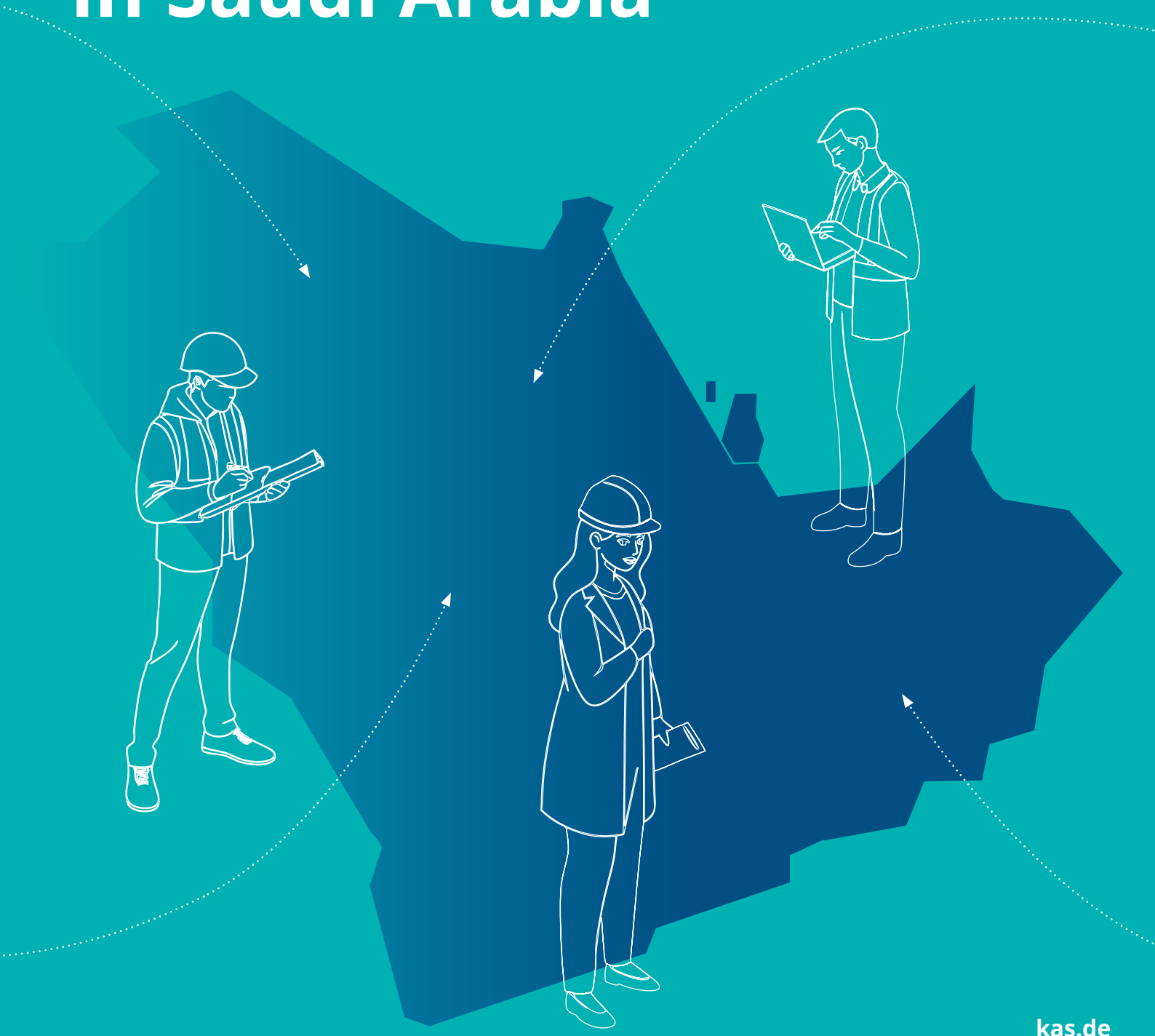
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Vision 2030 and the Future of Labour and Migration in Saudi Arabia



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Foreword

The landscape of migration and labour in Saudi Arabia is undergoing a profound transformation, shaped by rapid technological advancements and ambitious economic reforms. As the Kingdom pursues its Vision 2030 agenda, it is redefining its role in the global economy by investing in high-value sectors such as renewable energy, healthcare, and information and communications technology. These efforts are not only diversifying the economy but also fostering a knowledge-based society that is poised to lead the region in innovation and sustainable growth.

Central to this transformation is the dual imperative of attracting international talent while nurturing local skills. With the largest total and youth population in the Gulf, Saudi Arabia faces both the challenge and the opportunity of equipping its citizens – especially the younger generation – with the skills required for the new economy. The pace and breadth of reforms are remarkable, with a strong emphasis on aligning education and training with market needs, promoting gender inclusivity, and fostering adaptability and soft skills. These measures are designed to boost labour productivity and ensure that Saudi Arabia remains competitive in an era of automation and skill-biased technological change.

Saudi Arabia's demographic weight is significant, with a population of over 32 million, including more than 13 million foreign residents. This makes the Kingdom not only the strongest economy in the Arab world but also the primary destination for nearly half of all foreign workers in the Gulf region. Ongoing reforms, including the Saudisation policy (*Nitaqat*), the Labour Market Initiative, and the Premium Residency Card scheme, reflect a strategic effort to balance the needs of the national workforce with the benefits of attracting and retaining skilled expatriates.

This volume draws on first-hand research and insights from a diverse group of contributors, examining the impact of these sweeping changes on the labour market, migration dynamics, and broader socio-economic issues. It addresses critical questions about the future of work, the evolving profiles of national and foreign workforces, and the policies shaping migration and employment patterns. By exploring these themes, the book offers a comprehensive analysis of Saudi Arabia's journey through economic diversification, social reform, and global integration.

Special thanks to those who helped bring this book to fruition, including Dr. Kristian Alexander, Dr. Nasra Shah, Dr. Françoise De Bel-Air, Mr. Imco Brouwer, and Ms. Christine Williams of the Gulf Research Center as well as Mr. Philipp Dienstbier, Ms. Marah Jamous, and Ms. Layan Ounis of the Konrad Adenauer Foundation.

Dr. Abdulaziz Sager
Founder and Chairman, Gulf Research Center (GRC)

Foreword

In the emerging discussion around labour market transformation and the role of highly-skilled migration to and from the Gulf countries in this, the Kingdom of Saudi Arabia represents an especially important case study. As the strongest economy in the Arab world, Saudi Arabia also recorded the fastest-growing GDP among G20 economies. With a population of 32.2 million, 13.4 million of whom are foreign residents, Saudi Arabia not only outnumbers its GCC neighbours demographically but also attracts nearly half of all foreign workers in the region.

At the same time, Saudi Arabia has become a laboratory of post-oil social and economic transition. At the centre of this transformation is Vision 2030, the ambitious reform agenda designed to diversify and decarbonise the economy and reduce reliance on hydrocarbons. It promotes not only technical innovation, development of new sectors such as tourism, health, and sport, but also introduces far-reaching reforms to address unemployment and raise the labour market participation of women.

Programmes such as Nitaqat, launched in 2011 to advance workforce Saudisation, along with significant investments in education and vocational training, aim to align national skills with market needs. Meanwhile, newer initiatives, including the "Labour Reform Initiative", which moves beyond the traditional sponsorship system, and the "Premium Residency Card", are intended to attract international talent and retain skilled residents already in the Kingdom.

In this way, Saudi Arabia exemplifies both the challenges and opportunities of labour market transformation in the Gulf. The interplay between its demographic weight, ambitious diversification agenda, and evolving migration policies makes the Kingdom a central case for understanding the future of labour and migration in the region. As the labour market evolves, future skills, technological adaptation, and workforce readiness have become increasingly central to the Kingdom's transformation, underscoring how Vision 2030's ambitions depend on sustained investment in human capital.

Conceived by the Gulf Research Center (GRC) and developed with the Konrad-Adenauer-Stiftung (KAS), the volume at hand contributes to this fascinating development by examining in-depth the experience in transforming the Saudi labour market thus far and maps pathways for policymaking ahead. I invite you to engage with the chapters that follow, which interrogate issues of skills-development, workforce readiness and labour market governance in greater depth and shed light on the challenges looming and the opportunities presenting themselves for the Kingdom and the wider region.

Philipp Dienstbier
Director of the Regional Programme Gulf States, Konrad-Adenauer-Stiftung (KAS)

About the Institutions

Gulf Research Center

The Gulf Research Center (GRC) was founded in July 2000 by Saudi businessman Dr. Abdulaziz Sager. Dr. Sager's vision was to fill an important void and to conduct scholarly, high-quality research on all aspects of the wider strategic Gulf region including the GCC countries as well as Iran, Iraq, and Yemen. GRC operates on an independent, non-profit basis. The GRC's belief is that everyone has the right to access knowledge. As a result, it has made all its research available to the public through publications, workshops, seminars, and conferences. As a non-profit organisation, GRC injects all income back into new programmes and activities.

Gulf Labour Markets, Migration, and Population Programme

The Gulf Labour Markets, Migration, and Population (GLMM) Programme is an international independent, non-partisan, non-profit programme hosted and supported by the Gulf Research Center. The programme provides data, analyses, and recommendations contributing to the improvement of understanding and management of Gulf labour migration, population, and labour markets, engaging with and respecting the viewpoints of all stakeholders.

Konrad-Adenauer-Stiftung (KAS)

The Konrad-Adenauer-Stiftung (KAS) is a non-profit German political foundation affiliated with Germany's largest political party, the Christian Democratic Union (CDU). With over 100 offices in more than 120 countries and more than 200 programmes worldwide, KAS promotes international dialogue, democratic governance, the rule of law, and sustainable socio-economic development. Through its global network of partners across government, civil society, academia, and the private sector. KAS supports informed decision-making, fosters constructive exchange, and contributes to deeper mutual understanding in an increasingly interconnected world.

KAS Regional Programme Gulf States (RPG)

Established in 2009, the KAS Regional Programme Gulf States focuses on strengthening political, economic, and cultural cooperation between Germany, Europe, and the countries of the Gulf Cooperation Council (GCC). Its work centres on enhancing mutual understanding, supporting economic modernisation and private-sector development, fostering regional and collective security dialogue, and empowering youth and civil society. As a think-tank and consultancy platform, the programme facilitates bilateral and multilateral exchange and contributes to informed policymaking while addressing the diverse contexts and needs of the Gulf region.

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Introduction

Saudi Arabia today stands at the centre of one of the most ambitious socioeconomic reform projects in the world. With Vision 2030, launched in 2016, the Kingdom has committed itself to diversifying its economy, reducing dependence on hydrocarbons, and building a competitive, knowledge-based society. These reforms are not only economic in scope but also social and demographic, reshaping labour markets, education systems, and migration policies. As the strongest economy in the Arab world and the fastest-growing among the G20, Saudi Arabia has become a laboratory of post-oil transition, where the interplay of nationalisation policies, foreign labour demand, and human capital development will determine the trajectory of its future.

Migration is central to this transformation. Out of a population of 32.2 million recorded in the 2022 census, 13.4 million are foreign residents, making Saudi Arabia the largest migrant-receiving country in the Gulf and one of the largest globally. Historically, the Kingdom has relied on low-skilled migrant labour, particularly from South and Southeast Asia, to fuel its rapid development. Yet Vision 2030 introduces a new paradigm: the attraction and retention of highly skilled migrants to drive innovation, staff emerging industries, and support the transition to a diversified economy. At the same time, the reform process seeks to increase Saudi nationals' participation in the labour force, especially among youth and women, through education, training, and targeted employment policies. This dual challenge—mobilising domestic human capital while competing globally for talent—defines the future of labour and migration in Saudi Arabia.

This volume, produced by the Gulf Labour Markets, Migration, and Population (GLMM) Programme of the Gulf Research Center (GRC) in collaboration with the Konrad-Adenauer-Stiftung's Regional Programme Gulf States (KASRPG), brings together leading scholars and practitioners to examine these dynamics. It situates Saudi Arabia's labour and migration reforms within the broader framework of Vision 2030, offering both empirical evidence and analytical perspectives on how the Kingdom is navigating the global competition for talent. The contributions address the structural transformations underway in Saudi labour markets, the evolving role of highly skilled migration, and the perceptions of sending countries whose nationals constitute a vital share of the workforce.

The first set of chapters in this volume examines the **future of labour in Saudi Arabia and the migration of the highly skilled**, situating these dynamics within the broader framework of Vision 2030. **Mehmet Ali Soytas** opens with a detailed analysis of the skills needed to maximise labour productivity in the Kingdom. His chapter identifies the occupational shifts already underway, the sectors most likely to demand new competencies, and the strategies required to align education and training with these needs. Mehmet Soytas underscores the centrality of productivity growth to Saudi Arabia's economic diversification, showing how targeted upskilling and reskilling can bridge gaps between labour supply and demand. Building on this, **Sylvain Côté** explores the dual impact of demographic change and technological disruption. By applying international estimates of automation risk to Saudi labour market data, Côté demonstrates how different groups of workers—Saudi nationals, expatriates, men, and women—are differently exposed to automation. His analysis highlights both vulnerabilities and opportunities, stressing the importance of adaptive policies that foster continuous learning and resilience in the face of technological change. **Monera Al Mahmoud** then turns to the education and training landscape, focusing on how Saudi youth are being prepared for high-skilled employment. Her chapter evaluates the alignment between education outcomes and labour market

demands, paying particular attention to gender disparities and the qualifications gap. She shows how initiatives such as entrepreneurship programmes, vocational training, and scholarship schemes are reshaping opportunities for young Saudis, while also identifying persistent mismatches that drive reliance on foreign talent. Finally, **Yusra Al Shanqityi** provides a comprehensive report on the trends and dynamics of highly skilled migration to Saudi Arabia. Her chapter analyses recent policy innovations—including the Premium Residency scheme and labour reforms—while assessing their effectiveness in attracting and retaining skilled professionals in strategic sectors such as technology and healthcare.

Together, these chapters paint a comprehensive and nuanced picture of Saudi Arabia's labour market transformation: a system in flux, shaped by demographic pressures, technological change, and ambitious reform agendas, yet still grappling with structural challenges of skill mismatch, retention, and equity.

The second set of chapters shifts the lens outward, examining the **attractiveness of Saudi Arabia to highly skilled migrants and the perspectives of Asian sending countries**. **Justin Alexander** situates Saudi Arabia within the global competition for talent, comparing its performance with Gulf and international peers through benchmarking indices and empirical data. His chapter highlights both the progress Saudi Arabia has made—rising in global rankings of talent attractiveness—and the areas where it lags, particularly in quality-of-life indicators. He shows how the Kingdom's ambitious projects and reforms have succeeded in creating demand for highly skilled migrants, while also identifying the policy levers that could make Saudi Arabia more competitive. **Anju Mary Paul, Kurt Kuehne, Kareem ElRafei, and Bedoor AlShebli** then turn to the experiences of international science faculty in Saudi universities. Drawing on large-scale publication data, surveys, and interviews, they reveal both the opportunities and challenges of conducting research in the Kingdom. Their chapter highlights improvements in research productivity and job satisfaction, but also points to persistent obstacles such as funding constraints, administrative inefficiencies, and limited career advancement pathways. These findings underscore the importance of strengthening Saudi Arabia's nascent research ecosystem if the country is to become a global hub for scientific talent. Finally, **Bilesha Weeraratne** examines the perspectives of South Asian sending countries—Bangladesh, India, Pakistan, Nepal, and Sri Lanka—whose nationals constitute a significant share of Saudi Arabia's migrant workforce. Her chapter analyses how stakeholders in these countries perceive Saudi Arabia's institutional context and migration policies, and how these perceptions shape migration flows. The author highlights South Asian stakeholders and migrants' concerns about wage disparities, labour protections, and the impact of Saudisation policies, while also noting the enduring appeal of Saudi Arabia as a destination due to employment opportunities and remittance potential.

Taken together, these chapters reveal the complex interplay between Saudi Arabia's efforts to attract talent and the perceptions of those who supply it. They underscore that the Kingdom's success in the global competition for highly skilled migrants will depend not only on domestic reforms but also on how it is viewed by the international scientific community and by sending-country stakeholders.

Several cross-cutting themes emerge across the volume. First, Vision 2030's success depends on balancing nationalisation policies with the continued need for foreign labour at all skill levels. While initiatives such as Nitaqat, the Labour Reform Initiative, and the Premium Residency Card aim to increase Saudi participation and attract global talent, they also raise questions about efficiency, equity, and sustainability. Second, the Kingdom's demographic profile—youthful, increasingly educated, and with rising female participation—creates both opportunities and pressures, requiring careful alignment between education outcomes and labour market demands. Third, technological change, particularly in artificial intelligence, digital health, and renewable energy, is reshaping skill requirements and creating new professional pathways. Finally, the perceptions of sending countries and migrants

themselves remain critical: wage differentials, working conditions, and pathways to residency or family unification will determine whether Saudi Arabia is seen as a temporary stopover or a long-term destination.

By weaving together these perspectives, the volume contributes to a deeper understanding of how Saudi Arabia is reconfiguring its labour and migration regimes in the context of Vision 2030. It underscores the Kingdom's dual role as both a national reformer and a global competitor for talent. The analyses presented here are not only relevant for Saudi policymakers but also for international organisations, sending countries, and scholars of migration and labour markets. They highlight the need for evidence-based, inclusive, and forward-looking policies that recognise the aspirations of migrants, the developmental needs of origin countries, and the strategic ambitions of Saudi Arabia.

In sum, this volume situates Saudi Arabia at a critical crossroads: a nation seeking to transform its economy and society while remaining deeply embedded in global migration systems. The future of labour and migration in the Kingdom will depend on its ability to reconcile nationalisation with openness, short-term project demands with long-term settlement incentives, and economic diversification with social integration. As the contributions in this volume demonstrate, the stakes are high—not only for Saudi Arabia but also for the wider Gulf region and the global competition for talent.

A

The Future of Labour in Saudi Arabia and the Migration of the Highly Skilled

1

Future Skills Needed and Profiles of Workers: Ways to Maximise Productivity of Labour

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Abstract

The labour market in Saudi Arabia is currently undergoing substantial policy reforms as part of the broader Vision 2030 masterplan, aimed at equipping the workforce with the skills necessary to meet future job market demands. With a youthful and increasingly educated population, the labour market has seen significant growth in female participation and a gradual shift from public sector employment to a more dynamic private sector. This transition reflects evolving skill requirements and new career pathways, signalling the country's commitment to fostering a more competitive and diversified economy. At the core of these efforts is the recognition that labour productivity plays a crucial role in driving economic growth, and the demand for future skills is increasingly focused on enhancing this productivity. Central to the discourse is the necessity of acquiring the requisite skills to facilitate a smoother transition from school to the workplace, as well as the ongoing need for upskilling through on-the-job training for individuals navigating mid-career transitions. This report analyses key labour market trends in Saudi Arabia using data from official statistics provided by the General Authority for Statistics (GAStat) and reports published by the National Labour Observatory, identifies critical skill needs, and offers actionable strategies to maximise productivity of labour. Specifically, it aims to elucidate shifts in the occupational structure, identify high-demand occupations, and examine corresponding developments on the supply side, including potential mismatches, and the future demand for immigrant workers.

Introduction

The nature of jobs is undergoing a significant transformation in today's rapidly evolving world. The rise of AI and automation systems has brought both opportunities and challenges. While these technological advancements have the potential to enhance productivity and efficiency, they also pose a risk to certain occupations. Many jobs, particularly those in the low and middle skill segment, are vulnerable to being automated, leading to concerns about job displacement and the need for upskilling or reskilling the workforce (Autor, Levy, and Murnane 2003; Goos and Manning 2007; Michaels, Natraj, and Van Reenen 2014; Acemoglu and Restrepo 2018). Automation has the potential to streamline routine and repetitive tasks, leading to increased efficiency and productivity in many industries. However, jobs that primarily rely on manual or routine tasks are at a higher risk of disappearing. Occupations such as assembly line workers, administrative assistants, and data entry operators are examples of roles that could be automated by AI and automation systems among others.

In the Middle East and GCC countries, including Saudi Arabia, the changing nature of jobs is a topic of great significance. The region has been witnessing rapid economic growth and technological advancements, which have further fuelled the need for a skilled and adaptable workforce. In Saudi Arabia, the Vision 2030[1] initiative has placed a strong emphasis on diversifying the economy and reducing reliance on oil.[2] As part of this vision, the government has been actively promoting digital transformation, innovation, and entrepreneurship, with a focus on developing a knowledge-based economy.

While this transformation brings tremendous opportunities, it also necessitates a shift in the required skill sets. There is a growing demand for workers skilled in emerging fields such as artificial intelligence, data analytics, cybersecurity, and renewable energy. Furthermore, soft skills such as critical thinking, problem-solving, adaptability, and creativity are becoming increasingly essential in the rapidly changing job market. To navigate these shifts successfully, it is crucial for individuals, educational institutions, and policymakers to proactively address the changing landscape of work. This includes investing in lifelong learning programmes, fostering a culture of innovation and entrepreneurship, and ensuring access to quality education and training (ILO, 2023). By embracing these changes and developing a skilled and adaptable workforce, Saudi Arabia, can harness the opportunities presented by the changing nature of jobs and emerge as a leading player in the global economy.

Understanding the current labour market trends and the evolving nature of occupations in Saudi Arabia is crucial for designing effective policies to address skill needs. While Saudi Arabia boasts a highly educated labour force,[3] it is essential to recognise that the skills required for the future may not solely be acquired through formal education (ILO, 2023). Upskilling and reskilling programmes play a vital role in ensuring the workforce remains adaptable and equipped with the relevant skills. Furthermore, the Kingdom has witnessed the emergence of new and rising occupations driven by the diversification efforts of Vision 2030. Sectors such as technology, renewable energy, healthcare, and tourism have experienced significant growth and demand for

skilled professionals. While the country has made substantial progress in educational attainment, aligning the skills of the workforce with the needs of these emerging industries remains a critical topic (Rathelot et al., 2023; Cedefop, 2015; ILO, 2019).

Upskilling initiatives has become a global best practice in addressing skill gaps and promoting workforce adaptability. Programmes that combine formal training, vocational education (Cedefop, 2015), and on-the-job learning have been successful in equipping employees with the skills required for evolving job roles. Collaborations between educational institutions, industry, and government entities have proven effective in providing targeted training and improving employability (OECD, 2020).

Saudi Arabia's labour market has been evolving dynamically with shifts in supply and demand that have influenced wage growth patterns. The increased participation of women and a youthful, well-educated population has expanded the labour pool, creating unique pressures on wages. However, with recent labour market reforms, wage trends for Saudis in private sector roles are now on a promising upward trajectory (NLO, 2024). Average wages for Saudi employees in the private sector have consistently risen over recent quarters, with the average salary climbing from around 9,700 SAR in 2022 to 10,150 SAR in 2024 (GAStat, 2024 Q2). This wage growth reflects potential productivity gains across the economy, as wages tend to signal productivity gains. Further analysis based on administrative data (NLO Snapshot Report, 2023) also supports this positive trend in private sector job wages.[4] The positive outcome for wages underpins the success of the active labour market policies in the Kingdom. However, it is essential to address the productivity issue at the core ingredient –the skills – to ensure that wages remain competitive in the long run and commensurate with the future skills and contributions of the workforce.

Overall, understanding the current labour market trends, promoting upskilling initiatives, and addressing productivity challenges are crucial components of Saudi Arabia's efforts to build a dynamic and future-ready workforce that can thrive in the evolving global economy. This report starts with a discussion on the skills and productivity relationship, with subtopics of global skill shortages, and addition of Saudi specific experience to that. Following sections address the future skill needs in Saudi Arabia, and discuss the ways of maximising labour productivity, where the paper revisits the skills productivity link and effective policies in the Saudi context. Final sections of the paper are devoted to addressing challenges in the Saudi labour market that might need compromises and specific policies such as youth employment and increasing female participation. The paper finally concludes by offering policy recommendations and presenting a summary of the main points.

Relevance of Skills for Productivity Growth

Productivity growth is a fundamental driver of economic progress (Aghion and Howitt, 2009; Barro, and Sala-i-Martin, 1995). Productivity improvements, achieved through advancements in technology, skill development, and innovation, are essential for sustainable growth as they enhance the value generated per worker, thereby supporting higher wages, improved standards of living, and overall economic resilience (Solow, 1957; Jorgenson & Griliches, 1967). Increases in labour productivity can also affect labour demand, though the direction of this impact can vary depending on industry-specific factors, the pace of technological adoption, and policy frameworks. For instance, productivity gains in capital-intensive industries might reduce labour demand due to automation, while in knowledge-intensive sectors, productivity growth can lead to higher demand for skilled labour (Acemoglu & Restrepo, 2018). Therefore, the implications of productivity growth for the labour market are complex and multifaceted, and it is important to understand the dynamic interplay between productivity and employment, particularly in terms of short-run and long-run dynamics.

The Immediate Impact of Productivity Growth on Employment

Productivity growth often implies that fewer labourers are required to complete the same tasks. This immediate effect is generally perceived as negative for employment, as technological advancements and efficiency improvements can lead to job displacement. For example, automation in manufacturing and advancements in artificial intelligence have reduced the need for human labour in certain sectors. According to the International Labour Organization (ILO)[5] (ILO, 2015), these changes can initially result in job losses, especially in industries heavily reliant on routine tasks.

In Saudi Arabia, similar trends are evident as the nation pursues its Vision 2030 goals. The drive for economic diversification and modernisation has led to significant

investments in technology and infrastructure. While these initiatives are crucial for long-term economic sustainability, they also pose immediate challenges for the labour market. Many workers in traditional sectors may find their roles diminished or obsolete as businesses adopt more efficient practices.

The Long-Term Benefits of Productivity Growth

Despite the short-term disruptions, productivity growth is closely linked to job creation and higher employment rates over time. Increased productivity often leads to economic expansion, which in turn creates new job opportunities (Acemoglu & Restrepo, 2018). This correlation suggests that countries with a strong focus on boosting productivity often experience parallel improvements in employment, as the economic expansion associated with productivity gains can lead to higher labour demand and, consequently, job opportunities in diverse sectors (World Bank, 2020). This alignment is evident across both advanced and developing economies, where policies that foster productivity improvements – such as investments in education, technology, and infrastructure – tend to support sustainable employment growth. This is because the efficiency gains translate into cost savings and higher profits, which businesses can reinvest in expanding operations and hiring more workers.

When productivity increases are strategically managed alongside policies for upskilling and workforce adaptability, economies can experience a net-positive impact on employment (OECD, 2021 and IMF, 2022). Supportive labour market policies can mitigate transitional effects on the workforce while enhancing productivity. Empirical research further highlights that countries investing in targeted human capital development tend to see more favorable labour market outcomes as productivity increases (Goldin & Katz, 2008; Autor, 2015).

Furthermore, increased productivity is often linked to shifts in labour demand across sectors, prompting the need for reskilling and vocational training programmes to ensure a smooth transition for workers displaced by automation (World Bank, 2021; ILO, 2019). In Saudi Arabia's context, aligning productivity growth with labour market needs will be essential to managing employment transitions and preparing the workforce for future job opportunities in high-value industries (OECD, 2021).

Case Studies and International Perspectives

Examining the experiences of other countries can offer valuable insights for Saudi Arabia. Germany's approach to managing productivity growth through its "Industry 4.0" initiative has been particularly successful. The initiative focuses on integrating advanced manufacturing technologies while simultaneously investing in workforce retraining programmes. Industry 4.0 leverages the "Internet of Things" (IoT), cloud computing, and artificial intelligence to integrate physical production processes with digital systems, thereby enhancing efficiency, flexibility, and productivity across industries. This initiative allows manufacturing companies to employ advanced data analytics to predict maintenance needs, optimise production flows, and improve product quality, all contributing to sustained productivity gains (Kagermann et al., 2013).

The German government supports Industry 4.0 through extensive funding and collaboration between public and private sectors, as well as collaborations with research institutions. By developing policies that encourage small and medium-sized enterprises (SMEs) to adopt advanced technologies, Germany focusses on access to productivity-enhancing tools, ensuring that the productivity gains are widespread. This structured support has played a key role in Germany's industrial productivity resilience, and its commitment to workforce upskilling (OECD, 2020; Federal Ministry for Economic Affairs and Energy, 2021). Initiative's reliance on smart factories has significantly boosted production capabilities (Hermann et al., 2016) and boosted productivity gains of up to 30% (McKinsey, 2015).

South Korea's focus on education and skill development has been instrumental in preparing its workforce for shifting economic demands. By prioritising lifelong learning and continuous upskilling, the country has fostered a resilient labour market capable of adapting to rapid technological changes and global economic pressures (OECD, 2019). This approach aligns with policies encouraging digital and technical training, which the Korean government has embedded into its workforce strategies to ensure competitiveness (World Bank, 2020), and reduced job displacement risks despite technological advancements (Kim, 2018).

