognized as equally important, with the NDS3 envisioning improvements to school curricula, teacher preparation programs, and educational governance frameworks and processes.

Broadly speaking, the NDS3 seeks to ensure that education and training in Qatar is aligned with the needs of industry. To this end, Qatar will put in place a workforce planning committee that will develop a future-oriented understanding of labor-market needs. In turn, this will inform the programs that will be implemented to support workforce development within Qatar.

Innovation, whether through technological advancements or new approaches, is a critical driver of economic development and social welfare. Boosting expenditure alone, however, even in R&D, cannot deliver sustainable growth without a skilled workforce and the right human capital. This has sparked a global competition for RDI talent, with countries and businesses competing for the expertise needed to propel economic progress.

The "war for talent" in RDI is becoming increasingly competitive, as high-skilled professionals are key to driving technological and economic advancement. Beyond top-tier researchers, there is also a growing demand for medium-skilled workers—such as technicians and vocationally trained professionals—who are essential to maintaining the broader RDI ecosystem. With ongoing concerns about labor shortages, especially in high-tech industries, countries have put in place policies and programs to bolster their competitiveness in the global RDI talent landscape.

Mapping out various policies and programs targeting the global RDI talent pool has become especially relevant to Qatar as the country has placed a larger emphasis on its transition toward a knowledge-based economy. This is reflected in Qatar's increasing investment in research, with the country's GERD consistently growing over the past ten years (albeit still below the reported OECD average). Furthermore, RDI features prominently in Qatar's economic development strategy, as is evident in the Qatar National Vision 2030, the QRDI Strategy 2030, and the NDS3.

In support of Qatar's transition toward a knowledge-based economy, this report has examined a wide range of RDI talent strategies across different countries. Three broad objectives were observed across these policies and programs: (i) develop the existing local talent pool through education and training; (ii) attract international talent; and (iii) prevent the outward migration of talent.

Global strategies to develop local RDI talent primarily focus on education, training, and university reforms. These strategies include scholarships and fellowships to fund research, as well as expanding academic career pathways to encourage researchers to continuously upskill themselves. Also common are collaborations between academia and industry that aim to supply RDI centers with researchers, who in turn gain access to industry-relevant skills and on-the-job training. In addition, to further industry–academia crossover, some universities have set up seed funds for academic staff venturing into start-up projects.

Qatar implements similar schemes. Individuals aspiring toward a career in RDI have access to both publicly and privately funded scholarships and sponsorships, as well as need-based financial aid; these funding schemes typically align with national priorities. In fact, reflecting how Qatar has increasingly prioritized RDI, the total number of scholarship programs in the country has grown by 50% between 2012 and 2020. These scholarships and sponsorships are complemented by efforts to generate young people's interest in RDI, with pre-university training and mentorship programs creating an early awareness of professional RDI pathways.

In addition, Qatar has put in place support structures for entrepreneurial activity, with various entities offering capital investment, specialized training, networking opportunities, or advisory services for start-ups at different stages of growth. These support structures are run by both public- and private-sector bodies.

Public-sector bodies set out overarching strategies for RDI and create a regulatory environment that enables the development, attraction, and retention of local and international RDI talent. On the other hand, investors and various business incubators and accelerators offer funding and mentorship opportunities for promising start-ups and

entrepreneurial ventures. In addition, industry associations and consultancies expand innovators' access to information about the market, facilitating the development of products and services that are responsive to market needs. Furthermore, research centers and laboratories, which often have strong links with industry, provide innovators with advanced equipment and amenities for product design, development, and testing.

These financial resources and mentoring opportunities are complemented by a wide range of avenues for collaboration and networking, in the form of events and competitions, as well as co-working spaces that aim to foster a sense of community among innovators and entrepreneurs. Indeed, strengthening human capital is an important component of Qatar's efforts to strengthen its RDI ecosystem. Universities and other higher-education institutions play an important role in this respect, in that they not only provide education and training in RDI-relevant disciplines but also implement programs that encourage young people to pursue said disciplines. Furthermore, universities are a prime site of research, and are therefore an important source of knowledge and driver of innovation.

There is already a considerable number of initiatives within Qatar that aim to develop local RDI talent. To bolster these efforts, Qatar may consider implementing measures to promote further crossover between industry and academia.

For instance, while university scholarships and sponsorships in Qatar are informed by national priorities and may, in some instances, be funded by private organizations, there seems to be limited coverage for local postgraduate researchers seeking to gain industry exposure. Initiatives such as Spain's Ramón y Cajal and Juan de la Cierva programs, which supply RDI centers with researchers from academic institutions, may be useful models for similar programs in Qatar.

Support structures for entrepreneurial activity may also be extended to academic institutions. For instance, university-based incubators that provide seed funding for innovative, feasible start-up projects from within academia may be considered. Furthermore, entrepreneurship education may be embedded in the curricula of relevant university courses—a strategy currently being implemented by the UAE.

Increasing the crossover between industry and academia facilitates technology transfer, and smooth technology transfer is critical to the development of RDI clusters. These regional clusters—such as Silicon Valley in the US and the Stockholm-Uppsala Life Sciences Cluster—are a cornerstone of mature RDI ecosystems. Furthermore, developing these RDI clusters may also help attract talent from overseas.

Indeed, RDI ecosystems benefit from the circulation of international talent. Countries are aware of the benefits of attracting overseas RDI talent and of the fiercely competitive global marketplace. As such, sourcing countries have implemented a range of measures to make themselves more attractive to international talent, including but not limited to processes for recognizing foreign qualifications, scholarships and fellowships for international researchers, and visa and immigration schemes that facilitate the entry of skilled migrants. In addition, countries may also implement policies and programs that encourage return migration of nationals who have acquired skills from working or studying abroad.

Qatar has made strides in making itself more attractive as a destination for international researchers and innovators. For instance, the QRDI Council has recently expanded its research funding, and general investment in applied and experimental research within Qatar has grown in the past five years. There has

also been increasing investment into research infrastructure, with QSTP and Education City being landmark developments.

Moreover, Qatar has established incentives for international start-ups to set up base in the country. Initiatives such as the Alchemist Doha fund and the Technology Development Grant provide funding for international start-ups. These incentives are complemented by a favorable visa scheme: the forthcoming Mustaqel visa will facilitate the entry into Qatar of migrants who are skilled in at least one of 13 priority areas (including RDI), as well as entrepreneurs who are endorsed by a Qatari business incubator.

While Qatar's efforts to attract international talent have been extensive, retaining talent remains an issue. Though Qatar has taken large steps forward to improve working conditions for skilled migrants—for instance, becoming the first GCC country to discontinue the Kafala system in 2020—international RDI professionals still struggle with precarious employment, with many postdoctoral research contracts expiring very shortly after the end of the associated fellowship. This prompts the premature exit from Qatar of researchers who may have otherwise stayed. Such a premature exit could result in a net loss for Qatar, as locally trained researchers take their expertise elsewhere due to inadequate immigration support.

As it stands, retaining local talent has always been a more complex challenge. Fewer policies explicitly aim to retain talent—that is, compared to policies aiming to develop or attract talent—since in large part this issue depends on employers offering competitive compensation and career development opportunities. Nevertheless, broader improvements to the RDI ecosystem, such as stronger infrastructure and enhanced research opportunities, may indirectly help retain local talent.

In sum, this landscape report has explored a wide range of international policies and programs for strengthening RDI talent ecosystems. In determining the extent to which these strategies might also benefit Qatar, it is important to take stock of the country's contextual specificities.

Endnotes

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