International organisations like the International Labour Organization (ILO) emphasise the need for policies that drive productivity growth while also supporting employment and equitable social outcomes (UN, 2015; ILO, 2020). The ILO highlights the importance of social protection systems, labour market policies focused on job creation, and

Table 1: Fastest Growing Occupations, 2023 and Projected 2033 (in Thousands), Bureau of Labour Statistics.

2023 National employment title	Employment, 2023	Employment, 2033	Employment change, 2023–33	Employment change, %, 2023–33
Wind turbine service technicians	11.4	18.2	6.8	60.1
Solar photovoltaic installers	25.0	37.0	12.0	48.0
Nurse practitioners	292.5	427.9	135.5	46.3
Data scientists	202.9	276.0	73.1	36.0
Information security analysts	180.7	239.8	59.1	32.7
Medical and health services managers	562.7	723.3	160.6	28.5
Physician assistants	153.4	197.1	43.7	28.5
Computer and information research scientists	36.6	46.0	9.4	25.6
Physical therapist assistants	108.5	136.0	27.5	25.4
Operations research analysts	123.3	151.6	28.3	23.0
Occupational therapy assistants	47.5	58.1	10.6	22.3
Actuaries	30.2	36.8	6.6	21.8
Financial examiners	65.5	79.2	13.8	21.0
Home health and personal care aides	3,961.9	4,782.4	820.5	20.7
Veterinary assistants and laboratory animal caretakers	118.2	141.1	22.9	19.4
Veterinary technologists and technicians	125.7	150.0	24.3	19.3
Logisticians	237.1	282.9	45.8	19.3
Veterinarians	88.2	105.0	16.8	19.1
Mental health counsellors	449.8	534.3	84.5	18.8
Epidemiologists	11.0	13.1	2.1	18.8
Health specialties teachers, postsecondary	284.2	337.5	53.3	18.8
Speech-language pathologists	180.8	214.1	33.3	18.4
Medical equipment repairers	67.0	79.3	12.3	18.4
Software developers	1,692.1	1,995.7	303.7	17.9
Nursing instructors and teachers, postsecondary	89.9	105.9	16.1	17.9

Note: Data are from the Occupational Employment and Wage Statistics programme, U. S. Bureau of Labour Statistics.

substantial investment in education and vocational training, which are essential to ensuring that productivity gains benefit a broad segment of the population (ILO, 2019). These strategies equip workers with the skills needed to navigate changes in the labour market (OECD, 2021).

As nations transition to knowledge-based economies, the demand for future-oriented skills is accelerating. Key competencies such as digital literacy, critical thinking, and advanced technological abilities – such as data analysis, artificial intelligence, and automation – are essential for

fostering productivity growth (World Bank, 2020; OECD, 2019). For Saudi Arabia, equipping its workforce with these skills aligns with the goals of Vision 2030, which aims to build a dynamic, adaptable economy that can meet the demands of the global market (IMF, 2022; OECD, 2021).

Skills in technology, programming, and digital management are among the most valued globally, as they enhance efficiency and innovation across sectors (WEF, 2020 and OECD, 2021). Digital tools that enable predictive analytics and efficient resource management can significantly increase productivity in traditional industries such as manufacturing and logistics, as well as in new sectors like biotechnology and green energy, where Saudi Arabia is looking to expand. Investment in upskilling through continuous education is necessary to equip Saudi workers to adapt to changing demands, enabling them with a strong foundation in complex problem-solving, creativity, and critical thinking that boosts adaptability and resilience, particularly in industries undergoing rapid automation (World Bank, 2019; ILO, 2020). Policies that combine productivity-enhancing measures with social protections and skill development are essential for equitable growth, helping to spread the benefits of productivity gains across society (ILO, 2019).

Overall, the concerted efforts of the Kingdom's ministries highlight a comprehensive approach to workforce development, emphasising both the creation of new employment opportunities and the enhancement of existing skills (MHRSD, 2023). This multi-faceted strategy is essential for meeting the current and future demands of the labour market, ensuring long-term economic stability and prosperity. Additionally, by anticipating future trends in job demand and supply, economies can better prepare the workforce for the changes ahead and ensure that productivity growth translates into broad-based economic prosperity. This naturally requires continuous monitoring efforts. The U. S. Bureau of Labour Statistics (BLS) publishes an employment outlook report every other year to inform the public, educators, and policy makers about the future demand for existing jobs, highlighting the emerging occupations, the increased demand in occupations and declining occupations (U. S. Bureau of Labour Statistics, 2023). According to their latest report, some of the fastest growing occupations in 2023 and their projected 2033 numbers for U.S are given in Table 1[6, 7].

In Saudi Arabia similar efforts are underway, as the National Labour Observatory (NLO) of Saudi Arabia produces a similar foresight up to 2030 and beyond.[8] This forecasting exercise is important for informing many critical bodies in the Kingdom in terms of workforce planning based on occupational needs, shortages, surpluses, and the skill requirements.[9] Saudi Arabia's Ministry of Human Resources and Social Development (MHRSD) has launched the Sector Skills Councils initiative as part of a comprehensive strategy to meet the Kingdom's skill needs and improve productivity across multiple sectors. This initiative is a core part of Saudi Arabia's Vision 2030, targeting skill gaps in key industries like energy, manufacturing, digital services, tourism, logistics, and healthcare. A total of 12 councils have been established to focus on training and skills frameworks that align with the specific needs of these sectors, supporting long-term workforce adaptability and sectoral productivity (MHRSD, 2023; Zawya, 2023).

The role of the private sector in skill development is also crucial to fostering a highly productive and competitive workforce in Saudi Arabia. While public initiatives have been pivotal in setting the foundation for skill development, the private sector plays a complementary and increasingly indispensable role in equipping workers with the capabilities needed for a dynamic and evolving labour market. Many private entities are investing in in-house training programmes tailored to their specific industry needs, ensuring that employees are not only skilled but also aligned with the organisation's operational demands.[10] The growing trend of private companies adopting internal training programmes to meet the evolving demands of the Fourth Industrial Revolution is essential as such initiatives ensure that skill development is tightly integrated with technological advancements, allowing workers to remain relevant in the face of automation and digitalisation (WEF, 2020) highlights. Additionally, collaborations between private companies and educational institutions are emerging as key mechanisms for closing the gap between theoretical education and practical skills. Internships, apprenticeships, and dual training systems are notable examples of how such collaborations are being implemented globally and have the potential to further strengthen skill acquisition in Saudi Arabia. By adopting advanced tools such as e-learning platforms, virtual reality training, and AI-driven learning systems, companies are scaling training programmes while customising them to meet individual and industry-specific requirements, which can significantly enhance productivity by shortening skill acquisition time and foster lifelong learning and adaptability among workers (World Bank, 2022; Brookings Institution, 2021). Encouragingly, these private sector contributions align with Vision 2030's emphasis on increasing private sector participation in driving national economic transformation.

By scaling these efforts, the private sector can help bridge talent gaps, enhance workforce productivity, and ensure that Saudi Arabia's labour market remains resilient and adaptive to global changes. By embedding this skills-focused approach into its labour market strategy, Saudi Arabia has a chance to not only create a sustainable model for workforce development but also to create a supportive economic growth environment by addressing the skill requirements essential for high-productivity roles. This model reflects international best practices, aligning with similar strategies employed by countries focusing on technological and sectoral advancements to secure long-term productivity and growth.

Future Skill Needs in Saudi Arabia

To begin exploring Saudi Arabia's future skill needs, it is useful to examine the broader characteristics and unique aspects of the Saudi labour market compared to global trends. Saudi Arabia's labour market is shaped by its distinct demographic structure, which includes a high level of youth participation. As per the Saudi Census 2022, Saudi Arabia has a population of approximately 32.2 million (of which 18.7 million are Saudis), with a large youth segment, which brings both potential and specific labour market challenges. This demographic structure positions the Kingdom uniquely for rapid skill development, particularly as it advances its Vision 2030 objectives for economic diversification and reduced dependency on oil.

Saudi nationals' labour force participation rate reached 51.3% (60.4% overall) in 2023, with Saudi male participation at 67% and female participation seeing a significant rise to around 36%, a notable shift due to policies promoting gender diversity in the workforce (GAStat, 2023). Youth unemployment, meanwhile, has remained a focus of policy reforms, with programmes targeting young Saudis to increase their participation in sectors beyond oil (World Bank, 2021). Although, Saudi Arabia has made significant strides in increasing the labour force participation of women and youth, sustaining the increased labour market participation of women and youth, a multi-pronged approach drawing on international best practices and tailored to local dynamics is essential.

Targeted financial incentives can play a vital role. Subsidies for employers hiring women in underrepresented sectors could encourage diverse hiring. Similarly, performance-based stipends linked to skill acquisition could mirror elements of Singapore's SkillsFuture Credit, customising youth employment and skills development (OECD, 2017; Ministry of Manpower, Singapore, 2023). Tailored vocational and technical programmes are crucial for equipping women and youth with market-relevant skills. Germany's Dual Vocational Training System, which integrates hands-on experience with theoretical learning, offers a model for designing sector-specific training in Saudi Arabia. Flexible learning structures, akin to Sweden's accessible vocational courses, would further support individuals managing caregiving responsibilities (OECD, 2019). Industry partnerships can enhance workforce preparedness. Collabourations with industries to offer apprenticeships and internships ensure that participants acquire practical experience in high-demand fields (BMWK, 2022). Saudi Arabia could emulate Sweden's sector-specific digital skill-building programmes, such as ICT-focused boot camps (ILO, 2021).

Enhanced workplace policies can address retention challenges. Encouraging family-friendly workplace practices like flexible hours and parental leave can support women's ongoing engagement in the workforce. Youth-specific retention strategies, such as mentorship programmes and clear career progression pathways, can ensure young professionals remain engaged and committed (Eurofound, 2018; Swedish Institute, 2023). Public awareness and social norms campaigns can shift societal attitudes toward gender diversity and youth inclusion. Singapore's approach to promoting youth employment through targeted government campaigns provides an effective model for shaping perceptions and encouraging widespread participation (Ministry of Manpower, Singapore, 2023; ILO, 2022).

Saudi Arabia's labour market also features a high percentage of foreign workers – about 77% of the private sector workforce (ILO, 2022). However, recent labour market reforms have sought to balance this with increased Saudi employment, known as Saudisation, aiming to boost local workforce participation in private sectors traditionally dominated by foreign workers (IMF, 2023). Compared to other countries, this dependency on foreign labour is particularly distinctive and shapes the skill strategies, as initiatives seek to build local talent pipelines and ensure that the skills landscape aligns with Saudi Vision 2030's goals for a diversified economy.

The Kingdom has seen substantial progress in global competitiveness, attributed to its focus on employment growth and the efficiency of its labour market, placing Saudi Arabia at the top in the "Employment – Long-Term Growth" indicator among 67 countries.[11] The 2024 IMD World

Competitiveness Yearbook highlights this growth as a result of structural reforms and focused policies aimed at increasing private sector employment and fostering workforce productivity (IMD, 2024). The focus on technological integration and digital transformation across sectors is a defining feature of Saudi Arabia's labour market evolution. The Kingdom has been investing in areas like artificial intelligence, data science, and advanced manufacturing, underscoring the need for specialised skills to drive productivity in these emerging fields. While many economies worldwide also emphasise tech skills, Saudi Arabia's approach uniquely intertwines this with large-scale projects like NEOM and national digitisation initiatives, setting the stage for a distinct future skills agenda that integrates national growth ambitions with global competitiveness.

Skills Shaping the Future of Work

The labour market is witnessing a significant transformation with occupations undergoing substantial changes. This transformation has emerged as the most crucial headline across the globe, as industries and technological advancements continue to reshape the nature of work.[12] Despite a dynamic global labour market, understanding the gradual shifts in occupational structures is critical for shaping policies that support sustainable employment and economic growth. Although occupational changes occur gradually, the skills essential for productivity are evolving at a significantly faster pace. In today's work environment, the rapid introduction of new technologies, particularly AI and machine learning, means that the skill sets necessary for current tasks – and especially for newly emerging tasks – require continuous updates and adjustments to remain relevant and effective. This constant need for reskilling is reshaping how tasks are completed, creating unprecedented productivity gains and economic opportunities across industries (WEF, 2020).

The surge in digital technologies such as AI expertise, data analysis, and cloud computing. are reshaping productivity strategies, top performers in complex occupations – like software development and managerial roles – are up to 800% more productive than average performers (McKinsey Global Institute, 2018). This productivity gap is even more pronounced in emerging fields like AI and digital technology, where the advantages of acquiring highly skilled talent are enormous, placing a premium on sourcing top talent in these sectors.

Globally, countries are increasingly investing in skills development for AI and digital industries, recognising the long-term economic payoffs of attracting and nurturing skilled talent. This shift is also driving competition for top professionals as demand outstrips supply, making **skilled migration a vital source of talent for many economies**. Economies with a larger pool of skilled migrants tend to see increased knowledge creation and innovation, especially in technology-intensive sectors (Bosetti et al., 2015). This competition for skilled workers is creating a landscape where only a few global hubs may dominate AI and tech advancements, owing to the scale-dependent nature of these industries (Bosetti et al., 2015; OECD, 2021).

Future skills will also require strong non-technical competencies, including adaptability, creative problem-solving, and digital literacy, to complement specialised knowledge. This underscores that a workforce proficient in these areas is better equipped to adapt to technological disruptions, enhancing productivity across sectors (OECD, 2020). In Saudi Arabia, the growing emphasis on technical skills is particularly relevant as the nation advances its Vision 2030 agenda. Saudi initiatives like the Sector Skills Councils are working to build a robust framework for future skills needs and development in high-demand areas, aiming to create a resilient workforce prepared for the digital economy (HRSD, 2023).

Key Sectors and High-Demand Skills

High-skilled occupations are increasingly in demand, often requiring specialised competencies in digital technologies, analytics, and problem-solving. According to global findings (OECD, 2020); WEF, 2020), the global shifts indicate that skills are no longer static attributes but dynamic and continuously evolving components of a resilient labour market. In Saudi Arabia, skill requirements across occupational categories are evolving. According to the NLO analysis utilising a skill index based on the International Standard Classification of Occupations (ISCO),[13] there is an increasing tendency for Saudi workers to occupy higher-skilled positions over time.[14] This shift aligns with similar trends observed globally (ILO, 2019; McKinsey, 2021). Saudi Arabia's emphasis on increasing the skill levels of its workforce reflects its commitment to preparing for a knowledge-based economy. NLO findings, for example, reveal that Saudi nationals are progressively moving into higher-skill occupational categories, such as management, technical roles, and information technology, which require advanced skills. This progression is linked to both demand- and supply-side labour market

Table 2: Major Occupation Groups According to International Standard Classification of Occupations (ISCO) and Their Associated Skill Levels, ILO.

Code	Major Group	Skill Level
1	Managers	3–4
2	Professionals	4
3	Technicians and associate professionals	3
4	Clerical support workers	2
5	Service and sales wprkers	2
6	Skilled agricultural, forestry and fishery workers	2
7	Craft and related trades workers	2
8	Plant and machine operators, and assemblers	2
9	Elementary occupations	1
0	Armed forces occupations	1–2–4

https://ilostat.ilo.org/methods/concepts-and-definitions/classification-occupation/.

factors (MHRSD, 2023). Saudi Arabia's focus on educational reforms, vocational training, and on-the-job learning programmes is instrumental in this regard. Countries like Singapore and Germany have successfully implemented national upskilling strategies that prioritise adaptability, digital literacy, and specialised training, ensuring that workers remain employable amid technological disruptions.

A LinkedIn study analysed emerging occupations and in-demand skills by tracking job postings across 28 countries, including Saudi Arabia. This analysis spanned January 2018 to July 2022 and gathered insights on roles experiencing the fastest growth rates across various regions, such as the Americas, Asia, Europe, the Middle East, and Africa. The study found technology consistently leading as the fastest-growing sector globally, echoing pre-pandemic trends. Tech roles dominated the top 10 fastest-growing jobs in all 28 countries, indicating a global shift towards digitised skill sets. Besides tech, essential business roles – such as customer service, sales development, and business development – showed substantial growth worldwide (LinkedIn, 2023).

Globally, data engineering emerged as the most in-demand role, listed as a top-growing job in 24 of the 28 countries analysed. Sales roles, particularly sales development and business development representatives, showed substantial growth. Sales development roles ranked among the fastest growing in 20 countries. Additionally, cybersecurity roles, from specialists to analysts, were among the fastest-growing occupations in 17 countries, demonstrating the importance of cybersecurity in modern economies. With a growing emphasis on sustainability, roles in environmental management and green skills have seen notable expansion. In Saudi Arabia, for instance, "environmental manager" emerged as the top-growing job title. "Green talent" in the workforce increased from 9.6% in 2015 to 13.3% in 2022, representing a 38.5% growth rate, with jobs requiring green skills expanding at an 8% annual growth rate over the past five years (World Bank, 2022; LinkedIn, 2023).

The top 15 fastest-growing job titles from the LinkedIn study for Saudi Arabia encompass a wide range of skill demands, indicating a shift towards a more specialised and modernised workforce. Below we delve into the specific skill requirements, experience levels, and job characteristics driving these in-demand roles across various sectors. Table 3 summarises some of the fastest growing occupations, their related industries, their most sought-after skills, education, and experience requirements from the study.

Environmental Manager

Environmental managers, including sustainability managers and environmental advisors, are tasked with supporting environmental health and ensuring compliance with local and regional environmental regulations. **Skill-wise**, these managers need advanced environmental regulation knowledge and leadership in sustainability projects. **Experience**

Table 3: Select Fastest Growing Occupations, Saudi Arabia, LinkedIn 2023.

Job Title	Industries	Skills	Education Level	Median Experience
Environmental Manager	Construction, Government, Oil & Gas	Environmental Compliance, Sustainability	54% Master's, 46% Bachelor's	4.8 years
Human Resources Operations Specialist	Manufacturing, Government, Financial Services	HR Operations, Policies	31% Master's, 66% Bachelor's	2.4 years
Back-end Developer	Tech, Financial Services	Node.js, PHP, Laravel	19% Master's, 81% Bachelor's	1.6 years
Cyber Security Manager	Financial Services, Government, Accommodation	Vulnerability Assessment, Information Security	50% Master's, 50% Bachelor's	4.4 years
Data Scientist	Tech, Financial Services, Education	Machine Learning, Python	40% Master's, 60% Bachelor's	1.9 years

Note: Select occupations and their demanded characteristics derived from LinkedIn 2023 Study.

typically required includes nearly five years with higher education being a significant factor, as 54% hold master's degrees or above.

Human Resources Operations Specialist

HR operations specialists handle internal HR systems, budgets, and benefits packages, possess skills in HR operations, HR policies, and recruiting practices. The **required education** is predominantly at the bachelor's level (66%), and while it is a relatively young field, professionals need around 2.4 years of **experience**.

Back-End Developer

Back-end developers, also known as SQL developers or MySQL developers, focus on server-side development, building and maintaining web and mobile applications. Found largely in technology and financial services. The **education** requirement leans heavily towards a bachelor's degree (81%), with 1.6 years of **experience** needed on average.

Security Operations Centre Analyst and Cyber Security Manager

Cybersecurity is one of the fastest-growing sectors in Saudi Arabia. Security operations centre analysts and cyber security managers play crucial roles in protecting organisations from cyber threats. **Key skills** include vulnerability assessment, security information management. For security analysts, experience averages 1.9 years, while cyber security managers, typically senior roles, require around 4.4 years of **prior experience**. Both positions often require bachelor's degrees, though for managerial roles, master's degrees are equally prevalent.

Data Scientist

Data scientists are becoming increasingly valuable in industries such as technology, financial services, and education. The role involves analysing data, identifying patterns, and generating data-driven business solutions. **Skill requirements** include proficiency in machine learning, Python, and deep learning techniques. While a bachelor's degree is common (60%), 40% of professionals hold a master's degree. **Experience** requirements are relatively low, at around 1.9 years, making this an accessible but highly skilled career path for early-career professionals.

Dental Assistant

The healthcare industry is also experiencing growth in support roles like dental assistants, who perform a mix of clinical and administrative duties. The skills required for this job include infection control, oral surgery assistance, and patient management. With the sector expanding, particularly in hospitals and clinics, dental assistants typically need 1.4 years of prior experience, and a bachelor's degree is common among 76% of professionals in the field.

Talent Acquisition Specialist and Human Resources Business Partner

Human resources roles continue to expand, particularly in talent acquisition and business partnering. Talent acquisition specialists focus on recruiting and hiring strategies, while HR business partners act as consultants, balancing employee needs with business objectives. Both roles require strong skills in recruiting, talent management, and HR policies, A bachelor's degree is common in both roles (79% for talent acquisition, 54% for HR business partner), with **experience levels** averaging 2.8 and 3.8 years, respectively.

Contract Specialist

Contract specialists ensure that contracts for services, goods, and business partnerships comply with policies and regulations. They work predominantly in government, construction, and manufacturing industries. Skills in contract management, negotiation, and procurement are critical. A bachelor's degree is the standard education level (67%), with median experience at 2.6 years. This role requires a high level of attention to detail and understanding of legal regulations in contracts.

Financial Specialist and Supply Chain Specialist

Both financial and supply chain specialists play essential roles in supporting business operations. Financial specialists provide cost analysis and financial reporting, working mainly in government and financial services. **Skills** include financial analysis, reporting, and accounting. Supply chain specialists, on the other hand, focus on improving the efficiency of production and inventory management. **Education and experience** requirements for both roles reflect moderate expertise, with bachelor's degrees common and experience hovering around 2–3 years for both.

The fastest-growing jobs in Saudi Arabia reflect a modernising economy and an increasing reliance on technological, environmental, and human capital management skills. Across industries, the skill and experience requirements for these roles show the importance of specialised knowledge, particularly in environmental sustainability, cybersecurity, HR, and data analytics. As Saudi Arabia continues to implement its Vision 2030 reforms, the demand for skilled professionals in these fields is expected to rise, making targeted education and training essential for the workforce of the future.

According to the National Labour Observatory's (NLO) Occupation Review Report (2023), administrative data also highlights a transformative shift in Saudi Arabia's occupational landscape from 2016 to 2022, **mirroring similar trends observed in LinkedIn's global study**. The NLO's findings reveal that Saudi nationals have increasingly transitioned from lower-skilled roles to higher-skilled occupations, with substantial growth in professional, managerial, and technical fields. This shift reflects a broader pattern seen worldwide, where the demand for high-skilled roles – particularly those requiring specialised knowledge in technology and engineering – has surged (NLO, 2023).

The transition of Saudis into higher-skill occupations represents a positive development, signalling progress in labour market outcomes. However, the underlying dynamics of this shift warrant careful examination. While this increase can be interpreted as a reflection of improved educational attainment and skill development, the process must be evaluated with a nuanced understanding of the selection mechanisms and the specific task-based competencies required for these roles. The question of whether this shift is driven by genuine skill improvements[15] or external factors such as statutory upgrades in job classifications requires more research to be conducted in this direction.[16]

Globally, labour markets are grappling with talent shortages in critical sectors[17] – a challenge also noted in Singapore's Ministry of Manpower strategies to bridge skill gaps in emerging fields.[18] Within this context, it is unsurprising that Saudis are increasingly filling high-skill roles, particularly in new industries that often demand advanced technical qualifications and specialised training. This strengthens the argument that the observed transition reflects actual advancements in workforce capabilities rather than superficial adjustments to occupational classifications (MHRSD, 2023; NLO, 2023).

Technology-related roles have emerged as some of the fastest-growing occupations in the Kingdom, as indicated by significant wage increases within IT and other professional fields. IT positions rank among the top ten occupations experiencing the highest wage growth, a reflection of the increasing value placed on digital skills amid rapid technological changes (NLO, 2023). This mirrors global trends, as the LinkedIn report also highlights that high demand for data and software engineering roles has led to rapid compensation growth in technology fields worldwide (LinkedIn, 2023). Saudi Arabia's transformation programmes are evident in the upward trend of high-skill employment within key sectors, such as health, arts, infrastructure, manufacturing,

Table 4: Age Distribution of Saudi Labour Force

		Male		Female		Total	
		2024	2018	2024	2018	2024	2018
Youth	15–24	14.6	10.4	13.5	10.6	14.2	10.5
Core working age	25–34	34.9	38.9	36.8	46.6	35.5	40.7
	35–44	28.5	30.7	28.7	31.7	28.6	31.0
	45–54	13.9	15.9	15.4	9.9	14.4	14.5
Aged 55 and over	+ 55	8.1	4.0	5.6	1.2	7.2	3.4

Note: Data are from GAStat, 2018 and 2024 Labour Market Statistics.

Table 5: Age Distribution of Non-Saudi Labour Force

		Male		Female		Total	
		2024	2018	2024	2018	2024	2018
Youth	15–24	7.1	3.4	5.8	5.1	7.0	3.5
Core working age	25–34	36.2	24.0	43.3	35.1	36.8	25.0
	35–44	33.8	39.4	35.1	45.7	33.9	40.1
	45–54	15.5	23.6	12.8	12.4	15.3	22.5
Aged 55 and over	+ 55	7.4	9.6	2.9	1.8	7.0	8.8

Note: Data are from GAStat, 2018 and 2024 Labour Market Statistics.

and mining (NLO, 2023). The increased focus on these sectors demonstrates the Kingdom's strategic emphasis on creating a well-rounded and technologically adept labour force that can meet future economic needs (HRSD, 2023; World Bank, 2021; NLO, 2023).

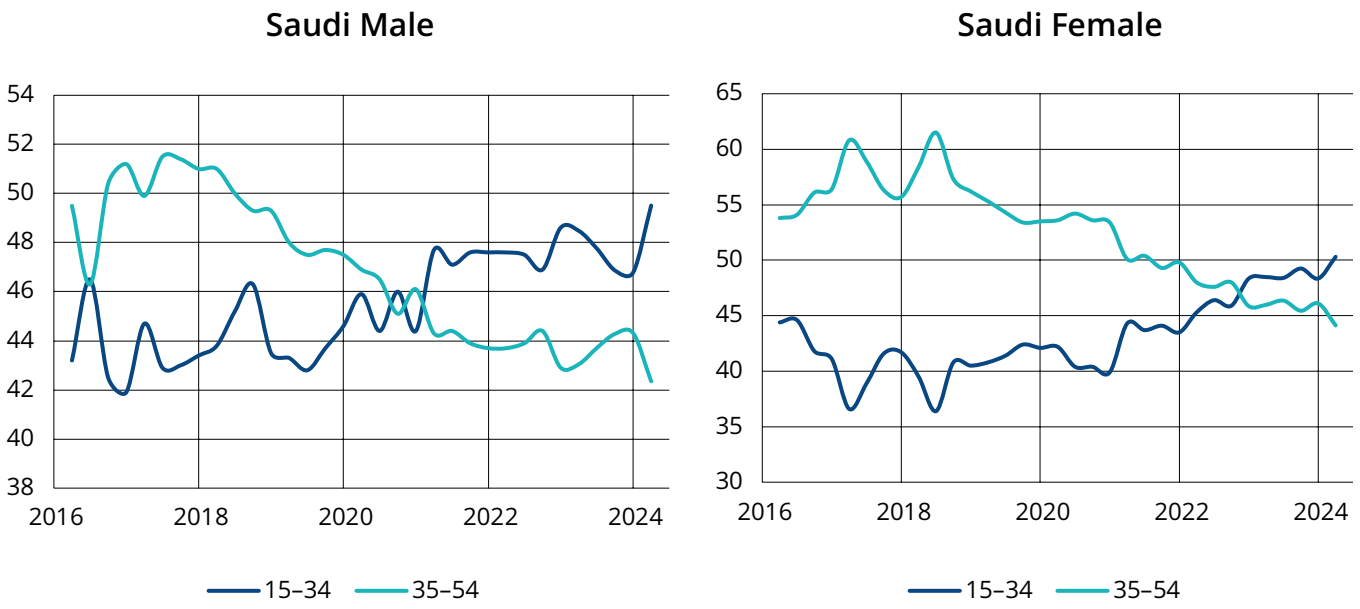
Profiles of Future Workers

The Saudi labour market is experiencing a shift towards a younger workforce, a change with significant implications for future skills needs and labour dynamics. Analysis of the age distribution of workers indicates that younger individuals are now a larger proportion of the Saudi labour force. Between 2018 and 2024, the share of Saudi workers aged 15–24 increased from 10.5% to 14.2% (Table 4). This shift highlights an essential dimension for the future of work in Saudi Arabia: younger workers bring new preferences, habits, and, crucially, distinct skill sets. As the youth increasingly populate the workforce, their adaptability to digital transformation, openness to continuous learning, and familiarity with technology become valuable assets for Saudi Arabia's economic goals (World Bank, 2021).

The trend toward a younger workforce provides a strategic opportunity, as younger workers often have a more robust inclination for acquiring digital and technical skills – qualities vital for productivity in an increasingly tech-driven economy (ILO, 2020). Table 5, which reflects similar age distribution trends among non-Saudi workers, suggests that while non-Saudi labour demographics are influenced by various legal and economic factors, both Saudi and non-Saudi workers are trending younger (GAStat, 2023).

As further illustrated in Figure 1, the proportion of younger workers aged 15–34 has grown significantly and now surpasses that of the 35–54 age group in Saudi Arabia's labour market. This demographic shift appeared first among Saudi males in 2021, with a similar trend among Saudi females emerging in 2023. With a younger workforce, Saudi Arabia's labour market must adapt skill development and training approaches to meet the evolving needs of this demographic.

Figure 1: Age Distribution of the Employed Saudi Workers: 2016 to 2024.



Source: GAStat Labour Market Statistics, 2016–2024.

Female Participation

Another transformative trend in Saudi Arabia's labour market is the sharp increase in female workforce participation, a key factor shaping the future of jobs. Women's labour force participation rose from approximately 20% in 2018 to over 35% in 2023, an unprecedented increase attributable to both policy reforms and cultural shifts aimed at gender inclusion (GAStat, 2023). The proportion of Saudi women in the private sector has nearly tripled during this period, reflecting Saudi Arabia's active efforts to diversify the workforce.

Increased female participation impacts the skills and training required across sectors, as new entrants bring fresh perspectives and expectations to the labour market. Global studies show that as more women enter traditionally male-dominated fields, skill requirements in those sectors shift to encompass a broader range of competencies, including leadership, digital literacy, and adaptability (WEF, 2021). Enhancing women's skills in technology, business management, and STEM fields aligns with global findings that a diverse workforce contributes to greater innovation and productivity (McKinsey, 2020).

Addressing the gender gap in skills training is essential for Saudi Arabia's future workforce development. Currently, a substantial gender disparity exists in technical and vocational training programme participation, often driven by traditional expectations regarding career paths. Initiatives that offer flexible training schedules, digital learning platforms, and mentorship for women can help close this gap, ensuring equitable access to skill development and advancement opportunities. Findings suggest that when women participate more in technical training, both productivity and retention improve, creating a more inclusive, dynamic labour market (World Bank, 2019).

These demographic shifts – toward a younger, more female-inclusive workforce – are setting the stage for Saudi Arabia to cultivate a labour market aligned with the demands of a modern economy. Recognising and supporting these shifts through tailored policies is essential for meeting future challenges and maximising productivity in a competitive global landscape.

Data

The General Organization for Social Insurance (GOSI) microdata is a cornerstone for analysing Saudi Arabia's labour market, particularly in the private and semi-government sectors. This dataset underpins reports like the "Occupations Review Report 2023" and "Quarterly Snapshot Reports" by the NLO. It tracks detailed employment information, including occupations classified using ISCO

standards, salary trends, education levels, and geographic and sectoral data. Additionally, GOSI data provides insights into employment transitions, enabling an understanding of career pathways and market fluidity. With longitudinal data structure across years, the dataset is highly valuable for trend analysis, though more recent data post-2020 offers greater granularity and reliability. Complementing GOSI, the Ministry of Human Resources and Social Development (MHRSD) dataset provides employment data for public sector and civil service jobs, filling gaps not covered by GOSI and enabling comprehensive labour market comparisons. Their use ensures actionable insights into addressing Saudi Arabia's workforce challenges and opportunities.[19]

Maximising Labour Productivity

Saudi Arabia's commitment to maximising labour productivity aligns with both its Vision 2030 objectives and global trends that emphasise productivity as a driver of economic growth. With a focus on skills development, digitalisation, and strategic workforce initiatives, Saudi Arabia is actively creating frameworks that foster productivity across multiple sectors. This section outlines how various productivity-enhancing strategies can impact Saudi Arabia's economic trajectory by building a skilled, technologically adept workforce that meets the demands of emerging and high-productivity industries.

Improving workforce skills directly influences labour productivity, particularly as Saudi Arabia shifts focus toward high-value sectors such as digital technology, engineering, and advanced manufacturing. Productivity growth varies considerably across industries, driven by sector-specific factors such as the reliance on skilled labour, the intensity of physical and knowledge-based capital, the potential for product and process innovations, and exposure to global value chains. Sectors that extensively utilise high-skilled labour and capital investments – such as advanced manufacturing – often see faster productivity growth than more labour-intensive services (OECD, 2017).

For Saudi Arabia, these global insights emphasise the need to focus on sector-specific skills and policies that enhance productivity. By channelling resources into targeted upskilling programmes within high-potential industries like technology and business services, Saudi Arabia can align its labour force capabilities with areas of strong productivity growth potential. Integrating these productivity-driven skills into strategic industrial plans can help Saudi Arabia capitalise on the productivity advantages seen in knowledge-intensive and technology-driven sectors globally.

Saudi Arabia's digital transformation is an essential component of its Vision 2030, designed to reduce the nation's reliance on oil, diversify its economy, and develop high-value sectors such as healthcare, education, and logistics (GAStat, 2023; World Bank, 2021). This transformation positions the digital economy as a critical enabler of economic growth, enhanced productivity, and increased competitiveness on the global stage. As part of these efforts, Saudi Arabia has implemented a series of strategic initiatives aimed at creating a strong digital infrastructure, with substantial investments having contributed to a 99% internet penetration rate and enabled mobile internet speeds that are among the fastest globally (OECD, 2022).

The Saudi Data and Artificial Intelligence Authority (SDAIA) is a cornerstone of this digital agenda, focusing on advancing artificial intelligence (AI) capabilities and leveraging AI for economic growth. The SDAIA's initiatives are projected to make Saudi Arabia a global leader in AI by 2030, with anticipated AI sector growth reaching $1.9 billion by 2027 (PwC, 2020). Additionally, Saudi Arabia's Cloud First Policy introduced in 2019 mandates that government entities prioritise cloud-based solutions, which has catalysed cloud computing investments projected to exceed $4.7 billion by 2027 (HRSD, 2023). The recent establishment of a Cloud Computing Special Economic Zone in 2023 further underscores this commitment, attracting international players like Google and Amazon Web Services (AWS) to the region (McKinsey, 2021). Studies estimate that AI could contribute up to 14% of global GDP by 2030, with countries investing heavily in digital infrastructure reaping significant productivity benefits (PwC, 2020). As a result, Saudi Arabia's commitment to building a robust digital economy positions it to compete globally and drive long-term economic growth, consistent with the productivity-focused goals of Vision 2030.

As automation and digitalisation reshape labour markets worldwide, **upskilling and reskilling** are critical to maintaining high productivity and economic competitiveness. Leading economies have demonstrated the success of comprehensive upskilling programmes. In Germany, for example, the Industrie 4.0 framework promotes a workforce equipped with digital skills, resulting in consistent productivity growth across manufacturing and tech sectors (Kagermann et al., 2013). Saudi Arabia's upskilling programmes follow similar models; the Ministry of Human Resources and Social Development (MHRSD) and Human Resources Development Fund[20] (HRDF) report that approximately 322,000

Saudis participated in government-supported training initiatives by 2023, with projected participation expected to reach 1.15 million by 2025 (MHRSD, NLO, 2024).

Saudi Arabia's National Skills Strategy places a strategic emphasis on developing sector-specific skills to enhance productivity across high-potential industries. Programmes within the Skills Accelerator Initiative target critical skills like data analytics, digital marketing, and engineering, which are central to supporting productivity growth as they align workforce capabilities with emerging job roles. The Sector Skills Councils, launched by MHRSD, represent a collaborative effort involving public and private stakeholders to set professional standards across key sectors and establish training frameworks that directly impact productivity by reducing skill mismatches. As of 2023, 12 councils are operational, covering essential sectors like tourism, energy, and digital services. These councils aim to adapt skill development efforts to the precise needs of each industry, ultimately increasing the efficiency and productivity of the Saudi labour market.

Educational institutions play a pivotal role in aligning curricula with the labour market, particularly in areas related to AI, data science, and advanced engineering. In recent years, Saudi universities have increasingly integrated digital and technical courses into their programmes. Many universities now offer specialised programmes in AI and machine learning, directly addressing Saudi Arabia's demand for technologically skilled professionals. The introduction of industry-aligned academic programmes, especially in data science and digital technology, contributes to workforce readiness in high-demand fields. International comparisons highlight similar trends, with leading institutions around the globe in the adoption of AI-centric curricula to meet labour market needs (World Bank, 2021).

Lifelong learning is essential for professionals needing to adapt to rapidly evolving technologies and market conditions. Saudi Arabia has developed several lifelong learning and upskilling programmes to enhance workforce productivity and prepare mid-career professionals for evolving job roles. Key initiatives for lifelong learning and vocational training are spearheaded by entities like the HRDF and the Ministry of Education. The Doroob programme for instance, a central HRDF initiative, offers extensive online training courses tailored to meet the market's skill demands, with a strong emphasis on digital, managerial, and technical skills.

Additionally, HRDF's Tamheer programme focuses on graduate development through **on-the-job training** in collaboration with public/private sector firms, allowing participants to gain hands-on experience that matches industry needs (HRDF, 2023). On-the-job training initiatives are increasingly recognised for their role in improving productivity, as they allow workers to gain skills relevant to their specific job functions. Successful cases in Saudi Arabia, such as training programmes within giant companies such as the ARAMCO and SABIC, highlight productivity gains linked to targeted on-the-job training.

The Ministry of Education also contributes to adult education through its Continuing Education Program, targeting lifelong learning needs. This programme provides training and resources for skill development in both basic and advanced competencies, (Ministry of Education, 2023). Such programme align with global best practices, as evidenced by countries like Singapore and South Korea, where lifelong learning initiatives have yielded notable productivity gains, particularly in knowledge-intensive sectors (OECD, 2019). Saudi Arabia's approach, through HRDF's targeted programmes and Ministry of Education initiatives, reflects a comprehensive strategy to enhance the skills of mid-career professionals and align with Vision 2030.

Addressing Challenges in the Labour Market and Policy Recommendations

Skill Mismatch and Current Measures

Saudi Arabia has recognised the critical importance of addressing skill mismatches to align workforce capabilities with the demands of a rapidly diversifying economy. Initiatives like the Human Capital Development Program (HCDP) and coordinated efforts with the Council of Universities have focused on analysing the destinations and outcomes of Saudi graduates to guide future policy. In collaborations with the Saudi Authority for Data and Artificial Intelligence (SDAIA), Saudi Arabia is implementing annual reports to track alignment between university programmes and labour market needs, enabling year-on-year comparisons to monitor progress (HRSD, 2023; GAStat, 2023).

To tackle mismatches, Saudi Arabia has also launched comprehensive sectoral foresight reports that identify skill needs and priority occupations over a 5- to 10-year horizon, with a national foresight report scheduled for publication in 2025. These reports are part of an extensive mapping effort, which connects occupational classifications with skill requirements at both national and sectoral levels. Such foresight allows educational institutions and training programmes to better align curricula with market demand, as sectors like IT, healthcare, and renewable energy see increasing demand for specialised skills (OECD, 2021; Saudi Press, 2023; NLO, 2024).

Bridging Skills Gaps: Targeted Policy Measures

To address current and anticipated skills gaps, Saudi Arabia is implementing targeted programmes within sectors with high productivity potential. Initiatives like the Sector Skills Councils foster partnerships between government agencies, private industries, and educational institutions, facilitating the development of specialised training that matches emerging job roles in sectors such as technology, healthcare, and energy. These councils support proactive curriculum adjustments and industry-driven upskilling programmes aimed at improving adaptability to technological shifts. This approach mirrors strategies seen in countries like Singapore and South Korea, where close collaboration between government and industry stakeholders has fostered a responsive and resilient workforce (ILO, 2019; WEF, 2020).

Additionally, through initiatives like the Doroob and Tamheer programmes, the Human Resources Development Fund (HRDF) provides e-learning and practical training opportunities to both new graduates and mid-career professionals. These programmes target essential skills, including digital proficiency, problem-solving, and management, which are crucial for productivity in high-value sectors. This dual approach, combining in-demand technical skills with transferable cognitive competencies, positions Saudi Arabia to bridge its skills gap effectively and strengthen workforce adaptability (HRDF, 2023).

War on Talent: Competing for Global Skills

As Saudi Arabia continues to diversify its economy, attracting and retaining top global talent has become an essential strategy. The "war on talent" has intensified globally, with many countries enacting policies to attract highly skilled professionals through incentives such as tax breaks, fast-track visas, and long-term residency options. The UAE's recent introduction of long-term residency for skilled professionals, for example, exemplifies a proactive approach to talent retention in the MENA region (OECD, 2022; McKinsey & Company, 2021).

For Saudi Arabia, combining Saudisation policies with selective immigration strategies and expansion of the premium residency programme[21] to talent fields help bridge immediate skill gaps while ensuring sustainable workforce localisation. Implementing visa programmes that target highly skilled foreign professionals in critical areas could complement ongoing efforts to build local talent pipelines. Moreover, by offering competitive compensation packages, career development opportunities, and improved work-life balance, Saudi Arabia can increase its appeal to top global talent, supporting productivity gains in sectors where top performers demonstrate productivity levels several times higher than their average peers (WEF, 2021; PwC, 2020).

The Future of Migration in Saudi Arabia: Policies and Workforce Integration

Saudi Arabia's future workforce development aligns with global trends emphasising advanced technical and digital skills. The challenge lies in addressing these skill needs while managing a growing and diverse workforce, characterised by increasing youth participation and a significant rise in female labour market involvement, which has grown from 17% to 36% in under eight years. These demographic changes highlight the need for comprehensive strategies that integrate reskilling for mid-career professionals, upskilling to meet emerging job demands, and the ongoing role of migrant workers in bridging immediate skill gaps. However, balancing the reliance on migrant labour with Saudisation efforts is a critical policy consideration.

Strategic migration policies will be central to meeting workforce needs, particularly in high-demand fields like AI, data science, and engineering. These policies should prioritise selective immigration programmes that attract and retain high-skilled professionals through competitive compensation, long-term residency opportunities, and career development pathways. Migrants should be integrated with emerging local talent through mentorship programmes and knowledge-sharing initiatives, fostering a dynamic labour market. Additionally, Saudi Arabia can diversify its talent pool by expanding recruitment to untapped regions and differentiating itself in the competitive Gulf region with unique incentives like cultural inclusivity, family-friendly

policies, and robust professional opportunities. The path forward involves creating a workforce ecosystem that leverages high-skilled migrants while strengthening local talent pipelines. This requires balancing Saudisation with the contributions of diverse migrants, fostering inclusivity, and promoting cultural understanding. These are already incorporated into current labour market policies, but targeted actions and measurable impacts are necessary to refine and optimise these efforts.

Conclusion

The analysis presented in this report highlights the critical role of skills in shaping the productivity and adaptability of Saudi Arabia's future workforce. As Saudi Arabia accelerates toward its Vision 2030 goals, the evolving demands of the global job market underscore the importance of fostering a skilled, flexible workforce to remain competitive. Key findings point to a dynamic labour market where the integration of emerging technologies, particularly in digital sectors, is reshaping skill needs. Future occupations, especially those in high-growth fields like AI, machine learning, and renewable energy, are driving demand for specialised technical skills alongside essential competencies like digital literacy, critical thinking, and adaptability (OECD, 2021; World Bank, 2020).

One of the core conclusions drawn is the direct link between skills and productivity in labour market transformations. The report shows that productivity improvements require targeted skills development at all workforce levels – from formal education to adult learning programmes and vocational training. Programmes such as the Doroob and Tamheer initiatives, alongside Saudi Arabia's Sector Skills Councils, represent essential steps in addressing skill mismatches by equipping workers with industry-relevant competencies. However, as global studies suggest, there is an ongoing need to align education systems and on-the-job training programmes with rapidly evolving industry demands. The development of future-ready skills requires a continuous feedback loop between industry and education sectors, supported by data-driven labour market insights to ensure that training remains responsive to new technologies and industry shifts (ILO, 2019; McKinsey & Company, 2021).

To maximise productivity, Saudi Arabia also needs to consider strategic immigration policies that attract high-skilled international talent, particularly in fields where demand exceeds the current domestic supply. Countries like Canada, Germany, and the UAE provide examples of how immigration frameworks can be adjusted to support productivity by filling skills gaps, thereby strengthening competitiveness (World Economic Forum, 2020; OECD, 2022). In Saudi Arabia's case, a balanced approach to Saudisation and selective talent attraction policies can facilitate sustainable workforce growth, bridging immediate skill gaps while nurturing local talent.

In conclusion, maximising productivity in Saudi Arabia's labour force will require an integrated approach to skill development that spans educational reforms, targeted training, and strategic policy adjustments for talent attraction. By focusing on tailored upskilling and lifelong learning programmes, fostering industry partnerships, and integrating international talent where needed, Saudi Arabia can create a resilient, future-ready workforce capable of meeting the challenges and opportunities of a modern economy.

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Endnotes

1 Vision 2030 is a strategic framework aimed at diversifying Saudi Arabia's economy, empowering its citizens, fostering a dynamic environment for local and international investors, and positioning the Kingdom as a global leader in innovation and development. See https://www.vision2030.gov.sa/en.

2 Saudi Arabia's Economy Grows as it Diversifies, IMF Country Focus. https://www.imf.org/en/News/Articles/2023/09/28/cf-saudi-arabias-economy-grows-as-it-diversifies

3 More than 50% of the labour force have some tertiary and higher level of education General Authority for Statistics (GAStat), Labour Market Statistics, Q2, 2024. Particularly 58% of females and 47% males have tertiary education in the Saudi labour force.

4 The Snapshot report by NLO is a quarterly publication which tracks the quarter-to-quarter as well as year-to-year changes to the quarter in the labour market dynamics including wages. The report gives other important statistics about Saudi employees. For instance, earnings of employees who earn a monthly wage of more than 15 thousand riyals increased from 2023 to 2024 according to the findings of the report. On the other hand, the percentage of employees earning monthly wages less than 4,000 Saudi riyals is slowly decreasing according to the report findings. The report is available on demand on the NLO webpage. www.nlo.gov.sa.

5 ILO Key Indicators of the Labour Market (KILM) 2015.

6 Data are from the Occupational Employment and Wage Statistics program, U. S. Bureau of Labour Statistics. Source: Employment Projections program, U. S. Bureau of Labour Statistics, 2023. https://www.bls.gov/emp/tables/fastest-growing-occupations.htm.

7 The Occupations Review report published by National Labour Observatory (NLO) of Saudi Arabia conducts a similar analysis for fastest growing jobs using historical data. The report can be accessed upon request at https://nlo.gov.sa/landing/reports/report-details/518?lang=en.

8 Targeted to be published in 2025.

9 NLO Labour Foresight Unit. www.nlo.gov.sa.

10 Many Saudi private companies, such as Aramco and SABIC, lead in-house training and scholarship programmes. Aramco, for instance, runs its "National Development Program," which integrates technical training with global best practices to create highly skilled professionals for its operations. Similarly, SABIC collabourates with universities and training providers to bridge the gap between education and employment, focusing on STEM fields to foster innovation and productivity growth in Saudi Arabia.

11 According to Q2 2024 statistics by GAStat, the Saudi labour market is composed of 1.76 million employees in the public (0.56 million, of which 80% is Saudi) and governmental (1.2 million, of which 96% is Saudi) sectors and 11.14 million employees in the private sector. The number of Saudis in the private sector is 2.32 million and 41% of private sector Saudis are female. The percentage of Saudis in private sector jobs is 21% according to the published number of 2024 Q2. Taking public and private sector jobs together (excluding governmental jobs), Saudi employment increased by 0.9 million between 2017 and 2024 of which most of the growth was due to the expansion of the private sector employment of Saudis. 550k jobs for females and 360k jobs for males have been filled by Saudis since 2017.

12 World Economic Forum, Future of Jobs Report 2023.

13 See Table 2. NLO research sketches a general picture of the skill increases in Saudi Arabia, as they adapted a skill index based on the 1-digit ISCO skill levels defined for occupational groupings (ILO) in the Saudi labour market. According to this definition, each major group of occupation is assigned a skill level ranging from 1 (Elementary Occupations) to 4 (Professionals). Figure 3 presents the associated skill levels with each occupation group.

14 NLO Occupations Review Report, 2023.

15 https://www.hrsd.gov.sa/en/media-center/news/74102589.

16 This requires highly granular, occupation-level data that can be mapped directly to specific skills for a comprehensive analysis. Such data is notoriously difficult to compile for any country, as it necessitates a robust framework linking occupations to their associated skillsets. The Saudi Ministry of Human Resources and Social Development (HRSD) has recently taken significant strides in addressing this gap by launching initiatives like the Sector Skills Councils. These councils are a cornerstone of the ministry's skills framework and are designed to foster collaboration between industries, government entities, and other stakeholders. The Sector Skills Councils hold regular meetings to define annual action plans, develop sector-specific skills reports, and establish tailored skills frameworks for key industries. This initiative underscores the ministry's commitment to identifying and addressing skill mismatches, enhancing workforce development, and aligning skills training with the demands of Vision 2030.

17 https://www.forbes.com/sites/tracybrower/2024/02/12/yes-the-talent-shortage-is-real-what-you-must-know-to-attract-and-retain/

18 https://vulcanpost.com/876120/singapore-highest-demand-careers-mom-talent-starved-jobs-2025/

19 Currently, these micro-level data sources are not publicly accessible. However, GOSI provides aggregate statistics derived from its datasets, which can be accessed at GOSI Statistics and Data section on their webpage: https://www.gosi.gov.sa/en/StatisticsAndData.

20 HRDF is the policy arm of the MHRSD that focuses efforts on enabling job seekers, enhancing their opportunities, and developing their skills.

21 See https://pr.gov.sa for more information.

2

Adapting to Change: The Potential Impact of Technology and Demography on the Saudi Labour Market

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Abstract

The research delves into two inter-related questions: To what extent are different groups of workers in the Saudi labour market exposed to potential automation, and what policy pathways can be implemented to mitigate these exposures? By utilising Frey and Osborne's estimates on the probability of automation, the paper examines the impact of technological advancements on both Saudi and non-Saudi workers across various sectors and occupations. Historically, workers in Saudi Arabia have been relatively less affected by technological change due to strategic policy choices and the unique nature of economic development in the post-Vision 2030 era. The Kingdom's labour market has experienced significant transformations, especially with the introduction of new economic activities and national projects aiming to diversify the economy beyond oil. Automation and technological advancements, while presenting certain risks, also offer vast opportunities for new job creation in emerging fields. As the nation looks forward, it becomes evident that the strong demographic trends and the skill-biased nature of technological change will necessitate substantial enhancements in the education and training systems. These improvements are crucial for effectively addressing the challenges posed by automation and ensuring favourable future labour market outcomes. The paper underscores the importance of adaptive policy measures that foster a culture of continuous learning and upskilling, which will be essential for maintaining competitiveness and resilience in the face of future technological disruptions.

Introduction

Throughout history, technological change has made labour more productive and subsequently increased the number of jobs in the economy. Despite this fact, technological advancement has long created anxieties among workers. These fears have recently been renewed, with many studies painting a particularly gloomy picture of the consequences of technological change on employment[1]. In many of these scenarios, automated processes and machines are expected to substitute workers leading to massive job losses, increased inequality, and social disruption.

Although most observers agree that technologies are altering the types of jobs available and reshaping the skills required to perform them, the impact on employment and skills is also more nuanced and context-specific than is often suggested. This is especially true in the case of Saudi Arabia. The dual nature of its labour market, as well as recent policies and economic priorities, have put Saudi Arabia in a good position to deal with the spectra of massive job substitution due to automation.

The primary aim of this paper is to examine the degree of exposure of different groups of workers in the Saudi labour market to automation. While we find some groups that may indeed be more vulnerable, a closer look at the data shows that scenarios of mass unemployment may not be as dire in the Kingdom's case. To test the degree of exposure of Saudi and non-Saudi workers, the paper applies the framework introduced by Frey and Osborne (2017) to the Saudi context. Given the skill- biased nature of technological change, the paper nonetheless suggests that the Kingdom's current education and training performance warrants attention.

Definitions, Data and Methodology

Technological change, in the context of employment, refers to the innovation and application of new technologies that alter the way work is performed, impacting jobs and tasks. It can be exemplified through advanced capabilities such as artificial intelligence[2], machine learning, cloud computing, Internet of Things (IoT), and cybersecurity. These can include physical tasks accomplished by machinery and robots, as well as mental or cognitive tasks managed through software and algorithms.

As depicted in Table 1, skills related to technology can be categorised along two axes: manual versus cognitive, and routine versus non-routine. Automation has predominantly targeted tasks that fall into the manual and routine categories – these include repetitive roles in manufacturing processes. It can also encompass a range of activities such as clerical work and sales[3]. Technological advancement is expected to gain momentum, especially in sectors like security, where artificial intelligence and surveillance systems are becoming more prevalent, and in transportation,

Table 1: Classification of Tasks by Degree of Risk of Automation

	Routine tasks	Non-routine tasks
Analytic and Interactive Tasks	Substantial substitution (Example: record-keeping, repetitive customer service)	Strong complementarity (Example: forming and testing hypotheses, legal writing, persuading/ selling, and managing others)
Manual Tasks	Substantial substitution (Example: picking or sorting, repetitive assembly)	Limited opportunities for substitution or complementarity (Example: janitorial services, truck driving)

Source: Autor, Levy, and Murnane, 2003.

with the rise of ride-sharing services and perhaps autonomous taxis and trucks, which are in development. As we will discuss, there is some evidence that technology is starting to impact jobs with cognitive abilities.

Data and Methodological Approach

The study uses the Saudi Labour Force Survey (SLFS) to analyse worker numbers. The SLFS provides details on age, gender, nationality, participation, employment, unemployment, education, sector of activity, and occupation. It offers broader population coverage than administrative data, with 5.6 million employed Saudis versus 8.4 million non-Saudis. However, the SLFS has is not without its limitations.

- One limitation is that GAStat only makes the publicly available data as percentage distributions, not levels. To surmount this limitation, we derived the employment counts using information from the Labour Force Survey and the 2022 Saudi Census. Another limitation is that the Saudi Labour Force Survey public file does not provide information on age across industry or occupation. This prevents the examination of how technology impacts individuals across age groups. This is unfortunate as the economic literature has shown that young people are among the most affected.

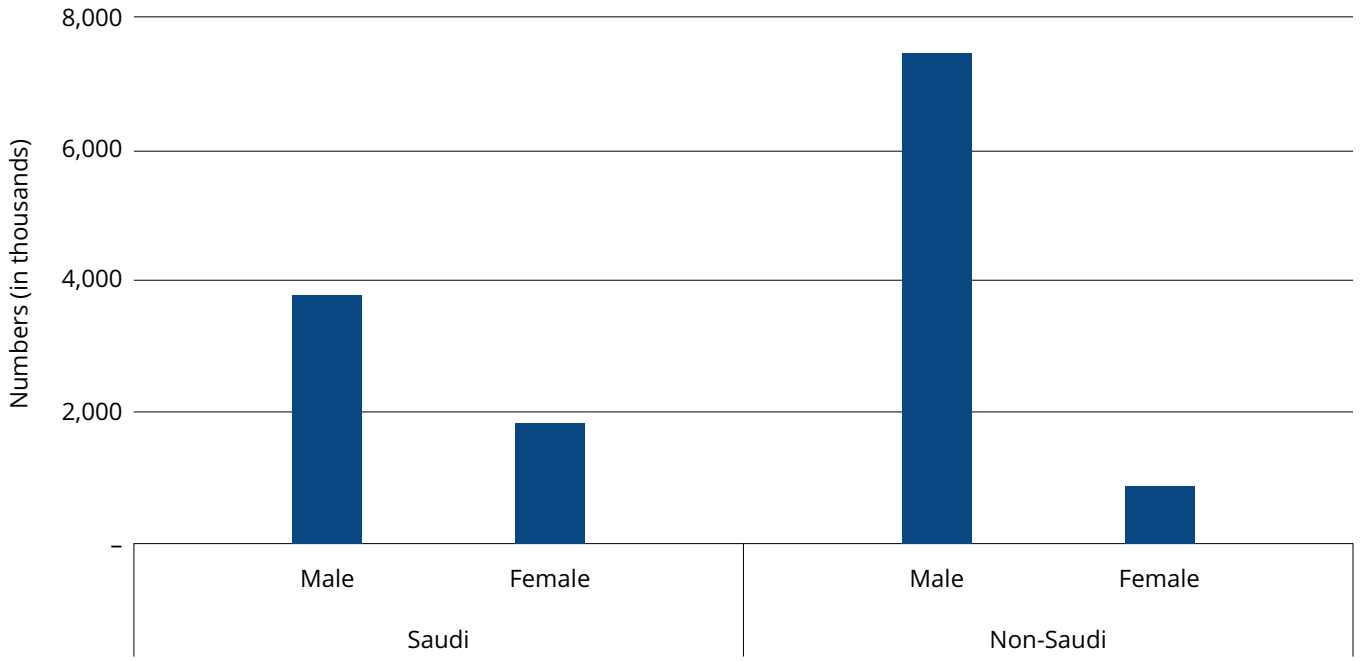
- Another limitation on the scope of analysis is that the SLFS only offers aggregated ISCO-08 occupational data at the 1-digit level. The list of occupations hence becomes restricted to ten (including the "undefined" category), which only permits a very general view. As the tasks for each occupational group do not vary greatly across countries; it nonetheless satisfies some level of comparability. Indeed, the tasks that a worker needs to be able to perform to be an engineer, a lawyer, or a domestic worker, for example, are generally similar worldwide.

To assess the likelihood of jobs to be automated, we used industry and occupational estimates from Frey and Osborne (2017) available through the British Office of National Statistics website[4]. It encompasses 702 varied occupations in England as classified by the 2010 Standard Occupational Classification (SOC) system. To assess the susceptibility of jobs to automation, they then categorise these roles into two groups: those that are fully automatable and those that are not. The individual estimates for these occupations are available in the appendix.

Table 2 shows the average risk of automation for main occupational groups and their range. The range within each occupation can vary greatly. Since occupations are aggregated at the 1-digit level in the SLFS, we were constrained to use the average estimate for each occupational group. Hence, these estimates should be seen as general guidelines, not precise assessments.

Despite having been replicated across many country studies[5], Frey and Osborne's approach has faced criticisms. Among others, Coelli and Borland (2019) have questioned the subjective nature of job classifications as well as the predictive validity of their results[6]. Given that the Kingdom and Western economies, such as the United States and England are very different, we are aware that their industrial and occupational composition and distribution of labour also differ from the one in Saudi Arabia.

Figure 1: Employment Levels by Nationality and Gender



Source: GAStat LFS 2023 Q4, Census 2022.

Table 2: Main Occupational Groups by Degree of Risk of Automation, England, 2017

	Average (%)	Range (%)
Managers	31	24–42
Professionals	25	18–32
Technicians and associate professionals	38	28–50
Clerical support workers	56	47–62
Service and sales workers	52	32–64
Skilled agricultural, forestry, and fishery workers	51	52–59
Craft and related trades workers	54	64–65
Plant and machine operators, and assemblers	61	52–69
Elementary occupations	64	56–73
Undefined	–	–

Source: Frey and Osborne, 2017. Estimates for the category "undefined" were not available.

The discussion regarding Frey and Osborne's research highlights the general difficulties in economic forecasting, where changing variables and swift technological progress make accurate predictions inherently challenging. Despite these caveats, the work by Frey and Osborne still offers general insights into the potential scale of automation across main occupational groups in Saudi Arabia. The goal is to use these broad estimates to discern some level of vulnerability across groups or workers, whether they are Saudi or non-Saudi, male or female.

The Context for Technological and Demographic Change

Although there is a consensus that technological disruption is inevitable, scholars often diverge regarding the speed and magnitude of its effects (Table 1). Many of these wide-ranging assumptions are due to different measurement approaches, whether job or task-based.

Advances in technology have long been a source of concern for workers, sparking ongoing debates about their impact on employment and job security. However, interpretations of their effects vary. Three main assumptions have been put forward about technology's consequences on workers.

1. A common assumption is that technology is a substitution for labour[7]. The mass unemployment perspective is often supported by historical precedents where technological advancements have led to significant shifts in labour markets. This consideration has gained fresh momentum in recent times, with discussions centring on whether technology will inevitably lead to widespread automation and subsequent job losses.

Although a large segment of the literature has focused on job displacement and polarisation as the most likely outcomes, some claim instead that automation is more likely to replace only a relatively small share of jobs in their entirety as most occupations will be restructured (Nedelkoska and Quintini, 2018; Lassébie and Quintini, 2022). In other words, the automation process would most often not lead to full automation of a given job but, rather, of tasks within it.

While routine and manual tasks are highly susceptible to automation, non-routine cognitive roles are also beginning to be affected (McAfee and Brynjolfsson, 2014). Professions once considered immune to automation, such as those in the legal, healthcare, and financial sectors, may now be affected by technological advancements.[8]

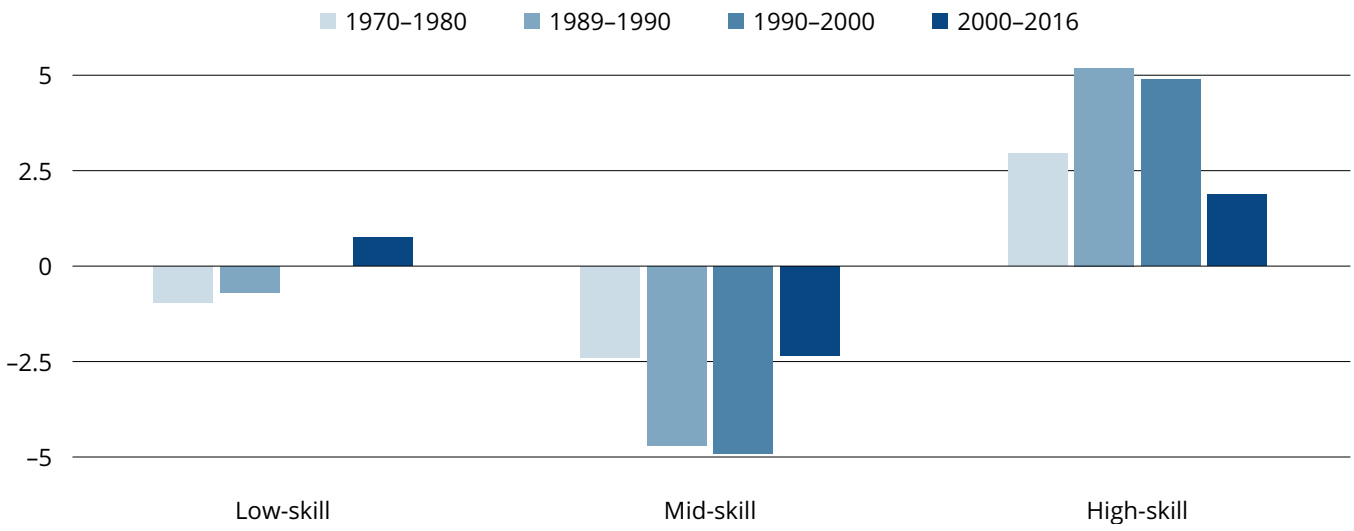
2. Another assumption is that the impact of technological change on employment has led to a rise in the skill premium[9], a trend also known as skill-biased technological change (Katz and Murphy 1992). The idea here is that technology does not uniformly affect all workers; instead, it tends to complement those with higher

Table 1: Selected Estimates of the Impact of Technology on Employment

Source	Expected employment at risk of automation
Rifkin (1995)	80% (United States) by 2035
World Bank (2016)	66% (Developing countries)
McKinsey Global Institute (2016)	60% (46 countries)
Chang and Huynh (2016)	56% (Asia); 70% (Vietnam); 89% (Philippines) in the next 20 years
Bowles (2014)	47–54% (European Union)
Frey and Osborne (2017)	47% (United States)
Lee (2018)	40% (Global)
Chui et al. (2017)	40%–55% (46 countries)
Deloitte (2014)	35% (United Kingdom)
Price Waterhouse Cooper (2017)	21% (Japan); 30% (UK); 35% (Germany); 38% (United States)
Lassébie and Quintini (2022)	18–27% High risk (OECD)
CEDEFOP (2019)	14% High risk (Europe)
Arntz, Gregory and Zierahn (2016)	9% High risk, 50%–70% low risk (21 OECD countries)
ZEW (2015)	9% (Germany) 12% (United States)
UK Office of National Statistics (2019)	7.4% High risk (England)
MGI (2017); Chui et al. (2016)	5% entirely, 60% partly (Global)

Source: ILO (2016) and studies as shown.

Figure 2: Changes in Occupational Employment, United States, 1970–2016



Source: Autor, 2019.

educational and skill levels. This dynamic creates a dual effect: while high-skilled workers find new opportunities for growth and higher wages, low-skilled workers face the risk of job displacement and wage stagnation (Fig. 2). This resulting increase in the polarisation of the labour market, has been observed across several studies.[10]

3. A third assumption is that technological change can act as a relative complement to skills, enhancing productivity by augmenting either high or low-skill workers (Bresnahan et al., 2000; Acemoglu, 2002; Autor et al., 2003; Frey, 2023; Acemoglu & Autor, 2011).

Professions that require a high degree of social intelligence, creativity, and human judgment – such as management, social work, and education – are deemed complementary as these skills are inherently human and difficult for machines to replicate. On the other hand, routine manual and cognitive tasks, which are more susceptible to automation, often see a decline in demand, thereby negatively impacting lower-skilled workers.

Moreover, the threat posed by automation has been shown to disproportionately impact young individuals and women (i. e., Nedelkoska and Quintini, 2018). For young individuals, the rapid pace of technological change means that the skills they acquire today may quickly become obsolete. This necessitates a continuous commitment to lifelong learning and adaptation. The transition from education to employment is also fraught with challenges, as entry-level positions, which traditionally serve as steppingstones to more advanced roles, are often the first to be automated. This creates a precarious job landscape where young workers must navigate an uncertain future and constantly update their skill sets to remain relevant in the job market.

Women face unique challenges linked to several factors. Primarily, they have a higher tendency to engage in part-time work, often within the service sector, which is more susceptible to automation. Additionally, women are underrepresented in more lucrative roles, such as those in the STEM fields, where job security is generally higher. Systemic barriers, including gender biases in hiring practices, limited access to education and training in high-demand skills, and societal expectations, further exacerbate this disparity (Dellot, 2018; World Economic Forum, 2018).

Hence, as technology evolves, it also creates a dynamic environment where certain roles become obsolete and where new opportunities arise, necessitating continuous adaptation and learning from the workforce. It can also shift the job market towards roles that require more specialised skills, particularly those that complement automated systems.

Saudi Arabia: An Expanding Labour Supply

Under the impulse of Vision 2030, the Kingdom's policies have focused on job creation and the increased participation of nationals, particularly females, in the Saudi labour market. Demographic developments, fuelled by a population of which 54% are under the age of 25, were anticipated

to intensify as young cohorts were to enter the labour market during the years leading to 2030. With Saudi unemployment, which at the time was above 12%, the government responded by expanding public service employment and by substituting foreign workers in the private sector for Saudis through its Saudisation policy programme – also called Nitaqat[11]. The main goal of the policy, which was recently enhanced[12], was to help Saudis get a foothold into the labour market by setting up quotas in certain sectors and occupations, while concurrently rewarding firms that met these quotas.

As a result, Saudi female labour participation more than doubled and is projected to reach 40% by the end of the decade. The female labour force increased from 913 thousand in 2017 to 2.2 million in 2023. To further improve employment outcomes, the unemployment rate for Saudi females, which is currently 13.7% (it was over 30% in 2017), would need to continue its downward trend (GAStat 2023 Q4).

Based on current estimates, the number of young Saudis reaching the working age is projected to grow by over 250,000 per year, resulting in a total of about 2 million new entrants to the labour market by 2030. With a young population, which is increasingly more educated, particularly females, the government has doubled down on its efforts to ensure that sufficient good quality jobs are created for them in sectors such as tourism, entertainment, and technology.

The employment levels of non-Saudis are expected to remain strong due to several initiatives aimed at boosting GDP, creating jobs, and diversifying the economy. These include the Shareek investment plan, the Green Initiative, Neom, the Riyadh Strategy, the Soudah project, and the PIF 2021–2025 strategy, which supports and invests in various sectors and projects.

This strategic shift will necessitate an expanded workforce, comprising both Saudi nationals and non- Saudis. In this context, the total size of the Saudi labour force is expected to approach 8 million by 2030, thereby significantly increasing the labour supply in key sectors such as construction, manufacturing, wholesale and retail, and accommodation and food services. While these sectors are labour-intensive and contribute to job creation, they also tend to yield lower-paid, lower-productivity roles. Concurrently, the strategy aims to cultivate a more resilient economy by promoting innovation and high-value industries. This indicates that a portion of these jobs will demand a more productive and skilled workforce.

What Is the Potential Degree of Exposure of the Saudi Labour Market to Automation?

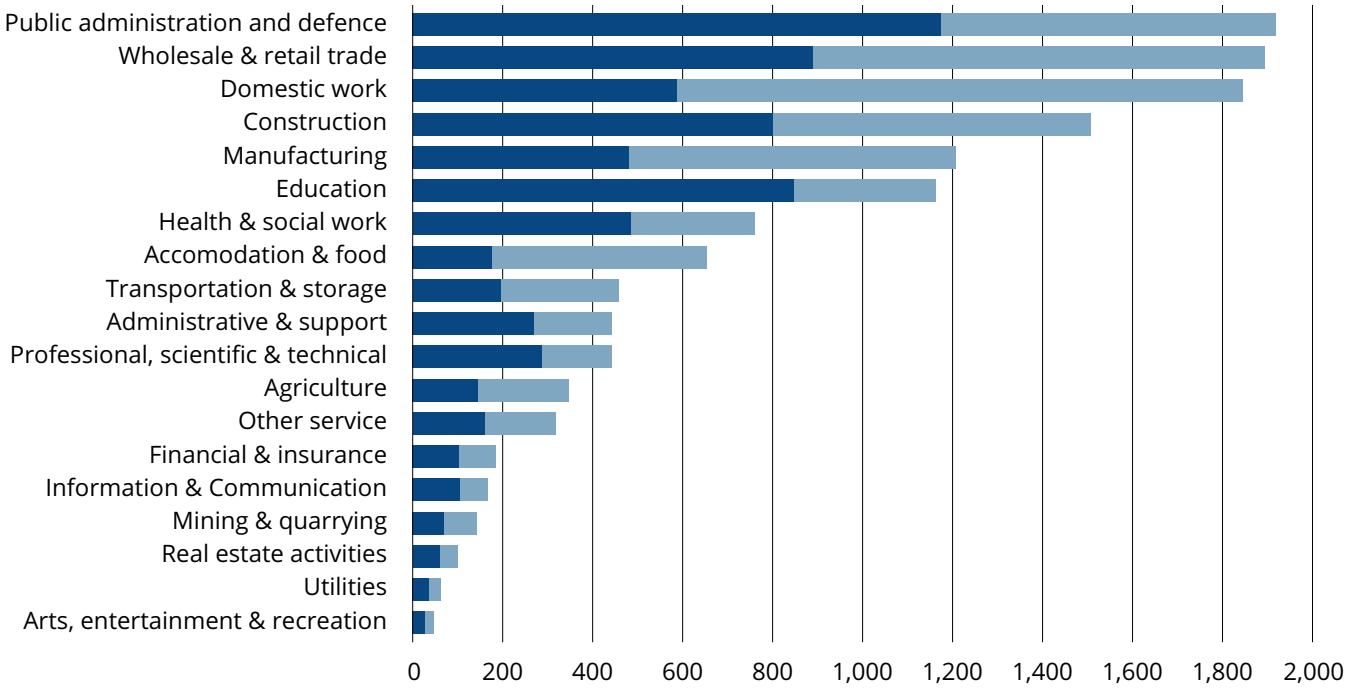
Like many countries, Saudi Arabia is navigating the complexities of technological advancement. Using Frey and Osborne's mid-range estimates on the risk of automation across occupations, we broadly illustrate how the risk of automation might be distributed among sectoral and occupational groups in the Saudi labour market.

Figure 3 shows the distribution of Saudi employment across sectors according to their probability of automation. About 47% of jobs in Saudi Arabia could be exposed to some degree of automation, a similar level to the United States. However, given the current labour distribution in Saudi Arabia, we find different degrees of exposure to automation across sectors. As is illustrated, sectors with routine, manual occupations, such as retail trade, domestic work, manufacturing, food, and accommodation, have the highest exposure to automation. It is however less the case for those with prominently non-routine occupations, such as education and health, because of the cognitive abilities and human interactions they require. However, this sectoral distribution hides a specific concentration of workers, which affects the level of exposure to potential automation.

The relative sectoral concentration of employment across gender and nationality does matter (Fig. 4). Within their group, a high proportion of Saudi males (37%) work in the public sector. Despite efforts to employ more Saudi females, the sector remains overwhelmingly dominated by Saudi males – with the latter accounting for about 90% of all employees. Although a shift to the private sector has been noticeable in recent years, the Saudi government continues to be an employer of choice. Saudi females, on the other hand, show a strong preference for education and health (34%), and over 21% now work in the hospitality and retail sector – the latter sectors being specifically targeted as part of the Nitaqat campaign.

Conversely, non-Saudi employment shows strong differences across gender. About 54% of non- Saudi males are concentrated in manufacturing, construction and hospitality and retail, while domestic work (i. e., drivers) employs an important proportion of males (20%). As for non-Saudi females, 72% are concentrated in domestic work (i. e., cleaners, servants,) and 11% in health (i. e., nurses and health workers).

Figure 3: Saudi Arabia: Distribution of Jobs by Sector, Probability of Automation, 2023



Source: GAStat LFS, Census 2022. Author's calculations.

Figure 5 shows a more detailed view of how these concentrations of workers across sectors affect the workers working in them. The charts show the percentage distribution of main occupations within each group. The Y axis represents the skill level of each occupational group (1 for low-skill and 4 for high-skill). The X-axis represents the probability of automation.

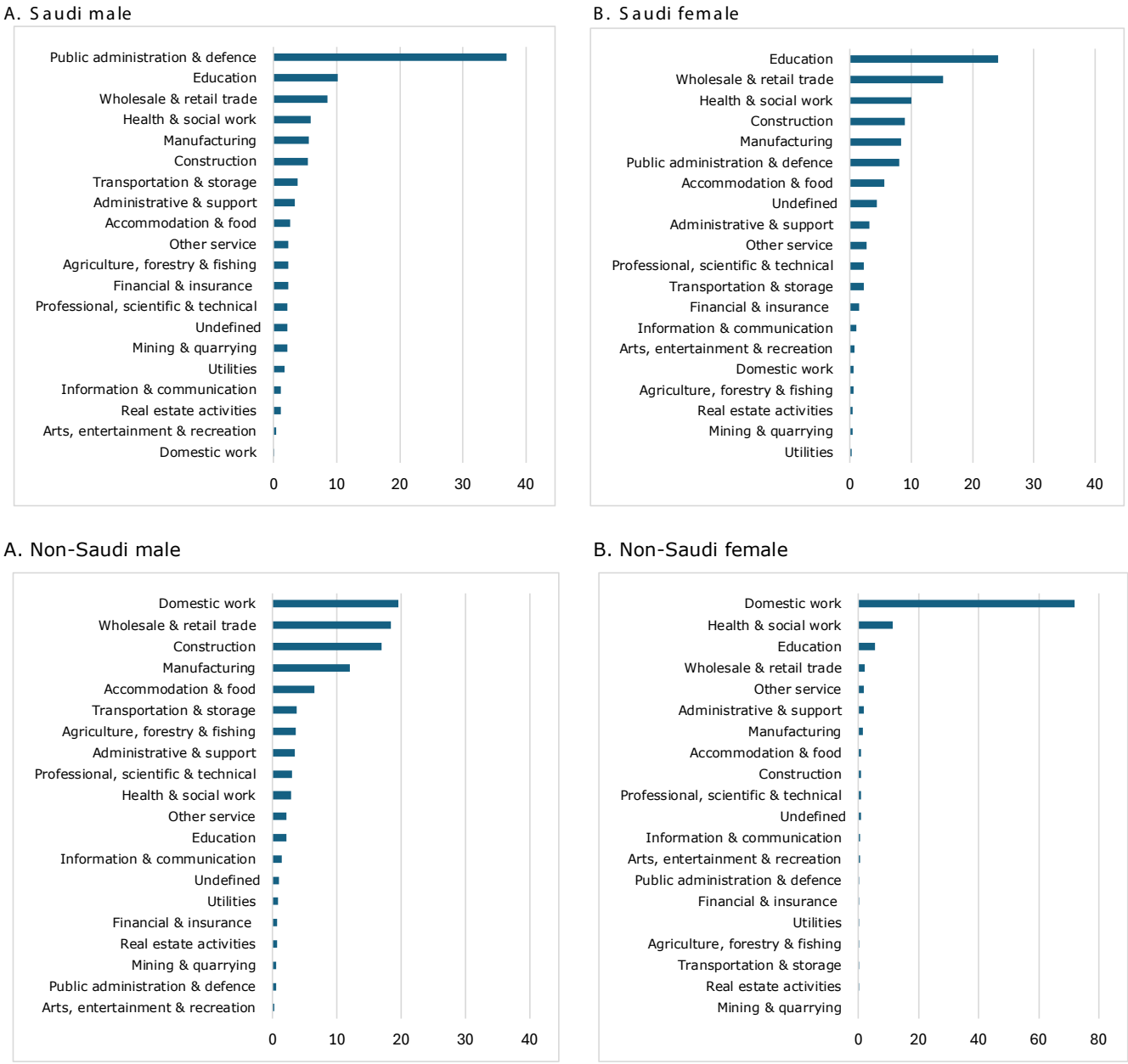
As we will show, some groups of Saudis, particularly males, have been holding jobs in occupations that are less prone to automation compared to non-Saudis. Saudis are more likely to work in more administrative functions requiring a higher level of education, while a greater proportion of non-Saudis work in lower-skill occupations.

A large proportion of Saudi males (33%) work in managerial and specialist roles mostly in sectors such as public administration and finance, occupations often requiring advanced cognitive skills, which are less susceptible to automation (Fig. 5.A). These positions involve complex decision-making and strategic planning, skills that are highly valued in a knowledge-based economy. The level of exposure to automation for managerial positions is estimated at 31% on average, with positions such as chief executives and senior officials at 24%. These roles often necessitate significant human interaction and emotional intelligence, which also reduce the risk of automation. Effective management requires strategic decision-making, empathy, and the ability to navigate complex social dynamics--attributes that remain challenging for AI to replicate. Another third of its workforce remains involved in technical occupations.

The remaining third are working in lower-skill occupations such as sales and service, and clerical jobs, which are more susceptible to automation due to the repetitive and routine nature of the tasks involved. For instance, clerical jobs often involve data entry, documentation, and administrative support tasks, which can be effectively performed by advanced software programme. Similarly, sales and service occupations may experience increased automation through AI-driven customer service platforms and automated retail systems. However, while industries might automate specific logistical and planning functions, roles that require a high level of human interaction, such as tour guides, entertainers, and hospitality managers, may be less prone to automation.

The employment landscape for Saudi women remains predominantly concentrated in sectors characterised by routine-based tasks, rendering these positions highly vulnerable

Figure 4: Saudi Arabia: Distribution of Employed Workers, Selected Sectors, 2023

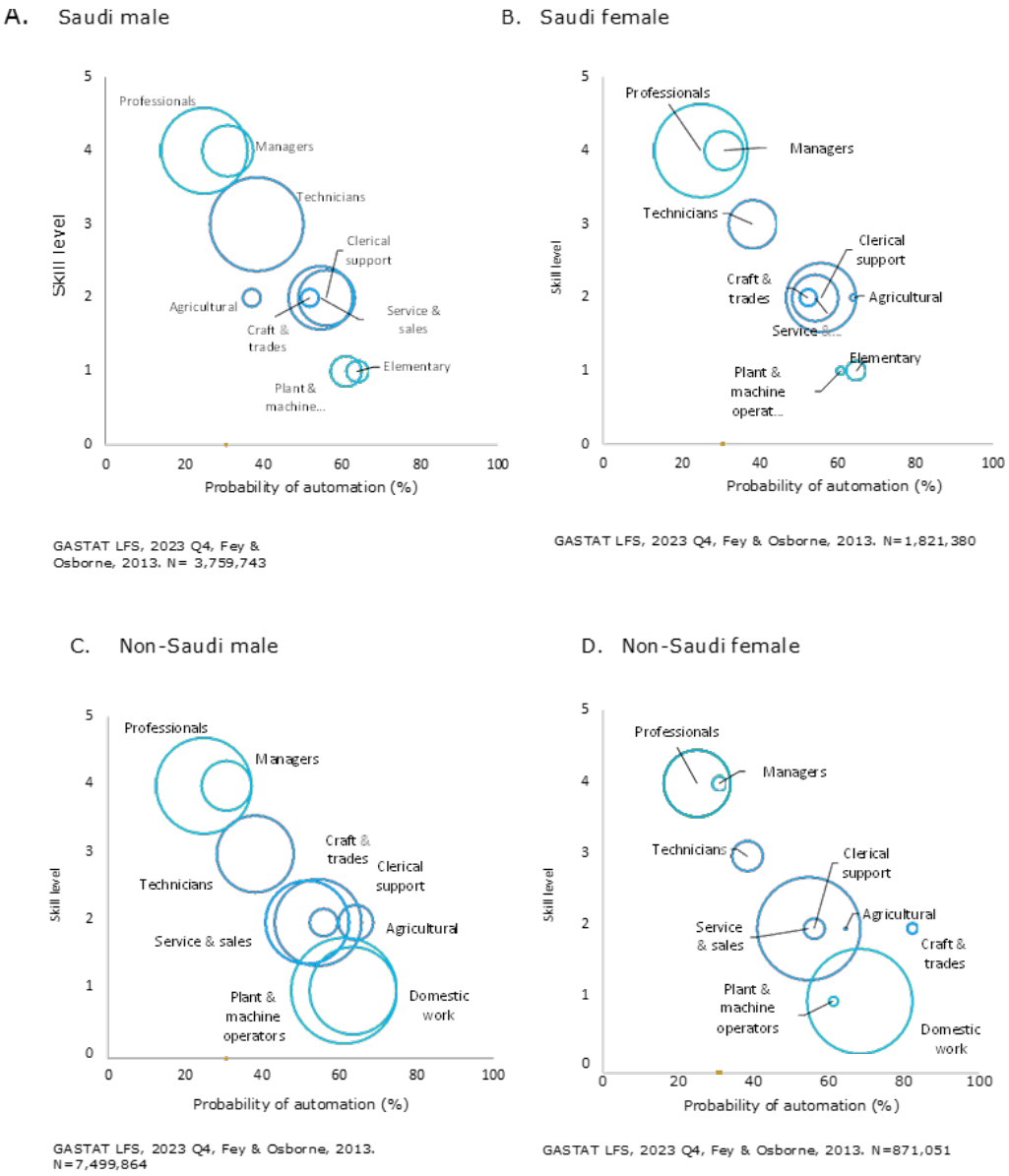


Source: GAStat Labor Force Survey, 2022 Census.

to automation. Despite advancements due to increasing levels of higher education among Saudi women, a substantial proportion of the workforce is still employed in administrative and clerical roles (30%). Over half of these roles are at risk of being automated, as they primarily involve repetitive and routine tasks that can be effectively managed by advanced software and AI technologies (Fig 5. B).

A significant portion of Saudi females are employed in the education and healthcare sectors, which together comprise 34% of their employment. These sectors necessitate complex cognitive and interpersonal skills that are less susceptible to automation. Professions such as teaching and medical practice require critical thinking, problem-solving abilities, and emotional intelligence, making them more resistant to technological disruption. These occupations exhibit relatively lower exposure to automation, with rates of 20% and 25%, respectively. While currently representing a smaller segment of the workforce, the number of Saudi women advancing into management positions is expected to increase due to their rising levels of higher educational attainment. Management roles are inherently more resistant to automation due to their dependence on leadership, communication, and human relations skills.

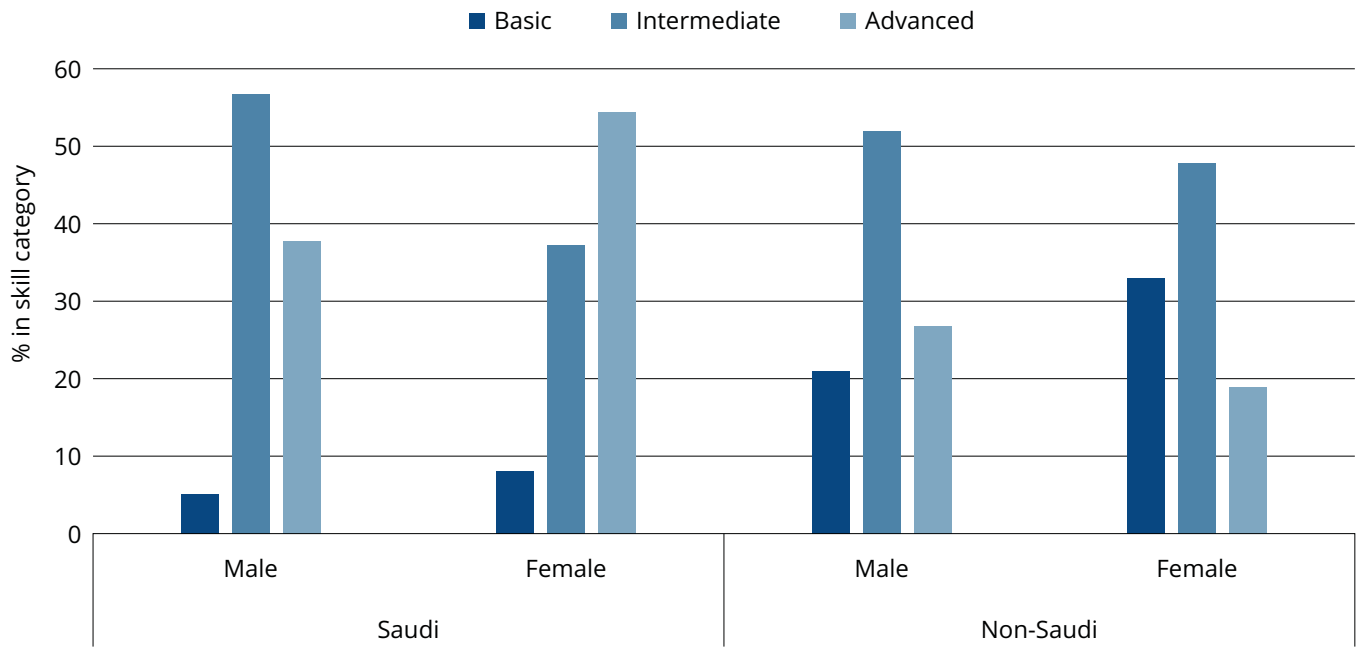
Figure 5: Occupations with a Higher Probability of Automation, Saudi Arabia



The distinct segmentation between Saudi and non-Saudi workers is further substantiated in Figures 5.C and D. A significant proportion of non-Saudi males are concentrated in lower-skilled occupations (66%) (Fig. 6). For instance, primary sectors such as construction, which employ the largest proportion of non-Saudi males, demonstrate a relatively high susceptibility to automation (62%). Similarly, occupations involving operating heavy machinery (61%), masonry (54%), and carpentry (63%) are also susceptible due to technological advancements. Non-Saudi workers are predominantly engaged in crafts, trades, and the operation of plants and machinery (54%), with a considerable number also employed in sales and service roles (52%), thereby increasing their risk of being affected by automation.

Among all the groups analysed, non-Saudi females are identified as the most vulnerable to automation, with 80% of their workforce classified as lower-skill workers. Jobs within lower skill categories have a probability of 54% to 82% of being automated. These individuals are primarily employed in domestic roles, such as servants or house cleaners, which demonstrate a higher exposure to automation at an average rate of 68%. Clerical support positions, another prevalent occupation for many non-Saudi females, also face a significant risk of automation at 56%. However, given that they constitute less than a million workers in the Saudi labour market, their overall impact remains relatively small.

Figure 6: Skill Levels by Nationality and Gender, Saudi Arabia, 2023



Source: GAStat LFS, 2023 Q4.

Job Creation vs. Labour Productivity

The question that arises is whether these low-skill, routine occupations are heading towards automation. A detailed examination suggests that this might not be an inevitable conclusion. In the context of Saudi Arabia, the relatively low wages associated with these positions pose a challenge to justifying the capital investment needed for automation. Given that labour costs are generally low for many non-Saudi workers, automating these tasks may not be economically viable for numerous businesses. This is particularly evident in sectors such as construction and domestic work. The same reasoning could apply to certain occupations held by Saudis.

Saudisation has targeted clerical and administrative occupations to boost the female employment rate, which has doubled since 2017. Public sector employment has remained strong although the private sector is attracting a higher number of Saudis. Why would the Saudi government continue creating low productivity jobs susceptible to automation? The advent of an expanding labour supply of young Saudis entering the labour market, including the fast increase of females, has put the government before a policy choice: increase the quantity of jobs or emphasise labour productivity. Until now, the choice has been to create jobs, particularly in the lower-skill sectors.

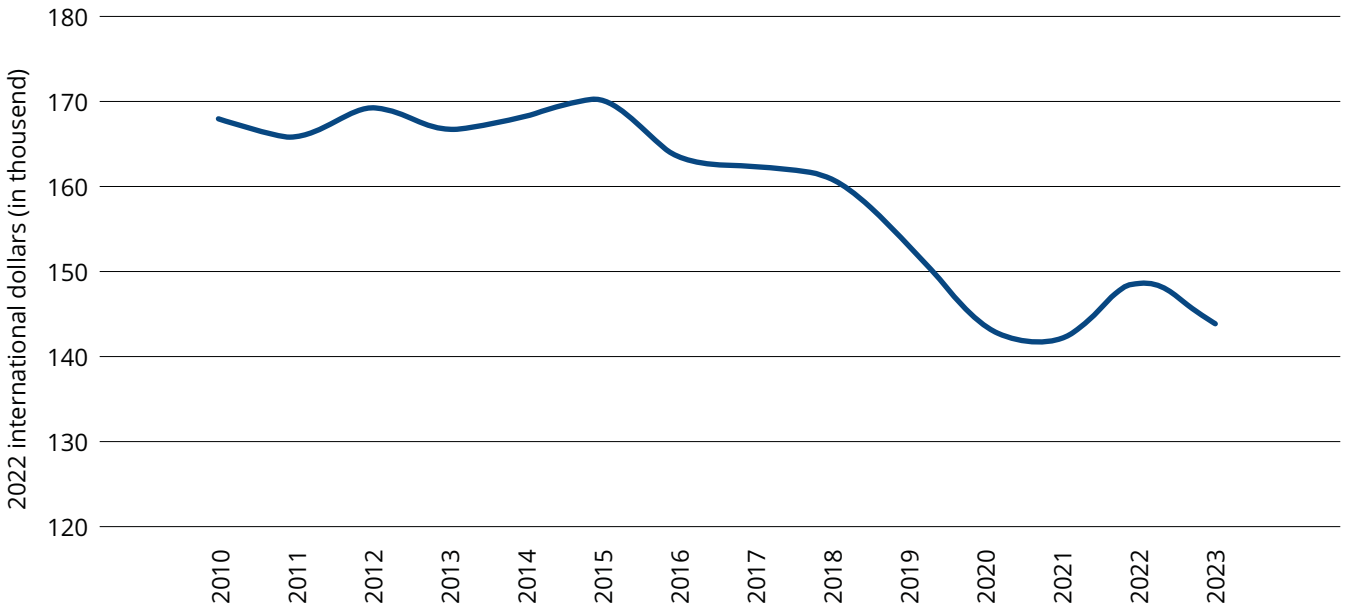
The concentration and magnitude of these lower skill occupations have led to a decline in labour productivity levels (Fig. 7). Saudi companies have long favoured hiring low-skilled, lower-paid expatriates over investing in advanced technology, resulting in labour-intensive production processes. This trend has boosted the prominence of lower-skill sectors like wholesale and retail trade, manufacturing, and construction. At the same time, the government's Saudisation programme aimed to increase the participation and employment of its citizens by targeting sectors such as hospitality and retail, while maintaining positions in public administration. In either case, these labour-intensive policies have not favoured technologically driven job productivity.

The situation may change soon. Economic growth and development involve not only capital accumulation but also the diverse and complex productive capabilities of a country. As the Saudi government aims to diversify its economy, there will be an increasing need for higher specialisations (Hidalgo and Hausmann, 2009).

Towards a Higher Skill-Based Future?

As discussed earlier, technological change has been predominantly skill-biased, favouring those with the ability to adapt to and integrate new technologies. Further strategic

Figure 7: Labour Productivity, Saudi Arabia



Source Conference Board, 2024.

development in this area on the part of the Saudi government would emphasise human capital and skill development as key components of economic sophistication. This transformation is accelerating the need for not only digital literacy, data analysis, and cognitive ability, but also social skills.

This could also indicate a potential shift towards highly skilled expatriate workers, who would support the evolving technological landscape with their expertise. Emphasising high-skilled expatriates and strategically substituting low-skilled jobs with automation could potentially reverse the decade-long decline in labour productivity. This approach would not only drive economic growth but also cultivate a more dynamic and resilient labour market. In this context, the ability to acquire new skills rapidly and efficiently would be a critical competitive advantage for both individuals and organisations.

As government policies increasingly encourage Saudis to seek employment in the private sector, skill allocation and labour costs will remain significant considerations for employers. Consequently, employers will progressively need to evaluate whether to automate certain tasks or roles as a labour- saving measure or to complement them with technology. This development could further incentivise Saudis to upskill and pursue lifelong learning to enhance their resilience to technological change.

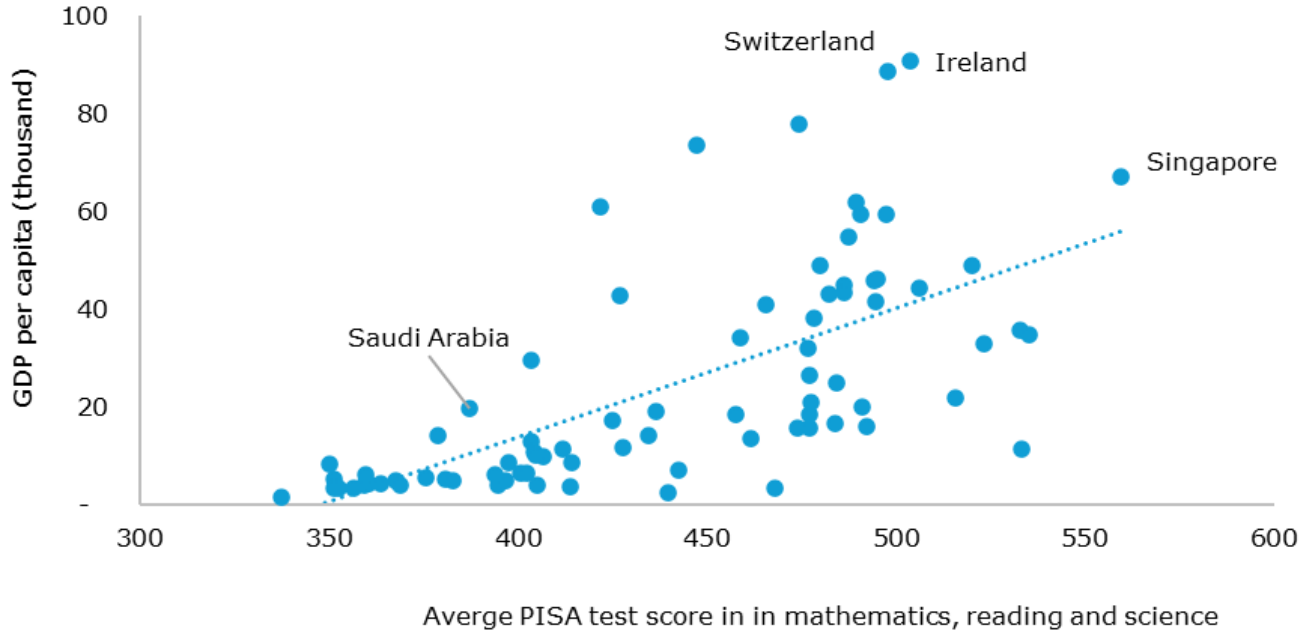
However, educational and training performance must align for this scenario to happen. The next section evaluates if these conditions are met in Saudi Arabia.

Are Conditions in Saudi Arabia Present to Face the Challenge?

As skill-biased technological change (SBTC) progresses, it is anticipated that the demand for skilled labour, particularly in sectors like IT, engineering, and advanced manufacturing will grow. This development could have adverse effects for some categories of workers in routine, low-skill jobs. To mitigate the adverse effects of SBTC in the future, there will first need to be a continuous investment in education and vocational training, along with an increase in educational performance.

The Saudi government already devotes sizable financial resources to its education system. The World Bank estimated that in 2020 the country was Asia's top spender on education, with 7.81% of GDP spent on the sector. It also devotes nearly 20% of its general government expenditure to education (UNESCO, 2021). Despite these considerable financial efforts, Saudi Arabia continues to lag behind other countries in human capital development.

Figure 8: Human Capital and Economic Growth



Source: OECD PISA 2022 Database; World Bank.

Early Educational Quality and Student Performance

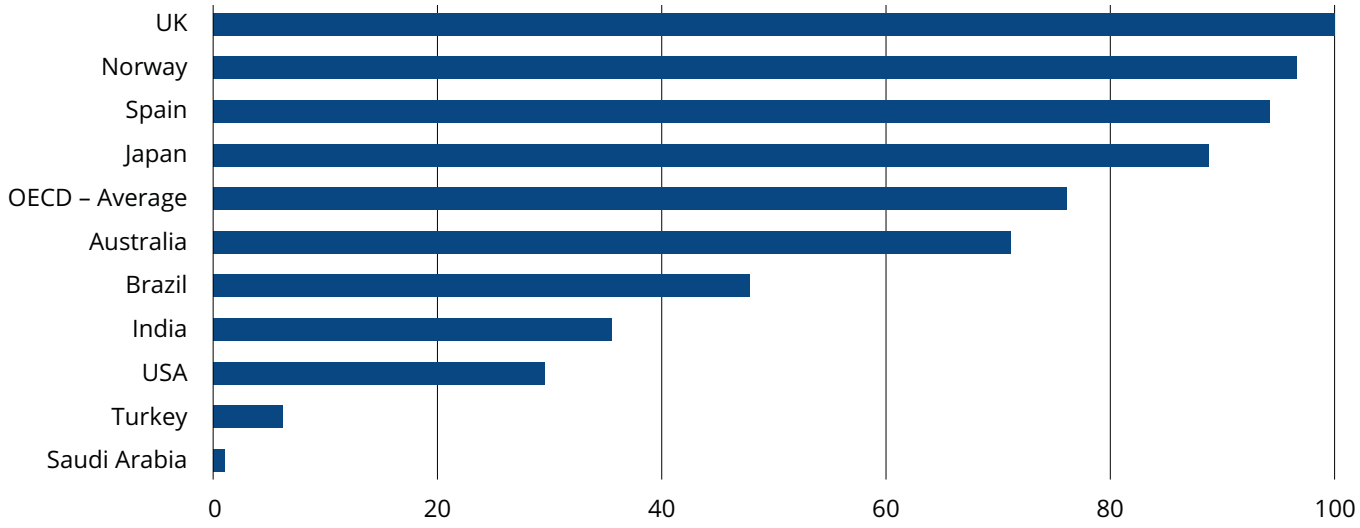
The ability to learn is of paramount importance. Early educational phases are crucial times in a child's skill development and an especially important time to develop the ability to learn which is essential for lifelong learning[13]. Studies on the subject have shown that lower educational participation at an early age may impact later educational performances. In this regard, Saudi Arabia has a lower proportion of students in early child education (ECE) compared to other countries (Fig. 9)[14].

In both primary and secondary education levels, Saudi students are also shown to perform below students in other countries as shown in the Trends in International Mathematics and Science Study (TIMSS), which measures the performance of 4th and 8th graders. The average score of fourth graders across TIMSS tests was 383 in mathematics and 390 in science (2019). For eighth graders, their scores were 368 in mathematics and 396 in science. By contrast, the average scores of fourth and eighth graders in most European, North American, and Asian countries typically exceeded 500. Those in Singapore, for instance, reached average scores near or above 600 in both mathematics and science. A positive development, however, shows that girls in Saudi Arabia consistently and significantly overperformed boys across different grades and subjects (Elsayed et al., 2022)[15].

At the secondary level, the Programme for International Student Assessment (PISA 2022), which tests 15-year-old students, showed similar need for improvement. Saudi students scored an average 387, far from the OECD average of 478. In reading literacy, the main topic of PISA 2022, 15-year-olds in Saudi Arabia scored 399 points compared to an average of 476 points in OECD countries. In science and mathematics, Saudi students scored 373 points in mathematics and 386 points in science, compared to an average of 485 and 472 points in OECD countries for each respective test.

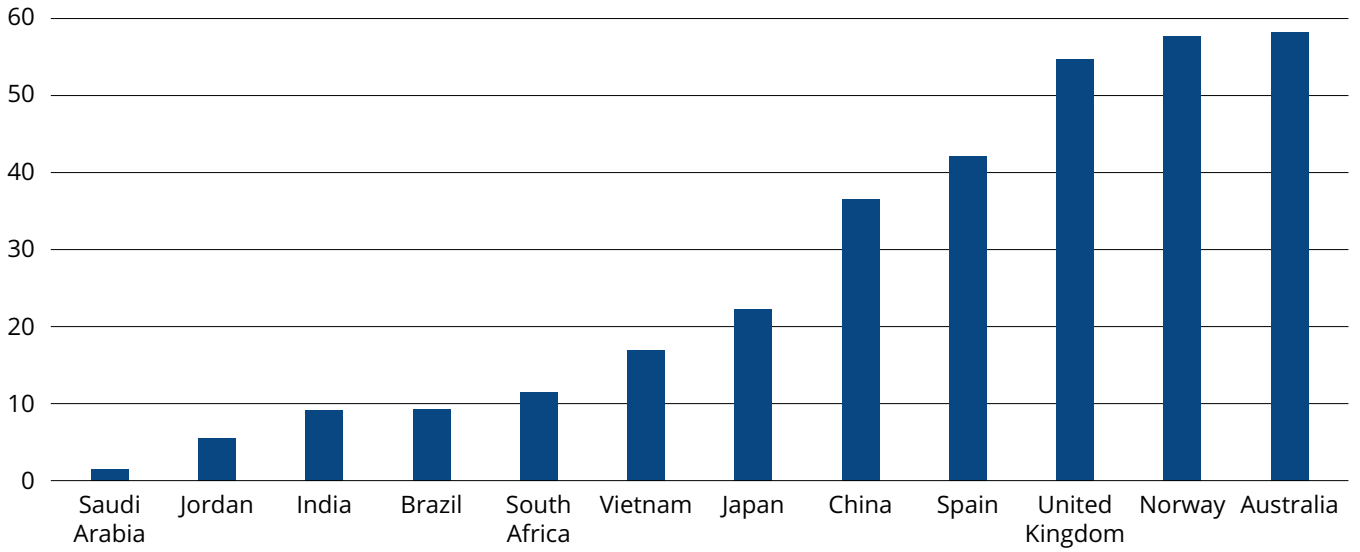
Vocational education and technical training programme (VET) are becoming increasingly relevant in the context of automation. Short and responsive, these programmes can provide a blend of technical and transferable skills, enhancing job resilience and adaptability. Despite efforts by the government in recent years to promote vocational education and technical training, Saudi student enrolment in these programmes continues to be low (Fig. 10). To appreciate the amount of progress that is needed, one can compare the proportion of 15–24-year-olds in countries such as Switzerland and Australia, which have enrolment rates of 29% and 26% respectively for males and females, while those in Saudi Arabia have less than 1% enrolled in VET. The proportion is even lower for Saudi females. Programme offerings for males have until recently focused on office management, technical support, and accounting, while for females

Figure 9: Enrolment Rate in Early Childhood Education, 3-year-olds



Source: OECD, Education at a Glance 2023.

Figure 10: Share of All Students in Secondary Education Enrolled in Vocational Education and Technical Training Programme (%)



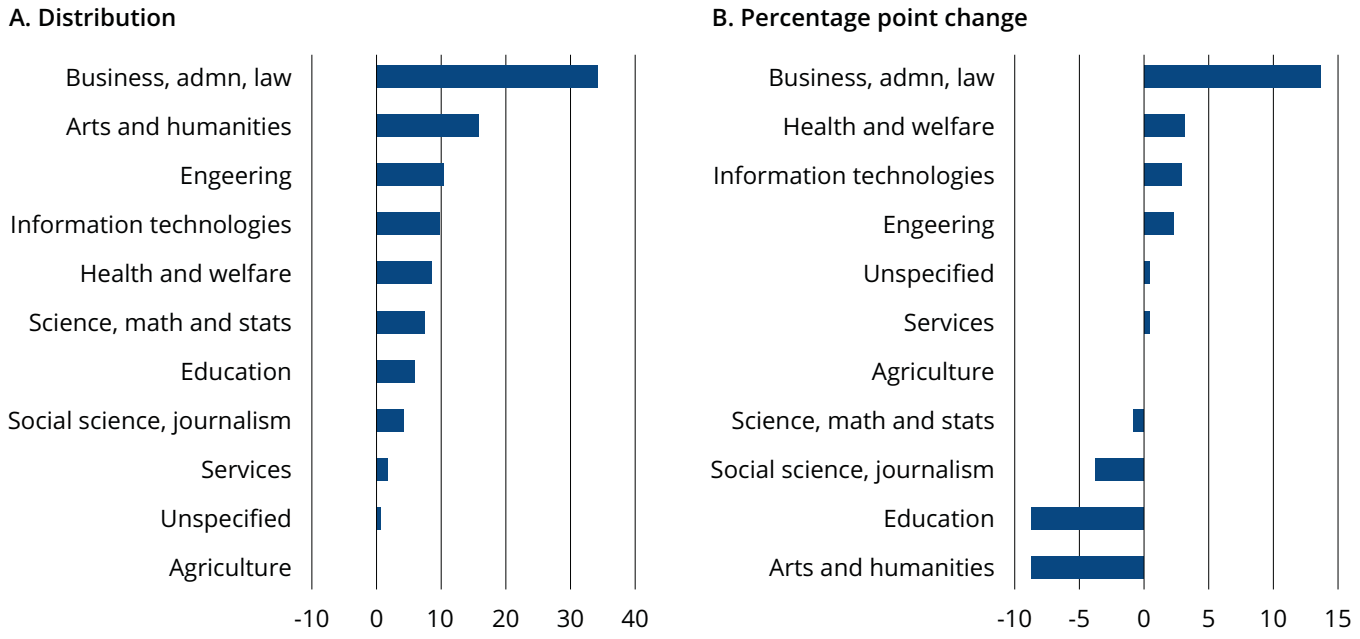
Source: UNESCO, 2022. Most recent year.

they have covered areas such as cosmetology, design and production of clothing, and hair care (World Bank, 2019).

There appears to be a sizable proportion of Saudis who have skills which are not aligned with the new demand of the labour market. The distribution of Saudi university graduates has long been heavily skewed towards general fields of education and training that not only created an oversupply of these skills, but that were also not aligned with the skills requirements for many of the jobs of the future (Fig. 11 A and B).

In the past, the preference of Saudis for public-sector employment has meant that much of the country's human capital investment has been directed toward specific fields of study and training. But field choice among students has been changing in recent years (Fig. 11 B). Indeed, there has been a shift towards programmes such as business, administration and law, information technologies, and engineering. A lower proportion of Saudi females graduated from education in 2018 than in 2015, which has long been a traditional field of study. Incidentally, there has been little progress in science, mathematics, and statistics – important

Figure 11: Distribution and Percentage Point Change, Fields of Study, Saudi Arabia, 2015–2022



Source: UNESCO.

components of STEM fields. Behind this low performance hides improvement.

While men continue to dominate STEM-related fields, Saudi Arabia has made progress in reducing the gender gap. For example, Saudi Arabia has a female graduation rate of 21% in STEM fields, which is higher than that of European countries and the United States, which range between 10% to 13%. In 2019, it was reported that 70% of students in Saudi Arabia who completed a degree in natural sciences, mathematics, and statistics were women (Montoya, 2024).

However, further advancements are necessary. Policy can play a role in increasing human capital and creating effective training systems to mitigate the risks of automation. It is essential to address the gap between the skills provided by the education system and those required in the future labour market. The next section will examine this issue from that perspective.

Implications and Potential Policy Responses

While these challenges provide an opportunity to examine more closely the dynamics between human capital development, labour, and technology, they also offer an occasion to reflect on potential corrective measures which could help improve conditions for learning and the mitigation of skill mismatches, while supporting those more vulnerable to technological change. Indeed, future workers will need to be prepared for a career, not just a job, and have the ability for life-long learning to adapt and upgrade their skills to ever-changing environments.

Dealing with Asymmetrical Information

Many young job seekers often do not know enough about jobs and labour market trends to make early informed decisions. The problem of asymmetrical labour market information, which arises mainly from the lack of access to and interpretability of information about future labour demand, often contributes to an inefficient allocation of human capital and amplifies the consequent mismatches in the Saudi labour market.

Rather than acting at the stage where students are about to enter the labour market, a better strategy could be to act earlier. In this way, students could benefit from being exposed to more and various career choices before they graduate from secondary school. This, in turn, would help them make better informed decisions about further studies, which could later lead to better labour market outcomes. Accordingly, initiatives like better labour statistics

and occupational projections, better counselling and more active stakeholders' involvement in skill requirements could be beneficial.

Asymmetric information between job seekers and employers has also led some countries to improve career guidance and counselling services to tackle human capital misallocation. The National Labour Observatory introduced by the Saudi Ministry of Labour and Social Development are a step in the right direction[16]. Australia also offers a good case study in this regard with their Monthly Labour Market Dashboards, which compile data from Jobs and Skills Australia, the Department of Social Services, and the Australian Bureau of Statistics. The latter offers key labour market indicators, employment trends, and information on in-demand occupations, providing valuable resources for policymakers, researchers, and the public. It plays a crucial role in guiding job seekers and shaping skills development initiatives to meet the evolving needs of Australia's economy.

Making Education More of an Investment Than a Consumption Good

Because education is heavily subsidised in the Saudi context, it is likely to be considered a consumption good rather than an investment in one's human capital. This outcome can have significant implications on how individuals approach learning. When education is heavily subsidised, it may be valued more for its immediate experiential benefits, like the enjoyment of learning and the social aspects of attending school, rather than for its potential to enhance future earning potential and career opportunities. This mindset could lead to suboptimal decisions regarding the pursuit of education and training, with less emphasis on fields of study that are in high demand or that provide practical skills for the job market.

Aligning Stakeholders

A robust skill development strategy is essential for fostering a workforce capable of meeting the demands of a dynamic global economy. This strategy necessitates a collaborative approach among educational institutions, labour market authorities, businesses, and individuals. The integration of inputs from private sector stakeholders is crucial, as it enables governments to steer educational and vocational programmes more effectively, aligning them with the precise needs of various industries. Such synergy not only enhances the relevance of the curriculum but also ensures that the training provided is practical and applicable in real-world scenarios.

A successful strategy must be inclusive, providing opportunities for all segments of society, regardless of socioeconomic background. This inclusiveness ensures that the talent pool is as diverse as the market it serves, fostering innovation and creativity. Thus, the cooperation of all stakeholders in this endeavour is not only beneficial, but imperative for economic growth and societal advancement.

Making Safety Nets More Dynamic and Inclusive

In addition to educational reforms, there must be a concerted effort to develop social safety nets and redistribution mechanisms to assist those affected by technological displacement. However, to be effective, such programmes must act as a trampoline to help labour market participants regain a foothold in the job market. As skills can erode rapidly, it is crucial that the unemployed do not remain idle and immediately join training programmes, which will enable them to re-integrate into the labour market more quickly.

Improving Education and Training

To be able to upskill and take part in lifelong learning, early childhood education (ECE) is crucial in providing the necessary foundation for later learning. Research has shown that it is very difficult for students to catch up later if they get behind during these early years. This means that the foundation of learning must be developed as early as pre-elementary and continue through primary and secondary levels so students acquire learning skills that will make them flexible, adaptable, and resilient to technological change in the future. The Saudi Ministry of Education has recognised the importance of ECE and has set to raise the rate of children's enrolment in kindergarten from 17% to 90% in 2030 and to raise the rate of children's enrolment in ECE from 17% to 90% in 2030.

In late 2017, the Ministry of Education also launched the Future Gate initiative to promote the use of digital learning tools in the classroom. This initiative appears to have paid dividends as Saudi Arabia is among the top countries with young people in the 15–24 age category having the ability to write a computer programmes using a specialised programming language. Remarkably, the skillset is more prevalent among Saudi females than males, according to

Box 1. SkillsFuture Singapore

SkillsFuture Singapore (SSG) is a comprehensive initiative that encourages individuals to take charge of their personal development at every stage of life, from schooling to mid-career and beyond. The main features of SkillsFuture include:

- Providing resources for education and career guidance
- Fostering an integrated system of quality education and training
- Promoting employer recognition of skills and mastery
- Nurturing a culture of lifelong learning.

This initiative supports the nation's vision of a future-ready society where all individual's skills and contributions drive the country's advancement towards an advanced economy and inclusive society. SSG provides resources such as SkillsFuture Credit, Jobs-Skills Insights, Skills Advisory services, and the MySkillsFuture online portal to empower Singaporeans to chart their career and lifelong learning pathways.

Source: World Economic Forum, 2023.

a UNESCO's 2024 report. This trend not only highlights the success of the initiative but also underscores the progressive strides in gender empowerment within the realm of technology in the Kingdom.

Improving participation in technical and vocational training programmes will also require alleviating the stigmatisation of related careers in Saudi society. Despite ambitious goals supported by recent efforts on the part of the government,[17] participation is still well below expectations. A remedy to this would be a better synergy between training institutions and private firms to help with more aligned curricula. Firms could also offer on-the-job apprenticeship training programmes in collaboration with them. The WAAD skill programme by the Saudi Ministry of Human Resources and Social Development is a positive development in this regard. So would be the SkillsFuture initiative in Singapore (Box 1).

Alternative and Complementary Training

Attitudes about training appear to be shifting, as micro-credentials and short and targeted technical and vocational training programmes are increasingly seen as better-suited alternatives to formal education (Cote, 2024; Thompson and Almoaibed, 2023). The fast pace of technological change has pushed more students to seek more efficient ways to complement their sets of skills. Online courses, virtual classrooms, and digital resources can make education and training more inclusive, allowing individuals to learn at their own pace and according to their own schedules. Upskilling and reskilling initiatives should be continuously updated to reflect the latest industry trends and technological advancements. Mentorship programmes, internships, and apprenticeships can also bridge the gap between theoretical knowledge and practical experience. By engaging with professionals in the field, learners can gain valuable insights, build networks, and enhance their employability.

Building on this foundation, a complementary balance could be as important. It could mean a greater premium on education with a mix of knowledge-intensive skills but also on "softer" skills such as the ability to communicate effectively, work with teams, find creative solutions to problems, socialise well, and adapt to fast-changing situations. To address this issue, it could be beneficial to shift the narrative towards viewing education as a strategic investment in one's future, highlighting the long-term benefits of acquiring marketable skills and knowledge. Making students assume a part of the cost of their education could incentivise them to think more about those lines.

Concluding Remarks and Next Steps

The dual nature of the Saudi labour market, along with recent governmental policies and economic priorities, has positioned Saudi Arabia favourably in addressing potential job loss due to automation. Despite this, given the skill-biased nature of technological change, the paper highlights that the Kingdom's current education and training systems require further attention.

Rapid technological advancements present both opportunities and challenges for Saudi Arabia. Previous initiatives aimed at job creation and increasing female labour participation have been notably successful. However, these efforts have predominantly targeted lower productivity jobs. While automation can enhance productivity, it also raises concerns about technological unemployment for certain groups of workers, particularly non-Saudis and females in lower-skill positions. Transitioning towards a future that values skills will necessitate significant adjustments.

While policymakers have prioritised education in recent years, there is a need to place equal emphasis on performance, continuous learning, and adaptability to mitigate the potential risks posed by automation. Cultivating a culture of lifelong learning will enable individuals to remain competitive and resilient, thereby ensuring a balanced and dynamic labour market.

Next steps

The paper faced significant limitations, particularly due to the lack of access to data. However, it paves the way for further research. For instance:

- Utilising microdata would allow for a more detailed analysis across age and other relevant variables. It has been notably shown that young individuals are among those most affected by technological change.
- Further research could also delve into the specific effects of technology on Saudi females. Recent data indicates that young Saudi females are becoming more highly educated and are beginning to match males in STEM fields, which positions them better for the future of work.
- Additionally, a comparative study between Saudi Arabia and other Gulf countries would be valuable. Examining different human capital and economic diversification strategies across the region could highlight best practices and innovative approaches to managing the effects of technological change.

While the paper lays the groundwork, further research is essential to deepen our understanding of these complex issues. By addressing these areas, we can develop more comprehensive strategies to enhance the resilience and adaptability of the workforce in the face of rapid technological advancements.

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Endnotes

1 The World Bank reports that megatrends such as automation, among others, will transform over 1.1 billion jobs in the next decade. The World Economic Forum (2023) also anticipates that within the next five years, job dynamics will shift significantly, resulting in the creation of 69 million new jobs and the elimination of 83 million. Brynjolfsson and McAfee (2014) warned that automated processes and machines would substitute workers leading to massive job losses, increased inequality, and social disruption. In a well-known study, Frey and Osborne (2013, 2017) estimated that almost half of US jobs were vulnerable to automation, with lower-wage occupations and those requiring lower educational levels being more likely to be automated.

2 Artificial Intelligence (AI), more specifically, refers to the simulation of human intelligence processes by machines, especially computer systems. These processes include learning, reasoning, and self-correction. AI can be employed to perform tasks such as problem-solving, data analysis, and even complex decision-making that traditionally require human intelligence. Generative AI, a subset of artificial intelligence (i. e., ChatGPT), is particularly noteworthy for its ability to create new content, whether it be text, images, or ideas, based on its training data.

3 The impact on clerical occupations needs to be approached with caution as well, as evidence is emerging that AI is improving the productivity of lower-skilled workers as technology acts as a complement to their skills (Frey, 2023).

4 https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/whichoccupationsareathighestriskofbeingautomated/2019-03-25.

5 For examples: Australia (Durrant-Whyte et al., 2015; Edmonds and Bradley, 2015); Finland and Norway (Pajarinen et al., 2015); Singapore (Lee, 2016); United Kingdom (Deloitte, 2013; Lawrence et al., 2017); Germany (Brzeski and Burk, 2015); Japan (David, 2017); South Africa (le Roux, 2018); and 40 developing countries covered by the World Development Report (World Bank, 2016).

6 They argued that the study's predictions did not align with actual employment changes observed from 2013 to 2018, suggesting an overestimation of the risk of job loss due to automation. This discourse highlights the complexities of forecasting technological impacts on the labour market and underscores the need for rigorous methodological standards in such analyses.

7 The Luddites, textile workers in 19th century England, fought textile machinery they saw as depreciating the value of their work. Later in the 1930s, Keynes (1933) warned of potential technologies resulting in what he called "technological unemployment." Decades later, Rifkin (1995) projected that 'the end of work" would soon be realised with technology eliminating up to 80% of jobs in the United States by 2035

8 For example, AI is increasingly being utilised in the legal sector for tasks like legal transcription, predictive analytics, and preliminary document review, which can drastically reduce the time lawyers spend on these activities. In healthcare, the advent of telemedicine, electronic health records, and diagnostic algorithms is transforming the way medical professionals deliver care. These technologies enhance patient outcomes but also alter the traditional roles of healthcare providers. Similarly, in the finance sector, algorithms and automated trading systems are revolutionising decision-making processes, impacting roles in stock trading and investment management.

9 See studies by Machin and Van Reenen (1998) and Bessen (2016), Bound and Johnson (1992), Katz and Murphy (1992), and Murphy and Welch (1992).

10 For example, Autor and Dorn (2013), Brynjolfsson and McAfee (2012). See also Autor et al., 2003; Autor, 2013; Michaels et al. (2014); Autor, Katz and Kearney (2006).

11 The policy was announced in 2011. It is interesting to note that there have been attempts to set Saudi quotas as far back as the early 1970s. For instance, the first Five-Year Development Plan (1970–75) called for 75% of workers to be Saudis and for 51% of total salaries to be paid to Saudi workers in all businesses by the end of the Plan. The Eight Development Plan (2006–2010) also called for a Saudisation rate in the private sector of 30% by 2010. The was recently enhanced to help Saudis get a foothold into the labour market by setting up quotas in certain sectors and occupations, while concurrently rewarding firms that met these quotas.

12 In 2021 the Ministry of Human Resources and Social Development introduced three main amendments to streamline the programme. First, the Nitaqat has been simplified by consolidating sectors, which aims to reduce complexity for businesses. Second, a three-year Saudisation plan has been published, providing regulatory stability and clear expectations for companies operating in Saudi Arabia. Lastly, the programme has moved away from fixed-size bands, establishing a smooth relationship between worker count and required Saudisation levels.

13 Research has shown that quality early childhood development (ECD) can have a large impact on future educational attainment and labour market outcomes (Shafiq et al. 2018, Garcia et al. 2016). Children who attended ECD classes had better reading and math scores at age 15 (Devercelli, 2017), and adults who received ECD when they were children earn 22% more than adults who did not receive ECD (Gertler, et al. 2014).

14 Enrolment rates in early childhood education and care (ECEC) are expressed as net enrolment rates, which are calculated by dividing the number of students of a particular age group enrolled in ECEC by the size of the population of that age group.

15 The study shows that the educational landscape in Saudi Arabia presents a unique case of gender disparity in academic achievement, where boys consistently underperform compared to girls across various grades and subjects. This phenomenon contributes to one of the largest gender gaps in student performance globally. The segregated educational system, starting from grade 1, where boys and girls are taught in separate schools by male and female teachers respectively, creates parallel education systems. This separation may contribute to differing school climates and educational experiences, which recent studies suggest have a significant impact on student achievement. For instance, research indicates that the school climate is more strongly associated with boys' achievement, particularly in mathematics and science. Boys attending schools with a poorer climate show considerably lower performance than girls in similar environments. Furthermore, factors such as student absenteeism, especially in grade 4, are strongly linked to decreased mathematics achievement among boys.

16 The NLO was established by a Royal Decree in 2010 to serve as the primary and reliable source of labour market data. However, it was officially launched and operational in 2019 (Saudi Gazette, January 31, 2019).

17 Vision 2030 ambitioned to increase the number of enrolled students in technical and vocational training education from around 100,000 to 950,000; that 90% of TVTC graduates join the workforce within six months of graduation; and to raise the number of Saudis who have completed online, hybrid, and on- the-job from training 36,000 to 1,000,000.

3

High-Skilled Employment and Vision 2030: Education and Training for Saudi Youth Alignment with Saudi Labour Market Demands

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Abstract

Vision 2030, Saudi Arabia's ambitious reform plan, aims to diversify the economy and reduce the Kingdom's dependency on oil by fostering a competitive, knowledge-based economy. Central to this vision is the development of a highly skilled workforce. This paper explores the intersection of education, training, and labour market demands, focusing on the preparation of Saudi youth for high-skilled employment. The paper provides an analysis of the education and training landscape for Saudi youth, in relation to the evolving demands of the labour market for high-skilled employment in sectors such healthcare, engineering, and technology, within the framework of Saudi Arabia's Vision 2030. By examining education outcomes, training programmes, and the alignment between supply and demand for high-skilled jobs, this paper identifies the opportunities and challenges facing Saudi Arabia in the development of a high skilled workforce and explores gender disparities and the qualifications gap in high-skill employment, offering recommendations for empowering Saudi youth to meet future labour market needs. The paper concludes with the broader implications for migration trends.

Introduction

Saudi Arabia's Vision 2030 plan is driving a significant transformation of the country, necessitating increasingly educated and well-trained human capital. Saudi Arabia is investing heavily in education and training its workforce to build a highly skilled workforce capable of supporting its plan to diversify the economy and promote sectors like healthcare, technology, tourism, and renewable energy with the goal of reducing the county's dependency on oil (Al-Gahtani, 2024; Sfakianakis, 2024). The reform for diversifying the economy creates new job opportunities requiring a highly skilled workforce specifically in STEM fields (science, technology, engineering, and mathematics) and entrepreneurship (DeBoer and Kranov, 2017).

The terms "high-skilled workforce" or "high-skill labour market" refer to individuals who have received advanced education or specialised training and gained significant expertise in a particular field, enabling them to perform complex tasks, solve problems, make decisions, and perform other duties beyond basic or routine job functions (Oliinyk et al., 2021). From a microeconomic perspective the wider the skill gap, especially for high skill jobs, between what employers need and what skills the labour force has to offer, the higher the unemployment rate, especially among the younger population (Freud, 2021). Further, if the skill gap increases, the wage discrepancies increase and due to a shortage of skilled labour in certain industries, employers pay more to attract skilled workers. This leads to wage inflation in those sectors where demand is high (Freud, 2021; Morris et al., 2020). Another layer of complexity that results from the skill gaps is foreign labour dependence to fill the positions that cannot be filled by the national work force, which leads to the microeconomic consequence of reduced investment in domestic skill development.

In the Saudi context, around 63% of the Saudi population is under the age of 30 (Saeed, 2024) and there is a strong emphasis on engaging youth through various initiatives to build a segment of high skill employment. For instance, the education system went through divergent phases of improving and integrating technologies and innovation with schools and higher education systems to meet the labour market demands (Abdullateef et al., 2023; Allmnakrah and Evers, 2020; Alyami, 2014). Initiatives such as entrepreneurship programmes and leadership training (i. e., the KAUST Entrepreneurship Center, Misk, Saudi Small and Medium Enterprises Authority (Monshaat), and the Human Development Resource Fund – HRDF) are aiming to invest in building skills for young Saudi graduates to meet the transforming Saudi labour market. See table 1.

In addition to education reforms, training initiatives such as the *Nitaqat* programme target to localise jobs and strike a balance between investing in Saudi human capital and benefiting from foreign high skilled employees. For example, the *Nitaqat* programme has had a significant impact on increasing the number of Saudi nationals' employment in retail, healthcare, and manufacturing, where more than 2.1 million Saudis joined the private sector since the programme's introduction.[1] Overall, the majority of jobs localised through the *Nitaqat* programme in retail and manufacturing were blue-collar roles, but there are jobs for higher skill levels in sectors like healthcare and specialised manufacturing like engineering.

Investments in education and training to prepare high skilled individuals for employment lead to sustained economic development and drive innovation and technological progress, which in turn fuels economic growth. As

Table 1: Key Statistics for Entrepreneurship Support and Training Programmes

Organisation	Key Statistics
KAUST Entrepreneurship Center[a]	300+ startups supported 50+ high-tech startups launched Over 100 mentors involved, and 50+ million SAR raised by startups
Misk Foundation[b]	Over 1,000 young entrepreneurs trained, 50+ startups funded and accelerated, 500+ mentorship hours, and over 100 million SAR raised in venture investments
Monshaat (Saudi Small and Medium Enterprises Authority)[c]	Over 30,000 SMEs supported through training programmes 5,000+ SMEs receiving financial support annually 20,000+ jobs created by supported SMEs
Human Development Resource Fund (HRDF)[d]	Over 200,000 individuals trained in soft & hard skills 75% job placement rate for trainees More than 5,000 employers partnered for workforce development

a KAUST "Innovation Report" 2021.
b Misk Foundation "Annual Report" 2021.
c Monshaat SME monitor 2024, https://www.monshaat.gov.sa/sites/default/files/2024-05/SME%20Monitor%20-%20Q1%202024%20EN.pdf.
d HRDF "annual report 2023" https://www.hrdf.org.sa/media/vgicuxsw/-2023التقرير-السنوي.pdf.

building a high skilled workforce became the centre for the Saudi Vision 2030, preparation of high skilled labour requires evaluation to measure the efficiency of the Kingdom's investments in education and training of new generations entering the labour market, and for upskilling the current workforce to meet labour market demands. This paper will present an overview of the current outcomes of the education and training programmes to reskill and upskill the Saudi workforce in the past years along with the Saudi labour market landscape to identify opportunities and challenges in addressing the labour market demand for high skill employment. The paper used government open source data (i. e., MoE, GAStat, World Bank, ILO), and government public reports that were published quarterly or annually presenting education, training, and labour market status statistics (i. e., MHRSD, NLO, TVTC), in addition to labour market projections reports based on Vision 2030 (i. e., Vision 2030 website, SAMA, McKinsey & Company). Together, these reports and data provided an estimated summary for potential gaps in the process of developing a high skilled Saudi workforce and highlighted the opportunities and challenges that can be addressed in the process of transitioning to a knowledge-based economy within the Saudi labour market context.

Overview of Higher Education Outcomes and Training Programmes in Saudi Arabia

Human Capital Theory (HCT) emphasises education as an investment in build better return for any country (Tonini, 2021). Saudi Arabia has been making significant strides and investments in reforming and expanding its higher education system in line with its Vision 2030 objectives. The goal is to create a more diversified, skilled, and highly educated workforce to supply employers with a more highly skilled Saudi labour pool. The results of this effort are already visible in the substantial increase in the number of university graduates since 2015. For example, the National Labour Observatory (NLO) indicated in their recent graduates' report of 2023, drawing from data from 51 universities across the Kingdom that the Saudi higher education system was producing around 200,000 Saudi graduates annually as of 2015, with a sizable portion coming from traditional fields such as humanities, education, Islamic studies, and social sciences. By 2023, this number had grown significantly to reaching over 300,000 Saudi graduates for local universities with a noticeable shift in the academic focus of graduates into STEM majors and healthcare. The

number of engineering graduates increased by around 50% between 2010 and 2020.[2] Similarly, increases were noted for finance and accounting graduates, where there were approximately 10,000 graduates in 2020, a sharp increase from 6,000 in 2010. In the health sector, around 7,000 students graduated from medical programmes, compared to about 4,500 in 2010, and 5,000 nursing students graduated compared to 2,800 in 2010.

In 2015, the gross enrolment rate for tertiary education was approximately 42% for both men and women, which increased to around 50–60% by 2023, with female enrolment nearing 60% of the total student population.[3] This growth in enrolment corresponds with the increase in the number of graduates. For instance, the number of private universities and colleges grew from 28 in 2010 to over 60 in 2023 which was associated with an increase in Saudi students' enrolment in private universities estimated at around thirty percent.[4] This growth is due to the expansion of higher education institutions across the Kingdom, as well as the increasing enrolment rates driven by the government's educational policies aimed at increasing access to higher education.

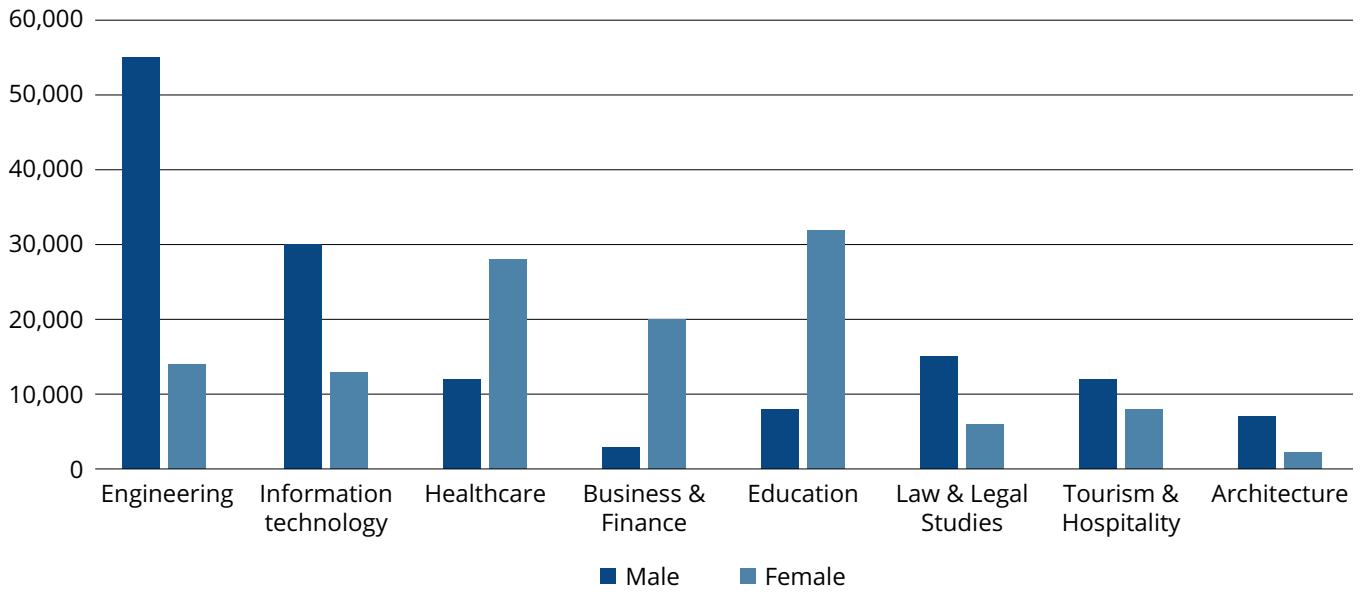
Recent studies indicate that private higher education institutions in Saudi Arabia are playing an increasing role in addressing employability issues by offering programmes that align with industry needs (Abdullateef et al., 2023; Yusuf and Jamjoom, 2022). For instance, Prince Sultan University (PSU) integrated industry-relevant curricula, including specialisations in engineering, technology, business administration, and healthcare and has formed partnerships with international organisations such as Microsoft, Oracle, and IBM to offer students training in the latest software, technologies, and business practices. These programmes are in addition to scholarship programmes that offer opportunities to Saudi youth to gain degrees in different fields and higher education degrees from around the globe. For example, the Custodian of the Two Holy Mosques Scholarship Program has supported up to 30,000 seats annually for students to gain degrees from prestigious US universities since 2015, with about 12,000 graduates annually from majors like medicine, business, STEM, and social sciences.[5]

However, there are still skill gaps and gender disparities presented in the outcomes of higher education in specific fields, along with low employability among women. The gender disparities in educational outcomes were summarised by the National Labour Observatory Graduates Report for 2023. According to the report, there were around 207,000 (98% Saudi nationals) students that graduated in the year of 2021 from fifty-one universities across the Kingdom. Out of those, 84% graduated with a bachelor's degree, mostly females (61%), with the highest concentration in business, law, and management fields, followed by humanities and natural sciences. There was a small number of graduates in specific majors on technology and renewable energy. According to the report, males tended to go for more technical degrees in STEM majors and in the manufacturing fields while more females graduated with humanities majors, which represents an imbalance in gender graduation. Though there are more females with higher degrees, there persist gender disparities in fields of study and this impacts employment outcomes due to labour market demands in STEM sectors. Females still fall behind in filling specific demands in these fields which creates imbalance in supplying the labour market. For instance, engineering graduates experience shorter waiting periods to find employment compared to graduates from other fields, however, the field of engineering has lower female participation. See Figure 1.[6]

The Saudi government implemented various reforms aimed at improving the quality of education and ensuring that graduates of both genders were better prepared for the labour market, yet a considerable proportion of graduates struggled to find employment that matched their qualifications (Abdullateef et al., 2023). Most Saudi graduates come from academic backgrounds that emphasise theoretical knowledge rather than practical skills required by the labour market. This creates a gap between the knowledge gained in the classroom and the practical skills that businesses need, especially in sectors like technology, engineering, and healthcare (Alzghaibi, 2023; Alsughayer and Alsultan, 2023). Employers frequently cited a mismatch between the skills acquired in university and those required in the workforce, particularly in the private sector (Alshaikhmubarak and Aljabr, 2023; Bindawas, 2024).

To address this gap, the Saudi government and the private sectors have been providing training opportunities for higher education graduates. For example, the Human Capability Development Program (HCDP)[7] was launched in 2021 as part of Saudi Arabia's Vision 2030 to build a more capable, diverse, and competitive workforce that aligns with the strategic goals of Vision 2030, and equips Saudis with the skills of the future with the goal of building a more competitive Saudi workforce capable of meeting the labour market demands, not only locally but also globally (Alghanim 2024). Key goals of the programme are to (1) focus on enhancing skills across various sectors, particularly in emerging fields such as technology, engineering, healthcare, and

Figure 1: Estimated Cumulative Number of Graduates (2015–2023)



renewable energy; (2) improve access to quality education, including specialised vocational and technical training, to better prepare Saudis for the workforce; (3) boost employment rates by matching the skills of graduates with market needs, especially for younger Saudi nationals; and (4) encourage more women's participation in the workforce.

Other government initiatives have been continuously addressing the skill gap through upskilling programmes which introduce more practical and applied learning opportunities through partnerships between universities and industries. For example, programmes such as Tamheer,[8] Forsa,[9] and various initiatives by the Misk Foundation[10] focus on bridging the gap between academic learning and practical skills. These programmes provide on-the-job training, internships, and continuous learning opportunities for professional development and equipping graduates and youth with the skills needed to succeed in the competitive Saudi job market. For example, in 2023, an increasing number of Saudi students received training before graduation, reflecting the country's emphasis on developing a skilled workforce in line with Vision 2030. The Technical and Vocational Training Corporation (TVTC)[11] in Saudi Arabia reported that approximately 246,883 students enrolled in technical colleges, and 17,217 students were enrolled in secondary industrial institutes. Similarly, more than 60,000 graduates benefited from the Tamheer,[12] on the job training programme since it launched in 2017. Both TVTC and the HRDF training programmes are examples of the Kingdom's investment in developing a more skilled and diversified labour force. While TVTC focuses more on blue-collar training and technical expertise in fields like construction, healthcare, and manufacturing, HRDF aims to enhance professional development and employment opportunities for Saudis, especially in white-collar sectors like IT, business, and education. Together, they are creating a robust framework for nationalising labour across a wide range of industries and contribute to the Kingdom's goal of enhancing its technical and vocational education and training systems which are recognised globally for their effectiveness (Duell and de Moraes 2024).

The private sector has been contributing to efforts to better prepare graduates in STEM fields to meet the labour market's high demands of specialised graduates in these fields. For instance, Saudi Aramco, SABIC, and Saudi Telecommunication Company (STC) designed training programmes to align with the needs of the Saudi labour market and contribute to the Kingdom's goal of enhancing its technical and vocational education system. In 2022, Aramco trained over 15,000 employees across various technical and professional disciplines and supports 4,000 students through its scholarship programme awarded annually for Saudi students with over 90% of the Aramco-trained graduates finding employment in relevant fields shortly after completion of their training. In a similar fashion, STC's partnership with various educational institutions provides annual training for around 1,500 students through internships and cooperative education programmes resulting in an 80% employability rate within six months of the completion of the programme. This is supportive of the alignment of training with industry needs, making graduates more competitive in the job market.

Table 2: Current Training Programmes and Estimated Needs for Training in High-Demand Sectors for Both Genders by 2025 in Saudi Arabia

Sector	Training programme	Number of participations	Female participation (%)	Male participation (%)	Projected growth rate (%) to 2025	Current training demands
Healthcare	Nursing	10,000	80	20	20	50,000
Information Technology	Software engineer	5,000	30	70	25	80,000
Engineering	Civil engineering	3,500	25	75	30	40,000
Finance	Financial analysis	2,000	40	60	15	30,000
Data science	Data analytics	4,500	35	65	35	20,000

Although specific employment rates for recent graduates can fluctuate, the general trend for the Saudi labour market suggests that sectors like healthcare, technology, and engineering are seeing higher demand for skilled professionals with lower number of training opportunities (Alqahtani et al., 2024; Mishrif et al., 2023). The shift towards a digital economy and knowledge workers increases the need for professionals with expertise in education, healthcare, and STEM fields such as cybersecurity, engineering, and artificial intelligence[13]. Despite all the efforts, the Saudi workforce is not fully equipped with the necessary digital and technical skills needed for these sectors. Estimates in Table 2 highlight the increased focus on training opportunities in high-demand sectors with indications of the number of participants and gender gap along with the projected demand growth by 2025.[14]

Supply and Demand Analysis for High-Skill Employment within the Saudi Labour Market

The supply and demand dynamics for high-skilled employment in the Saudi labour market reflect a complex interplay of education, industry growth, demographic, and economic diversification efforts. Since launching Vision 2030 in April 2016, the demand for high-skilled workers, particularly in sectors like technology, healthcare, and engineering, has surged in response. The Ministry of Human Resources and Social Development (MHRSD) reported a 20% increase in job openings for high-skilled positions since 2017, with technology-related roles growing fastest. Yet, employers in Saudi Arabia are struggling to find high-skilled workers, particularly in STEM fields (PwC, 2023).

On the supply side, however, challenges persist despite a growing number of graduates from universities, especially in STEM fields; The mismatch between the skills acquired and the requirements of high-skilled jobs remains significant. For example, in 2023, only about 30% of graduates in engineering and technology were deemed fully qualified (i. e., soft skills, hands on practical skills in the industry) for available positions in the private sector, highlighting a critical skills gap (NLO, 2023). Global studies have indicated that academic programmes in engineering and technology sometimes lag behind the rapidly changing needs of industries, particularly in fields like artificial intelligence, data science, and engineering (Ackerman, 2000; Garner et al., 2019). Also, hands-on skills that are acquired through practical training including soft skills, verbal communication, problem-solving, and project management may not always be incorporated into academic curriculum (McGunagle and Zizka 2020). Employers often seek graduates who can immediately apply their knowledge in real-world settings, such as through internships, practical projects, or lab/field work that simulates industry conditions (Adeosun et al., 2022). As the Saudi labour market continues building solutions to decrease the youth unemployment rate, particularly among university graduates, the discrepancy underscores the need for enhanced educational curricula and training programmes to better prepare students with hand-on skills for the demands of the labour market. Table 3 illustrates an estimate of the current landscape of supply and demand for high-skilled jobs in key sectors (i. e., technology, healthcare, engineering, and finance) in Saudi Arabia.[15]

Table 3: The Job Demands and Qualified Supply in the Saudi Labour Marker in High-Demand Sectors

Sector	Job Demands (2023)	Qualified Supply (%)	Unemployment Rate (%)
Technology	50,000	30	25
Healthcare	40,000	60	15
Engineering	30,000	35	20
Finance	25,000	40	10

Demographics and Job Creation

Saudi demographics are changing with a significant increase in the working-age population. As the Saudi labour market is growing, the NLO Overview of Saudi Labour Market (2023) report estimates that around 920,000 additional jobs will need to be created for Saudi males between 2023 and 2030 to maintain the employment rate at 64.3%, the same as in 2022. For Saudi females, approximately 413,000 additional jobs will be needed during the same period to keep the employment rate at 28.8%, to match the 2022 levels. Under moderate economic growth (2% for oil GDP and 4% for non-oil GDP), around 749,000 additional jobs for Saudi males and 314,000 jobs for Saudi females are needed by 2030. According to the report, Saudi women's education has significantly evolved over the past decade, aligning with the country's labour market demands for high-skilled professionals. As of 2023, women comprised about 57%[16] of university students in Saudi Arabia, with a notable increase in enrolment in STEM fields, where female participation rose to 34% in engineering programmes. This educational shift is crucial as the labour market increasingly seeks high-skilled workers to support economic diversification initiatives under Vision 2030. Table 4 summarises progress in Saudi women's access to education and employment since 2015.

According to the General Authority for Statistics of Saudi Arabia (GAStat) report for the last quarter (Q4) of 2023, Saudi females showed notable changes in their employment dynamics. The employment-to-population ratio increased by 0.6 percentage points, reaching 30.7%, which indicated a positive trend in women's employment. However, the participation rate saw a slight decline of 0.4 percentage points, bringing it to 35.5%, a notable increase from about 22% in 2016. Despite this decrease, the unemployment rate for women improved significantly, dropping by 2.6 percentage points to 13.7% compared to the previous quarter. These statistics highlight the ongoing progress in women's employment while also pointing to the challenges in sustaining higher participation rates in the labour force.

Efforts and initiatives in Saudi Arabia are continuously empowering the Saudi youth aiming to raise their workforce participation. However, societal norms and barriers continue to impede progress, making targeted strategies to address social aspects of the challenge essential for improving employment opportunities for women (Al-Asfour et al., 2017; Al-Munaiey 2020). Women are still favouring sectors approved by societal norms such as healthcare and education, where women comprise over 70% of the workforce. Retail also shows increasing female engagement, particularly in roles like sales and management, driven by reforms that promote empowering women in the Saudi economy. Looking ahead, the Saudi government is committed to further increasing women's representation in STEM as part of its Vision 2030 goals through increasing access to higher education including specialised education, hybrid learning, and scholarship opportunities, along with mentorship and on the job training programmes and encouraging female role models and public awareness campaign and policies for workforce policies to empower women.[17] Predictions suggest that with continued investment in education and targeted policies, the proportion of women in STEM could rise to 50% by 2030 (Alzahrani 2020; Jawhar et al., 2022). This shift is crucial not only for advancing gender equality but also for driving innovation and economic growth in a rapidly evolving Saudi economy.

One of the major focuses on supporting Vision 2030 for job creation is through innovative projects and entrepreneurship (Ahmad et al., 2023). Saudi Arabia has made significant strides in empowering entrepreneurship as part of its Vision 2030 initiative. The government recognises the vital role that entrepreneurship plays in diversifying the economy and creating jobs. Various programmes have been introduced to provide financial support, mentorship, and training for aspiring entrepreneurs. For instance, initiatives such as the Misk Foundation and Monshaat (the Small and Medium Enterprises Authority) have been instrumental in fostering an entrepreneurial ecosystem. These organisations offer resources, training workshops, and access to funding, which

Table 4: Progress of Women's Education and Decrease in Unemployment Rate Between 2015–2023[a]

Year	Female higher education graduates (%)	Employment rate (%)	Unemployment rate (%)	Key progress in workforce participation
2015	50	60	10	Increased participation in STEM fields
2018	56	65	8	30% of graduates in engineering are women
2021	60	70	7	35% of the healthcare workforce is female
2023	62	72	5	25% growth in women in technology roles

a Source: GAStat. Labour market statistics Q2, 2024; Alhawsawi and Jawhar, 2023; MoF. Women Empowerment.pdf report.

Table 5: Initiatives and Impact to Support Entrepreneurship

Initiative	Description	Impact
Misk Foundation	Provides mentorship and training	Supports thousands of entrepreneurs
Monshaat	Offers funding and resources	70% increase in SMEs (2016–2023)
PNU Women Leadership Program	Enhances leadership and skills for women	Female entrepreneurship rate: 24% (2023)
Human Capability Development Program	Skills training for youth	Potential creation of 1.2 million jobs

have collectively benefited thousands of budding entrepreneurs. According to the Saudi Arabian Monetary Authority (SAMA), the number of small and medium enterprises (SMEs) increased by over 70% from 2016 to 2023, demonstrating a growing entrepreneurial landscape.

A significant aspect of Saudi Arabia's entrepreneurship initiatives is the emphasis on empowering women. Programmes specifically focus on enhancing skills, leadership, and access to funding that have resulted in a notable increase in female entrepreneurs. Statistics from the Global Entrepreneurship Monitor (GEM) indicate that the female entrepreneurship rate in Saudi Arabia rose from 17% in 2018 to 24% in 2023. This upward trend not only reflects a cultural shift towards women's participation in the economy but also aligns with the government's goal of increasing women's workforce participation.

The impact of entrepreneurial initiatives on job creation is significant. As more women and youth start their businesses, the number of jobs created rises. According to the NLO, SMEs account for approximately 60% of all jobs in Saudi Arabia. This is crucial in addressing youth unemployment, which stood at around 25% for those with degrees in STEM fields as of 2023. According to Monshaat, the number of registered SMEs increased from approximately 800,000 in 2020 to over 1.4 million by 2023, reflecting a 75% growth in just three years. This expansion has been fuelled by various government initiatives aimed at providing financial support, reducing regulatory burdens, and enhancing access to markets for SMEs. Furthermore, SMEs now account for about 60% of the total workforce in the private sector, highlighting their crucial role in job creation and economic resilience.

Recognising the vital role that women play in driving economic growth, various initiatives have been implemented by the Saudi government to foster an entrepreneurial ecosystem that empowers female entrepreneurs. Programmes offering financial support, training, and mentorship are designed to enhance women's skills and capabilities, enabling them to launch and manage their own businesses successfully. By prioritising women's entrepreneurship, the untapped potential of half of its population is achieved, ultimately contributing to a more inclusive and sustainable economic future.

Table 6: The Impact of Nitaqat Programme on Saudi Workforce Participation in the Private Sector

Year	Saudi workforce participation Rate (%)	Foreign workforce percentage (%)	Key initiatives
2015	31	69	Introduction of the *Nitaqat* programme
2016	33	67	Increased incentives for hiring Saudis
2018	36	64	Focus on women's employment initiatives
2020	40	60	Expansion of training and skill development
2022	45	55	Enhanced support for small and medium enterprises (SMEs)
2023	51.3	50	Continued emphasis on entrepreneurship and innovation

Table 7: The Current and Expected Saudisation Percentage Between 2023 and 2030 in STEM Sectors[a]

Field/industry	Current Saudisation percentage (2023)	Target Saudisation percentage (2030)	Current expatriate percentage (2023)
Healthcare	25%–30%	70%–75%	40%–50%
Technology	20%–30%	50%	70%–50%
Engineering	20%–25%	40%–50%	75%–80%
Finance	30%–40%	50%	60%–70%
Data	15%–20%	50%	80%–85%
Renewable energy	10%–15%	30%–50%	85%–90%

a Estimated data from Nitaqat Mutawar Program | Ministry of Human Resources and Social Development and المرصد - تقرير : تقرير التوطين NLO Saudisation report, 2024, Vision 2030 Annual Report 2023.

Saudisation

The *Nitaqat* programme as part of the Saudisation initiative has presented a positive trend toward increased local workforce participation (Aljohani, 2023; Bin Judai, 2022; Nataraj et al., 2021). Since its launch in 2011 by the Saudi Ministry of Human Resources and Social Development (MHRSD) the goal was to enhance the employment of Saudi nationals in the private sector and reduce reliance on foreign labour. As of 2023, statistics show that the overall percentage of Saudi nationals employed in the private sector has increased to approximately 33%, up from around 24% before the programme's implementation in 2011. Table 6 presents the progress of increasing Saudi workforce participation in the labour market since 2015.

The programme establishes sector-specific quotas for the hiring of Saudi workers, with goals tailored to the unique needs of each industry. Key sectors such as healthcare, engineering, information technology, finance, and education have specific employment targets, encouraging companies to prioritise local talent. By promoting Saudisation, the *Nitaqat* programme seeks to lower unemployment rates among Saudi citizens, boost the overall economy, and foster a skilled workforce capable of meeting the demands of a rapidly diversifying job market. See table 7.

This initiative not only supports economic growth but also aims to empower women and enhance their participation in various sectors, contributing to broader social and economic development goals. Table 8 summarises the

Table 8: Estimated Growth Rate for High-Demand Sectors in the Saudi Labour Market and Saudi Employees in Each Sector by 2030[a]

Sector	Expected growth rate (%) by 2030	Saudi employees (%)	Foreign employees (%)	Key drivers
Technology	20	70	30	Digital transformation, increasing tech adoption
Engineering	15	60	40	Major infrastructure projects and investments
Healthcare	10	65	35	Growing population and healthcare needs
Finance	8	75	25	Expansion of financial services and fintech

a Estimated data from Nitaqat Mutawar Program | Ministry of Human Resources and Social Development and المرصد - تقرير : تقرير التوطين NLO Saudisation report, 2024).

expected growth in technology, engineering, healthcare, and finance as an example of high demand sectors along with the percentage of Saudisation in each sector.

Challenges and Opportunities

One of the primary challenges to sustaining the increase of young Saudis' employment in the private sector is ensuring that the education system evolves in tandem with the private sector needs. There have been efforts to revise curricula and introduce new programmes that align with Vision 2030. For example, King Saud University revised its curricula across various engineering and scientific disciplines to include the introduction of specialised courses in artificial intelligence, cybersecurity, renewable energy, data science, and innovation and research which are all key areas in Saudi Arabia's diversification efforts to ensure that they align with the goals of Vision 2030. Similarly, Princess Nourah bint Abdulrahman University (PNU) is the largest women's university in the world and has been at the forefront of aligning its curriculum with Saudi Arabia's Vision 2030 through offering a wide array of STEM programmes, including biotechnology, information systems, computer engineering, digital transformation, cybersecurity, and big data analytics aimed at equipping women with the skills needed for high-demand sectors. These programmes have been designed in line with industry requirements and global trends, ensuring that graduates are ready to contribute to the national economic transformation outlined in Vision 2030. Finally, King Abdullah University of Science and Technology (KAUST)[18] is a graduate university offering research programmes focusing on innovation and STEM fields particularly in areas that are vital to Saudi Arabia's future, such as renewable energy, marine science, biotechnology, and advanced engineering. KAUST also attracts top talent from around the world and partners with international universities to ensure its research programmes are on the cutting edge of global scientific and technological advancements and offers specialised master's and doctoral programmes that focus on applied research in fields like smart cities, desalination technology, and solar energy with programmes supporting women in science and technology through scholarships, research fellowships, and entrepreneurship programmes. Yet, the pace of change in the job market often outstrips the rate at which educational reforms can be implemented specifically in training for soft skills and practical experience, leading to a situation where, despite a surplus of graduates in certain fields, there is still a shortage of candidates in high-growth industries. To mitigate these challenges more efforts are needed to embedded practical training in enhancing education-industry collaboration.

On the other hand, the growing emphasis on vocational and technical education presents a significant opportunity and is pivotal in producing graduates with technical, practical, and soft skills tailored to industry needs. These programmes are crucial in bridging the gap between theoretical knowledge and practical application, ensuring that graduates are better equipped with hands on experience to meet the demands of the labour market. Internationally, many countries and organisations have implemented strategies to address skills mismatches in the labour market. These efforts focus on aligning education and training systems with evolving industry needs, fostering better job matching mechanisms,

and improving workforce mobility and adaptability. Some examples of initiatives and policies from different regions aimed at addressing skills mismatches are: (1) The *European Skills Agenda* has been proactive in tackling skills mismatches through several comprehensive initiatives aiming to improve the skillsets of European workers to transition to new industries. Saudi Arabia has a similar goal and aims at bridging skills gaps by aligning training and education with market needs, in the context of a young, growing population transitioning towards a knowledge economy. Thus, in 2023 the Saudi government launched the Sectoral Skills Councils in the Kingdom[19]; (2) The *European Qualifications Framework (EQF)* provides a common reference framework that compares qualifications across Europe. This helps standardise qualifications and enables easier mobility for workers by ensuring that their skills are recognised across different countries. As the growing need for STEM fields will continue, the National Qualifications Framework,[20] led by the Education and Training Evaluation Commission[21] of Saudi Arabia adopted similar methodologies (i. e., national qualification framework NQF-KSA[22]) to improve the international portability of Saudi qualifications. This would help both Saudi nationals looking to work abroad and foreign workers in Saudi Arabia, ensuring that qualifications for specialised majors are universally understood and accepted; (3) *Youth Guarantee Programme* ensures that young people under age twenty-five receive a job offer, continued education, or apprenticeship within four months of leaving formal education or becoming unemployed. This reduces youth unemployment and mitigates skills mismatches by guiding them into industries with demand; (4) *the TechSkills Accelerator (TeSA)* focuses on building tech-related skills through industry-led training programmes in fields like artificial intelligence, cybersecurity, and data analytics. By providing structured career conversion programmes and job placement in technology-related industries, TeSA reduces the mismatch in Singapore between the available workforce and demand in high-growth tech sectors. The Skills for the Future initiative lead by the Ministry of Communication and Information Technology (MCIT)[23]in Saudi Arabia is similar to TeSA, which focuses on equipping Saudi citizens, particularly the youth and women, with the skills required for emerging industries, including technology, artificial intelligence, data science, and renewable energy.

The ongoing economic diversification under Vision 2030 presents significant opportunities for high-skilled employment and initiatives to increase women's participation in the workforce through opening further avenues to entrepreneurship, which plays a critical role in job creation and economic diversification. By providing targeted support and resources the entrepreneurial ecosystem will not only foster innovation but also aligns with Vision 2030 broader economic goals. As initiatives continue to evolve, the expected growth in the SME sector is projected to contribute significantly to reducing unemployment rates and enhancing economic resilience. The concerted effort to involve women in entrepreneurship not only bolsters gender equality but also maximises the potential of the entire workforce, paving the way for a more inclusive and prosperous future. Saudisation policies in the private sector became essential to increase the employment of Saudi nationals and reduce the employment gap, especially for women, and to align job creation with demographic shifts.

Conclusion

Addressing the issue of skill mismatch is crucial for Saudi Arabia's long-term economic development, especially as the country moves towards a diversified economy beyond oil. Bridging the gap between education and industry needs, enhancing vocational training, and equipping workers with future-oriented skills will be key to reducing unemployment and boosting productivity. Addressing labour market mismatch issues, where the skills or qualifications of job seekers do not align with the needs of employers, requires a multi-pronged approach. Governments, businesses, and educational institutions should collaborate to provide programmes for upskilling (improving existing skills) and reskilling (teaching new skills). This helps workers adapt to changes in technology and industry needs.

The reforms in Saudi Arabia aimed at addressing the skills mismatch and fostering a more diversified, knowledge-based economy are likely to have several important implications for future migration trends. As the country works to bridge the gap between education and industry needs, upskill its workforce, and enhance vocational training, there will be both direct and indirect effects on migration patterns, particularly in terms of labour mobility, talent attraction, and demographic shifts. Pivoting towards non-oil sectors like technology, renewable energy, healthcare, and tourism, increases the demand for skilled workers in specialised fields, while the Saudi government is still focusing on upskilling and reskilling the young domestic workforce. Thus, there will still be a need to attract skilled and talented migrants in the short to medium term – especially those with expertise in emerging industries such as AI, cybersecurity, green technologies, and advanced manufacturing. This shift could lead to a more competitive global talent market,

where countries, including Saudi Arabia, increasingly focus on creating attractive environments for skilled migrants through initiatives like expedited work visas, job matching programmes, and incentives for international professionals, such as tax-free income, health care benefits, housing allowance, and family accommodation. In line with efforts to diversify the economy and increase Saudisation, Saudi Arabia may continue to see a large influx of foreign workers in key sectors such as construction, healthcare, and education where local expertise is scarce. The challenge will be to balance the need for international talent with fostering the growth of domestic skills to gradually reduce dependency on foreign workers.

As Saudi Arabia's economic diversification takes shape, the country could also become a regional hub for talent, particularly within the Gulf Cooperation Council (GCC) countries. If Saudi Arabia's Vision 2030 reforms succeed in creating an attractive job market, it may draw workers not only from traditional labour-sending countries like India, Pakistan, and Egypt but also from neighbouring GCC nations, where skill gaps in specialised industries are emerging. This could lead to greater intra-regional migration as workers from the wider MENA region seek new opportunities in Saudi Arabia's evolving economy. With Saudi Arabia's push to become a global player in technology and innovation (e. g., with initiatives like NEOM and investments in tech startups), attracting high-level researchers, entrepreneurs, and specialists from around the world could significantly impact migration patterns. The establishment of tech hubs, science parks, and international research collaborations would increase the inflow of highly educated professionals. Furthermore, the country's increased focus on education and research institutions could help shape migration patterns as students and academics choose Saudi Arabia for their studies and careers. The multifaceted policy approach to addressing Saudi Arabia's skills mismatch will not only reshape the country's labour market but is also likely have broader implications for migration trends. On one hand, the country may experience increased inflows of skilled professionals from abroad to meet emerging needs in high-tech and specialised industries. On the other hand, the focus on building local talent could reduce the country's reliance on low-skilled foreign labour, fostering a more balanced labour market over time. The success of these policies will determine how effectively Saudi Arabia can attract and retain talent, both domestically and internationally, as it continues to evolve into a knowledge-based economy.

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Endnotes

1 Source: The Ministry of Human Resources and Social Development reveals the results of the first and second phases of the upgraded Nitaqat Program | Ministry of Human Resources and Social Development.

2 (*n*= 12,000 in 2010, to *n*= 20,000 in 2023).

3 NLO graduates report 2023.

4 Ministry of Education Statistics إحصائيات عامة - التعليم الجامعي (*n*=60,000).

5 وزارة التعليم | البيانات والإحصاءات Data source obtained from Ministry of Education.

6 Data from NLO graduate report 2023.

7 Human Capability Development Program

8 تطوير الخريجين - تمهير | صندوق تنمية الموارد البشرية - هدف

9 النهضة | خدماتنا الإلكترونية

10 Home – Misk Foundation

11 TVTC offers specialised technical diplomas, vocational certificates, and short-term courses in partnership with private and public sector entities. It focuses on both blue-collar jobs (like mechanics, construction workers, electricians) and white-collar jobs (like IT specialists, administrative roles, healthcare technicians), making it a comprehensive player in the Saudisation strategy.

12 Tamheer is part of HRDF programme and aims to improve Saudi labour market participation by providing financial support, training programmes, and career development opportunities through partnering with employers to enhance the skills of Saudi nationals, particularly those interested in entering white-collar professions and leadership roles.

13 NLO Employment Prediction Report 2023

14 Sources: Saudi Commission of Health specialties report (2023), General Authority Statistics, Saudi Ministry of Education statistics, Saudi Arabian Monetary Authority report (2023), Saudi Digital Economy Strategy Report (MHRSD).

15 The table is an estimate of Saudi labour market demand and qualified supply based on four reports: MHRSD labour market report, 2023; McKinsey & Company Workforce Trends and Economic Forecasts 2023 (report); PwC report; Saudi Arabian Monetary Authority Annual report 2023.

16 Saudi Arabia's rate of enrollment in higher education is within the 60–65% range, which is in the middle of the G20 group (OECD, 2022). The trend of female dominance in enrollment is visible across G20 countries, with women consistently outperforming men in terms of university attendance. This is driven by the increasing availability of scholarships and programmes aimed at empowering women in higher education.

17 Source: رؤية السعودية 2030.

18 King Abdullah University of Science and Technology | KAUST.

19 As part of the strategic directions for skill development and enhancement, the Ministry of Human Resources and Social Development has established 12 sectoral skill councils in the Kingdom.

20 هيئة تقويم التعليم والتدريب - عن الهيئة

21 ETES is responsible for planning, evaluation, assessment, and accreditation of educational and training systems in Saudi Arabia in coordination with the Ministry of Education.

22 13-NATIONAL-QUALIFICATIONS-FRAMEWORK-FOR-THE-KSA-NQF-KSA.pdf.

23 Home | Future Skills Portal

4

Trends and Dynamics of Highly Skilled Migration in Saudi Arabia: A Report

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Abstract

This report analyses the trends, dynamics, and policies regarding highly skilled migration in Saudi Arabia. The Kingdom of Saudi Arabia is increasingly becoming a crucial destination in the global talent competition market. While the kingdom has historically been a significant destination for low-skilled migrants, Saudi Arabia and other Gulf Cooperation Council (GCC) countries have realised the need to diversify and decarbonise their economies. Prioritising high-skilled migrants is a measure for which global economies compete. According to the national transformation plan Vision 2030, attracting high-skilled migrants is crucial in transforming the country into a knowledge-based, innovation-driven economy. This transformation includes introducing new social and economic policies that benefit high-skilled migrants and their families. These policies offer social protection, extended stays, and career prospects for talent arriving in Saudi Arabia. Recent labour-related measures include the new premium residency card scheme and allowance for property ownership. The report examines current policies, their background, and future policy directions in the context of Vision 2030. It analyses the effectiveness of recent initiatives in attracting and retaining skilled professionals, particularly in strategic sectors such as technology and healthcare. The study reveals that while Saudi Arabia offers competitive advantages through tax-free salaries and massive development projects, challenges remain in areas such as permanent residency pathways and knowledge transfer mechanisms. The report concludes with recommendations for enhancing Saudi Arabia's position in the global competition for talent while maintaining a balance with local workforce development.

Introduction

Saudi Arabia is undergoing a profound economic transformation, shifting from an oil-dependent economy to a knowledge-based one. This transition, guided by Vision 2030, has positioned the Kingdom as an emerging destination in the global competition for talent. While historically known for attracting low-skilled labour, Saudi Arabia now prioritises highly skilled migration as a strategic tool for economic diversification and technological advancement.

The current landscape shows promising developments, with the digital economy contributing 14% to Saudi GDP and significant technological adoption across sectors. Recent policies, including the Premium Residency scheme and Labor Reform Initiative, have created new pathways for skilled professionals while improving working conditions. These changes occur against the backdrop of broader social and cultural reforms that enhance the Kingdom's attractiveness to international talent.

This report examines the trends, policies, and impacts of highly skilled migration in Saudi Arabia, with particular focus on strategic sectors such as technology and healthcare. It analyses current challenges in attracting and retaining skilled professionals, evaluates the effectiveness of recent policy measures, and provides recommendations for strengthening Saudi Arabia's position in the global talent market while maintaining the balanced development of the local workforce.

The Strategic Shift: Attracting High-Skilled Migration

Saudi Arabia is executing a fundamental transformation from an oil-dependent economy to a knowledge-based powerhouse. This transition represents a decisive shift from the historical reliance on low-skilled labour to a strategic focus on attracting and retaining high-skilled migrants. While the Kingdom previously depended on workers mainly from Asian, South Asian, and neighbouring Arab countries for construction and basic services, it now aims to become a global hub for innovation and high-tech industries.

This process of actively attracting and retaining high-skilled migrants started in 2016 as part of Vision 2030's launch. The transformation accelerated in 2019 with the introduction of the Premium Residency scheme, establishing the Premium Residency Centre to offer comprehensive benefits packages to professionals and investors. The momentum continued with major labour market reforms in 2021, followed by strategic institutional initiatives in 2022.

The Ministry of Human Resources and Social Development (MHRSD) spearheads this transformation through policy development and implementation of talent attraction programmes. Supporting this effort are specialised technical institutions:

The Digital Government Authority (DGA) focuses on attracting digital talent through targeted recruitment programmes for IT professionals and digital transformation experts. The

DGA also streamlines digital services and regulatory frameworks to facilitate high-skilled migrants' integration into the workforce.

The Saudi Data and AI Authority (SDAIA) implements specialised programmes for attracting AI and data science professionals. Through its Capability Building and Talent Development sector, SDAIA develops professional certification frameworks for AI and data science. SDAIA partners with global tech leaders (like Microsoft Arabia) for AI training programmes. It also implements sector-specific initiatives such as the AI in Ophthalmology Hackathon, supports the Premium Residency Centre by providing specialised technical services, and ensures seamless integration of digital systems while maintaining security standards.[1]

Recent labour market data (Q2 2024) validates this strategic shift:[2]

- Saudi unemployment rate: 7.1% (males: 4.0%, females: 12.8%)
- Decrease of 0.5 percentage points from Q1 2024
- Year-on-year decrease of 1.4 percentage points from Q2 2023
- Non-Saudi unemployment rate: 1.1% (males: 0.8%, females: 5.0%)[3]

This change in the way Saudi Arabia approaches foreign workers shows the significance of having skilled human capital in today's world if a country wants its economy to thrive. While Saudi Arabia invests heavily in education for its citizens – both within Saudi Arabia and abroad – bringing in highly skilled workers from other countries can better support the educational goals. These professionals can share their knowledge and transfer their experience to the Saudi market. A diverse workplace is an environment for creativity, new ideas, which helps building the skills needed for emerging industries.[4]

This transformation extends beyond mere workforce demographics – it is reshaping the economy itself. The digital economy now contributes 14% to Saudi GDP (2022), with the ICT sector showing 68.3% adoption of advanced technologies like cloud computing. The digital transformation extends beyond the tech sector with 60% of all establishments using internet connecting devices.[5] Additionally, according to the General Authority for Statistics (2022), 48% of institutions are using computing services, while 20% of these establishments – both government and private- offer their services to the public via applications.[6] The healthcare sector particularly exemplifies this evolution, maintaining a 67.4% technology adoption rate and achieving maximum maturity on the Global Digital Health Index.[7]

Having established Saudi Arabia's fundamental strategic shift towards attracting high-skilled migration, it is essential to examine the broader economic context driving this transformation. The Kingdom's economic foundation and its ambitious Vision 2030 targets provide crucial insight into why this strategic pivot towards skilled talent has become a national priority.

Saudi Arabia's Economic Transformation: From Oil Dependency to Knowledge Economy

The magnitude of Saudi Arabia's transformation becomes clear when examining its economic foundation. With the petroleum sector accounting for 42% of GDP, 87% of budget revenues, and 90% of export earnings, the need for diversification is critical. Global shifts toward cleaner energy and climate change concerns have intensified this imperative.[8]

Vision 2030 sets ambitious targets for this transformation:

- Increasing non-oil government revenue from SAR 163 billion to SAR 1 trillion
- Raising the private sector's contribution to GDP from 40% to 65%
- Increasing SME contribution to GDP from 20% to 35%
- Lowering the unemployment rate from 11.6% to 7%
- Increasing women's participation in the workforce from 17% to 30%.[9]

The Vision aims to change both economic and socio-economic attributes. Human capital development plays a crucial role in Vision 2030. The plan emphasises education and training to create a skilled workforce capable of driving innovation and productivity in non-oil sectors. This focus on human capital is seen as essential for attracting foreign

investment, fostering entrepreneurship, and building a knowledge-based economy.[10] This strategic pivot toward skilled migration has already begun reshaping Saudi Arabia's workforce demographics, particularly in key sectors driving the knowledge economy.

While understanding the economic imperatives driving Saudi Arabia's transformation is crucial, equally important is examining how these changes are manifesting in the current labour market. An analysis of present workforce demographics and skilled migration patterns reveals the practical implementation of these strategic objectives.

Current Landscape of Skilled Migration in Saudi Arabia

In 2022, non-Saudis only made-up 3.6% of the governmental sector's workforce, but 77.9% of workers employed in the private sector. Citizens of Arab countries made up the bulk of foreign employees in the government sector (60%), while nationals from Asian states dominated numerically in the private sector (Table 1).

The shift toward skilled migration is reshaping Saudi Arabia's workforce demographics, particularly in knowledge economy sectors. Following the International Labor Organization's ISCO-08 framework (the basis of the Saudi Classification of Occupations adopted in 2021), highly skilled migrants fall into three categories: managers, professionals, and technicians/associate professionals.[11]

Data for mid- 2024 (Q2 2024) shows the total non-Saudi employed population numbers 13 million, of which 8.9 million are registered under the General Organisation for Social Insurance (GOSI), which covers workers employed in the private sector and as non-civil servants in the government sector. Out of these 8.9 million foreign workers, 1.4 million (16%) are classified as highly skilled, in the three categories of Managers, Professionals and Technicians (Table 2). The highly skilled also make up 18.7% of foreign workers' inflows, i. e., of those newly registered with GOSI during the second quarter of 2024 (Table 2).

The current composition of Saudi Arabia's workforce provides a foundation for understanding the Kingdom's focused approach to specific strategic sectors. These key areas demonstrate both immediate demands for international talent and long-term vision for developing domestic capabilities.

Table 1: Labor Market Demographics in Saudi Arabia (2022)

Sector/Category	Saudi Nationals	Non-Saudis	Total
Government Sector	1,166,099 (96.4%)	43,180 (3.6%)	1,209,279
Arab Countries' Nationals		25,771 (59.7%)	
Asian Countries' Nationals			
Private Sector	2,193,007 (22.1%)	7,744,139 (77.9%)	9,937,146
Arab Countries' Nationals		2,338,123	
Asian Countries' Nationals		5,237,893 (67.6%)	

Source: Gulf Labour Markets, Migration and Population Programme (GLMM).[a]

a GLMM processing of original GOSI dataset "Statistics of establishments and workers in the private sector for the year 2022" in: https://od.data.gov.sa/Data/en/group/labour_market, and GLMM processing of original Ministry of Human Resources and Social Development (MHRSD) datasets: "Workforce in the Government sector during year 2022" parts 1; 2; and 3, by administrative region" (https://od.data.gov.sa/Data/en/dataset/the-workforce-in-the-government-sector-during-the-year-2022; https://od.data.gov.sa/Data/en/dataset/the-workforce-in-the-government-sector-during-the-year-2022).

Table 2: Stocks and Inflows of Highly Skilled Migrants to Saudi Arabia (Q2 2024)

Occupation Category	Total Employed (Stocks)	Percentage of Total Stocks (%)	New Registrations (inflows)	Percentage of total inflows (%)
Managers	117,229	1.3	1,543	1.5
Professionals	747,254	8.4	10,076	10.1
Technicians	549,211	6.1	7,043	7.1
Total employed	**8,934,343**	**100**	**99,740**	**100**

Source: GAStat Q2 2024 Report.[a]

a General Authority for Statistics (GAStat). "New Participants to the rules and regulations of social insurance by Sex, Nationality and Main Groups of Occupations" and "Participants on the job Subject to the rules and regulations of social insurance by nationality, sex and Main Groups of Occupations", Register-based Labour Market Statistics, Q2 2024. Retrieved October 10, 2024, from https://www.stats.gov.sa/en/814.

Strategic Sectors Driving Skilled Migration

Saudi Arabia's strategy to attract highly skilled migrants is particularly focused on two sectors crucial to the Kingdom's economic transformation: artificial intelligence/technology and healthcare. These sectors showcase both the immediate demand for international talent and the long-term vision for developing domestic capabilities.

AI Technology Sector

The Kingdom actively recruits AI specialists as part of its push to become a global tech hub. According to the National Strategy for Data and AI (SDAIA, 2020), Saudi Arabia aims to attract and train 20,000 data and AI specialists by 2030. This initiative has catalysed an influx of highly skilled migrants in machine learning, data science, and robotics, building the technical expertise needed to drive the Kingdom's mega-projects.[12]

Healthcare Sector

Healthcare remains a significant attractor of skilled professionals. Ministry of Health statistics (2021) show that expatriates comprise approximately 60% of physicians and 70% of nurses in Saudi Arabia. The Kingdom specifically targets specialists in oncology, cardiology, and neurology, positioning itself to become a global healthcare destination. [13]

This focused approach to strategic sectors clearly demonstrates Saudi Arabia's ongoing transformation from a destination for low-skilled labour to a hub for global talent.

While the strategic focus on AI/technology and healthcare sectors is clear, it is important to acknowledge the methodological challenges in tracking and analysing skilled migration trends. Understanding these data limitations provides crucial context for interpreting current trends and projecting future developments.

Data Limitations and Methodological Consideration

Understanding the exact numbers and trends of highly skilled migrants in Saudi Arabia requires careful consideration of methodological changes and data limitations. The following two key shifts have shaped our ability to analyse these trends.

Methodological Shift (2017) and Employed Population Coverage

In 2017, the General Authority for Statistics (GAStat) transitioned from survey-based data production to incorporating administrative data for employment measurements. Current data sources include:

- GAStat *Labour Market Statistics Bulletins* (quarterly). A processing of Labor Force Survey data providing rates and percentages
- GAStat *Register-based Labor Market Statistics* (quarterly), based on administrative data sources, among which GOSI records (private sector and non-civil service government employees), MHRSD records of Civil servants and Ministry of Interior's records of domestic workers.

GOSI data indicates that highly skilled workers constitute approximately 16% of registered non-Saudi workers during the second quarter of 2024 (table 2).[14] However, GOSI figures excludes civil servants, domestic workers, and workers in sectors not subject to labour regulations. While such administrative data are published as numeric figures in the publications of the General Authority for Statistics (GAStat), records-based, administrative sources in general may be considered lacking comprehensiveness because they only records workers formally registered in social security registries (civil servants and those covered with GOSI), as well as domestic workers recorded by the Ministry of Interior. Administrative data records miss workers in the informal sector or those who are not registered with these official social coverage systems. The Labour Force Survey, while having its results disseminated as percentages in GAStat's publications and not as numeric figures, potentially captures a more complete picture of employment because it may include both formal and informal workers. [15]

Classification System Change (2021)

- Adoption of international standards (ILO-ISCO-08)
- Previous classifications used different definitions and categorisations for some professions
- Makes direct historical comparisons between periods (pre- and post- 2021) challenging.

Historical Context and Regional Comparison

While precise historical comparisons and comparisons between countries are challenging due to classification changes and variations by country, available data shows the following:

- 2010: ~9% highly skilled in expatriate workforce
- 2019: ~13% highly skilled in expatriate workforce
- 2024: ~ 16% highly skilled in expatriate workforce

Table 3: Regional Comparison of Highly Skilled Workforce (2022–2024)[a]

Country	Percentage of highly skilled foreign workers (%)
Bahrain	14.7
Qatar	24.4
Saudi Arabia	16
UAE	45

Source: Labour Force Statistics, National Institutes of Statistics, given countries.

a GLMM (2022). Qatar: Economically Active Population (15 years and above) by Nationality (Qatari/Non-Qatari), Sex and Occupation Group. Retrieved from https://gulfmigration.grc.net/qatar-economically-active-population-aged-15-years-and-above-by-nationality-qatari-non-qatari-sex-and-occupation-group-2022/; UAE: https://gulfmigration.grc.net/uae-total-labour-force-in-the-private-sector-by-occupation-2011–2022/ (total employed population).

Contextual Challenges

Saudi Arabia's position in attracting highly skilled migrants is influenced by two key factors:

- The relatively recent implementation of the Premium Residency scheme (2019) [16]
- An evolving ecosystem for international talent

Unlike other GCC countries with already established expatriate infrastructure, Saudi Arabia is developing these foundational policies together with its economic transformation.

Having examined the current landscape and its measurement challenges, we can now explore the factors attracting skilled professionals to Saudi Arabia. These drivers help explain both the successes and limitations of the Kingdom's talent attraction strategies.

Drivers of Highly Skilled Migration to Saudi Arabia

Why are skilled and professional migrants applying for jobs in Saudi Arabia? What are some of the advantages that a job in Saudi Arabia offers compared to other well-established destinations worldwide?

Job Opportunities in Emerging Sectors

Saudi Arabia is creating numerous job opportunities in emerging sectors as part of its economic diversification efforts. The renewable energy sector, for instance, aims to create up to 750,000 jobs by 2030.[17] Additionally, the digital economy is expected to contribute 19.5% to the GDP by 2025, creating substantial job opportunities for highly skilled workers. [18] This comes with high potential growth and great professional development prospects.

The Kingdom's transformation creates specific professional advancement paths across key sectors. In technology, professionals can progress from technical specialists to leadership positions in projects like NEOM's cognitive metaverse development or King Abdullah Financial District's smart city initiatives. Recent digital economy data shows this is not just planning – as stated earlier in the report, 68.3% of information and communication establishments are already implementing advanced cloud services, creating immediate opportunities for technical leadership roles.[19]

Healthcare offers equally concrete advancement paths. Medical professionals can move from specialists to department heads in new medical cities or take leadership roles in digital health transformation projects. With 67.4% of healthcare establishments adopting smart systems, there is a growing demand for professionals who combine medical expertise with technical knowledge.

Competitive Salaries and Benefits

Saudi Arabia offers competitive salaries to attract highly skilled migrants. According to the Gulf Business Salary Survey, Saudi Arabia's salaries for professionals in sectors like banking, real estate, and healthcare are among the highest in the GCC region.[20] According to GOSI 2024 figures, as well as the Haya GCC Salary guide, technology and healthcare remain the highest-paying sectors for skilled professionals. Looking at specific numbers:

- Technology sector: Entry-level AI specialists start at 15,000–20,000 SAR ($4,000–$5,333) monthly, advancing to 35,000–45,000 SAR ($9,333–$12,000) for senior positions.
- Healthcare sector: Medical specialists begin at 20,000–25,000 SAR ($5,333–$6,667), progressing to 40,000–50,000 SAR ($10,667–$13,333) for consultant roles.

These figures are competitive within the GCC region, and when combined with Saudi Arabia's tax-free environment, they represent significant earning potential. Skilled professionals pay Value Added Tax (VAT) for most goods and services. They also pay dependant fees set currently at SAR 4,800 per dependent annually. In some instances, professionals have to pay work permits fees. For comparison, similar positions in other GCC countries like Qatar and UAE offer comparable, tax-free base salaries but often with higher living costs, such as housing, for instance.

Visa Reforms

In addition to the competitive salaries and job opportunities, Saudi Arabia has adopted some major changes in migration policies. The Kingdom has introduced several visa reforms to attract highly skilled migrants. The Premium Residency (Saudi Green Card) launched in 2019 offers long-term residency and various benefits to highly skilled expatriates.[21] The Kingdom's competitive position in attracting skilled professionals is supported by the newly implemented comprehensive benefits structure. According to the Premium Residency Centre (2023), qualified professionals receive benefits including: long-term residency options; property ownership rights; family sponsorship privileges; business ownership opportunities and investment rights.

Additionally, the Temporary Work Visit Visa introduced in 2019 allows for easier short-term employment of foreigners.[22] It also aims to attract long-term investors and highly skilled expatriates to contribute to Saudi Arabia's economic diversification.

The naturalisation programme, introduced in 2019 and formalised through a 2021 royal decree, provides a pathway to Saudi citizenship for distinguished professionals in fields such as science, medicine, technology, and Islamic scholarship. This represents a significant shift from traditional renewable visas tied to employment, offering exceptional talents the opportunity for permanent integration into

Saudi society. The 16% of highly skilled non-Saudi workers registered with GOSI during Q2 2024 (Table 2) represent a substantial pool of professionals who could potentially benefit from these visa and naturalisation schemes. This initiative aligns with Vision 2030's goals of cultivating an attractive environment for global talent while reducing economic dependence on oil.[23]

Improved Working Conditions for Expatriates

Saudi Arabia has made significant strides in improving working conditions for high-skilled migrants. The Labor Reform Initiative, launched in March 2021, allows job mobility, offers exit visa reforms, and regulates the contractual relationship between employers and employees, in replacement of the sponsorship rule. Before the Labor Reform Initiative workers needed employer consent to change jobs but during the first year following the implementation of the measure, over 200,000 workers successfully changed employers, a 14.2% increase in labour market mobility compared to the pre-reform period.[24] As for the exit visas the reforms simplified exit visa procedures by digitalising the process through the *Absher* platform. Under the new system, expatriate workers can directly apply for and receive exit permissions without employer approval, representing a fundamental shift from the previous requirement of explicit employer consent. In October 2024, Saudi Arabia further enhanced labour market protections by introducing an insurance product that covers expatriate workers' entitlements in the event a private sector establishment would default on wage payments. This demonstrates continued commitment to strengthening worker protections. All these changes are part of the broader Labor Reform Initiative that aims to increase labour market flexibility.[25]

Quality of Life Improvements- Cultural and Social Reforms

Recent years have seen substantial cultural and social reforms in Saudi Arabia. These include allowing women to drive, and opening cinemas (which has led to rapid growth with Saudi Arabia now leading the MENA region with 803 screens expected by the end of 2024).[26] It also include sports, tourism, and hosting international entertainment events, such as Formula 1 Saudi Arabian and the Red Sea International Film Festival. The Future Investment Initiative (FII) and the LEAP Technology Conference are also examples of international business events taking place in Saudi Arabia. Cultural and social reforms also include gender equality measures and increased women's participation in the labour force. International education options and other family-friendly policies such as parental leave and childcare support make Saudi Arabia an attractive choice for foreign workers. The Quality-of-Life Program 2020, launched as part of Saudi Arabia's Vision 2030, aims to make Saudi Arabia more attractive to both locals and expatriates by improving the overall lifestyle.[27] According to Saudi Arabia's Vision 2030 official documentation, the programme aims to make the Kingdom a global destination with specific targets including increasing household spending on entertainment to 6%, positioning three Saudi cities among the world's top 100 most liveable cities, and raising the ratio of individuals exercising once a week from 13% to 40%. The programme focuses on several key areas: development of entertainment complexes, expansion of cultural facilities, enhancement of urban infrastructure, improvement of healthcare services, and creation of community spaces.

According to the 2023 Vision 2030 Annual Report, physical activity targets were exceeded with 62.3% of adults participating in at least 150 minutes of physical activity per week, surpassing the 2023 target of 51%. The programme has also contributed to expanding entertainment and cultural venues, with 3,934 entertainment venues established (exceeding the target of 2,093) and 584 cultural events organised (surpassing the target of 345). The programme's impact can also be seen in sports development, with over 110 sports clubs established across various fields.[28]

Infrastructure Development

Saudi Arabia is investing heavily in infrastructure development. Projects like NEOM, a $500 billion futuristic city, and the Red Sea Project, a luxury tourism destination, are set to provide world-class living environments.[29] The Kingdom is also expanding its transportation network, including the Riyadh Metro project, to enhance mobility and quality of life. [30] As for the migrant workers' families, the Saudi government has made extensive efforts to reform and expand its education system for high-skilled migrant families relocating to Saudi Arabia. These reforms include establishing international schools, constructing new universities and modernising curricula.[31] These changes are some of the factors that can make the country more appealing to high-skilled migrants, especially those from countries with more liberal social norms.

While Saudi Arabia offers numerous attractions for skilled migrants, the path to becoming a global talent hub faces several obstacles. Understanding these challenges is crucial for developing effective policies that can enhance the Kingdom's competitiveness in the international talent market.

Challenges in Attracting and Retaining Highly Skilled Migrants

After discussing some of the main changes to policies that regulate both employment and living conditions of skilled migrants in Saudi Arabia, a question arises: are these changes successful in attracting skilled migrants? Also, after attracting these skilled migrants, are the current changes sufficient to not only attract but also retain skilled migrants? Do these changes target all types of high-skilled migrants and investors at the same time? Is there a need for policymakers to distinguish between skilled migrants and investors?

The changes discussed earlier in this report represent significant progress, but it remains to be seen whether these changes, including professional development opportunities, competitive salaries, and visa reforms, are sufficient to help Saudi Arabia win both in the global and regional competition for talented skilled professionals.

Competition from Other Global Destinations

Saudi Arabia's competition for international talent operates on two levels: regional and global markets, particularly with the European Union. According to the European Labour Authority's 2023 report, while the EU attracts skilled migrants through established innovation ecosystems and clear pathways to permanent residency, Saudi Arabia offers distinct advantages through its rapid economic transformation and tax-free environment.[32] Recent data from the Saudi Investment Ministry shows that highly skilled professionals in technology sectors can earn 20–30% more in Saudi Arabia compared to European markets, primarily due to tax benefits and additional allowances.[33]

The Kingdom's competitive position is strengthened by its massive transformation projects. While the EU offers established tech hubs like Berlin and Paris, Saudi Arabia counters with projects like NEOM ($500 billion) and the Red Sea Project ($100 billion), providing unique opportunities for career advancement and innovation.[34] According to Boston Consulting Group's 2023 Global Talent Report, this scale of development and opportunity for impact is increasingly attracting skilled professionals who might traditionally have chosen European destinations.[35]

However, the EU maintains significant advantages in certain areas. The European Commission's 2023 Skills and Migration Report highlights that the EU's strength lies in its established research networks, strong intellectual property protection, and family-friendly immigration policies.[36] These factors contribute to the EU's ability to retain talent long-term, with average skilled migrant retention rates of 68% after five years, compared to Saudi Arabia's current rate of 45%.[37]

Competition from Regional Established Destinations

In the regional context Saudi Arabia offers a comprehensive programme. As discussed earlier, Saudi Arabia's digital economy contributes 14% to its GDP. This surpasses several regional economies. The adoption of computing services for public and private establishments presents a strong digital infrastructure development. This digital transformation is creating an ecosystem that leverages skilled workers to advance the labour market regionally. The challenges Saudi Arabia faces in retaining highly skilled migrants are multifaceted and distinct from other GCC countries. While Saudi Arabia offers competitive salaries and increasing professional opportunities, certain structural factors affect long-term retention. Unlike the UAE and Qatar, which have established more flexible residency schemes and freehold property ownership rights in designated areas, Saudi Arabia's pathways to permanent residency are still evolving. The Premium Residency scheme, introduced in 2019, represents progress but its implementation is still in the early stages compared to Dubai's Golden Visa Program or Qatar's permanent residency options.

Another key factor is the ecosystem for international talent. Dubai, for instance, has developed a comprehensive expatriate infrastructure over decades, including international schools, multicultural environments, and established expatriate communities. Saudi Arabia is rapidly developing these elements through mega-projects like NEOM and significant social reforms, but such ecosystems take time to mature. The Kingdom's digital economy data from 2022 shows promising progress, with 48% of establishments adopting cloud computing services and 60.1% using internet-connected systems, indicating growing sophistication in the business environment.

Overall, the social and cultural infrastructure that supports long-term settlement of international talent is still developing. We can say that Saudi Arabia's transformation shows two distinct speeds of development: while professional opportunities in key sectors like technology (contributing 14% to GDP) and healthcare (with 67.4% technology adoption rate) are advancing quickly, the social and cultural infrastructure needed to support international talent is developing more gradually. [38]

Balancing Expatriate Recruitment with Local Workforce Development

Saudi Arabia faces the challenge of attracting highly skilled migrants while simultaneously developing its local workforce. Saudisation, or the replacement of foreign workers with Saudi nationals, is a key government policy aimed at increasing the participation of Saudi citizens in the labour force. The *Nitaqat* programme, launched in 2011, sets quotas for Saudi employment in the private sector based on company size and economic activity. [39] The Saudisation policy, which aims to increase the employment of Saudi nationals in the private sector, can sometimes conflict with the goal of attracting foreign talent.

Balancing between importing necessary skills and cultivating opportunities for the domestic workforce is a complex undertaking that demands careful policy management from the Saudi government. As the Kingdom moves ahead with its ambitious infrastructure projects and economic diversification efforts, maintaining this delicate balance becomes increasingly crucial. On one hand, the sheer scale and technical complexity of initiatives like the Riyadh Metro expansion necessitate the infusion of specialised expertise that may not be readily available within the local labour pool. Attracting skilled migrants can help fill these critical gaps, accelerating the country's transformative agenda. The influx of engineering talent, project management capabilities, and cutting-edge know-how can serve as a vital catalyst for progress. Yet, the Saudi leadership remains steadfastly committed to empowering its own citizens and ensuring they have ample opportunities to actively participate in the nation's economic development. To this end, the government has implemented various Saudisation policies, designed to incentivise the hiring and training of local workers.

Effective policy management is essential in this context, as the authorities must carefully calibrate the inflow of migrant workers with the nurturing of domestic talent. This might entail targeted skills development programmes, vocational training initiatives, and educational reforms to build a robust pipeline of local professionals capable of meeting the evolving demands of the labour market. Moreover, the integration of migrant workers and their families must be handled with utmost care and consideration, ensuring that they can contribute to the local economy and community while respecting and preserving the cultural identity and values that define the Kingdom. By striking the right balance, Saudi Arabia can harness the expertise of global talent while simultaneously empowering its own citizens to shape the future of the nation.[40]

A key factor in empowering local talent is to view skilled migrants as a complementary and strategic factor in economic development. This volume of high-skilled migrants is not a replacement for locals but a tool to develop the local workforce and enrich the economy. After all, an economy with a diverse, well-trained workforce with international exposure is an advantage over comparable economies both in the region and globally.

Moreover, there is a need to ensure knowledge transfer from expatriates to local workers, which is crucial for long-term economic development to be effective. The Saudi government has implemented many programmes to facilitate knowledge transfer, such as scholarships and exchange programmes. The government offers extensive scholarship programmes to send Saudi students abroad for higher education, with the expectation that they will return and contribute to the workforce. There are also more direct knowledge transfer initiatives. Some of the major development projects, like NEOM and the Red Sea Project, have structured knowledge transfer components. In December 2022 NEOM launched an intensive 8-week training programme for 600 students from the NEOM-Tabuk region, helping them align their studies with future job market needs. Working with KEYSS Project and the Ministry of Education, NEOM has also established a scholarship programme supporting 379 students, along with English language and career development initiatives.[41]

However, due to some limitations these programmes have not been as effective as originally expected. A major limitation has been the lack of coordination. Effective knowledge transfer requires strong collaboration between the government, the private sector, educational institutions, and migrant communities. Coordinating all these stakeholders can be complex and requires the focus of qualified entities. This involves training and mentoring of local engineers, project managers, and other professionals by experienced

migrant workers. Policymakers need to find channels through which knowledge and experience can be transferred. This might include large-scale programmes of job shadowing initiatives providing real day-to-day experience. Structured mentorship is another programme that aims to pair local professionals with skilled migrants. Invested governmental and non-governmental entities could benefit from collaborative research projects that host foreign talent and target local professionals.[42] These policies and programmes will not only transfer knowledge between high-skilled migrants and locals but will also foster an environment of knowledge sharing and creativity.

Despite these challenges, the influence of highly skilled migration on Saudi Arabia's development has been significant. Analysing this impact across economic and social dimensions provides valuable insights into the effectiveness of current policies and guides future strategic decisions.

Impact of Highly Skilled Migration on Saudi Arabia

Economic Impact

Knowledge Transfer and Innovation

Highly skilled migrants play a crucial role in knowledge transfer and innovation in Saudi Arabia. They bring expertise in advanced technologies and international best practices, contributing to the country's innovation ecosystem. Fayolle and colleagues (2019) demonstrated that highly skilled expatriates contribute significantly to innovation and entrepreneurship in Saudi firms, particularly in the technology sector.[43] Similarly, advancement in important sectors like healthcare requires the contribution of global talent.

Saudi Arabia's approach to knowledge transfer has evolved significantly since 2020. The National Strategy for Data and AI aims to train 20,000 data and AI specialists by 2030, with a specific focus on knowledge transfer from international experts to local talent.[44] This strategy is already showing results: according to KAUST's 2023 Impact Report, their International Faculty Exchange Program has facilitated over 150 knowledge transfer partnerships, resulting in a 40% increase in local research output.[45]

The healthcare sector demonstrates particularly effective knowledge transfer mechanisms. Ministry of Health data shows that through Clinical Fellowship Programs and specialised training centres, the percentage of Saudi specialists in key medical fields has increased from 15% to 25% between 2020 and 2023.[46] This progress is supported by structured mentorship programmes and international partnerships with leading medical institutions.

In the technology sector, the Ministry of Communications and Information Technology reports that companies participating in formal knowledge transfer programmes are 35% more likely to engage in innovation activities and 42% more likely to expand internationally.[47] These outcomes are achieved through specific initiatives, which include: the Tech Mentorship Initiative, connecting international experts with local professionals; Innovation Hub Partnerships, facilitating direct technology transfer; Start-up Accelerator Programmes, combining international expertise with local entrepreneurship.[48]

Challenges in knowledge transfer persist, particularly in documenting and transferring knowledge. The Ministry of Human Resources and Social Development's 2023 report identifies key barriers including language differences, cultural adaptation, and varying professional practices.[49] To address these challenges, Saudi Arabia has implemented several solutions:[50]

1. Bilingual professional development programmes, now mandatory in major institutions
2. Cross-cultural training initiatives, showing a 30% improvement in team collaboration.
3. Standardised knowledge documentation systems, implemented across 60% of major or according to the Saudi Central Bank's latest economic report, sectors with formalised knowledge transfer programmes show 28% higher productivity compared to those without such programmes. This data supports the effectiveness of Saudi Arabia's structured approach to knowledge transfer and talent development.[51]

Contribution to GDP and Economic Diversification

The economic impact of highly skilled migrants on Saudi Arabia's economy has been substantial and measurable. Economic research from the Saudi Central Bank (SAMA) indicates that sectors employing skilled migrants contributed approximately 28% to the non-oil GDP in 2022.[52] This contribution is particularly significant in knowledge-intensive

industries, where skilled migrants often bring specialised expertise and international experience. Research from the Ministry of Human Resources and Social Development demonstrates that private sector competitiveness has increased in sectors with high skilled migrants' concentration. Their 2022 Labor Market Report shows that companies employing high skilled migrants are: 35% more likely to engage in innovation activities; 42% more likely to expand internationally; and 27% more likely to introduce new technologies. These impacts are particularly evident in key strategic sectors. In the technology sector, where digital transformation is crucial for Vision 2030, companies with higher concentrations of highly skilled migrants report faster adoption of advanced technologies. The Saudi Digital Economy Report shows that such companies achieved a 68.3% rate of cloud computing adoption, significantly higher than the national average.[53] Similarly, in healthcare, institutions employing international medical professionals demonstrate 67.4% higher technology integration rates, directly contributing to the sector's modernisation.[54] The economic contribution of skilled migrants extends beyond direct sector performance to broader economic indicators. According to the Saudi Central Bank (SAMA)'s latest economic analysis, sectors with high professional migrants participation show: higher productivity rates (30% above sector averages); increased export capabilities (25% higher than comparable firms), and greater research and development investment (40% higher than sector norms).[55] These indicators not only demonstrate the crucial role of highly skilled migrants in advancing Saudi Arabia's economic diversification goals under Vision 2030 but also their contribution to building a more resilient and innovative economy. As noted in the Ministry of Economy and Planning's strategic review, this transformation is essential for maintaining Saudi Arabia's competitive position in the global knowledge economy.[56]

Social and Cultural Impact

Changing Demographics

The influx of highly skilled migrants is gradually changing Saudi Arabia's demographics. Based on GOSI Q2 2024, highly skilled expatriates constitute about 18.7% of the new workers' inflows to the private sector.[57] This change the skill composition of the workforce is influencing various aspects of Saudi society, from the labour market to cultural norms. Added to the fact that a major share of Saudi Arabia's population is of working age, with an employment-to-population ratio of 63.2%,[58] a working population equipped with the necessary training would result in higher participation rates and higher productivity. Additionally, Saudi Arabia displayed a positive population growth rate of 4.5% in 2021–2022.[59] Saudi Arabia is also experiencing one of the fastest urbanisation rates globally, with the share of urban population increasing dramatically from 58% in 1975 to 84.8% in 2023.[60] These changes, along with the presence of high-skilled migrants, offer a great opportunity for Saudi Arabia's development.[61] This demographic profile positions Saudi Arabia favourably for economic transformation, provided appropriate policies and investments continue to support workforce development and job creation.

Cultural Exchange and Diversity

Highly skilled migrants bring diverse perspectives and cultural practices to Saudi Arabia, fostering a more cosmopolitan environment. Aldossari and Robertson[62] note that this cultural diversity is particularly evident in major cities and innovation hubs, where it contributes to a more globally oriented workforce. King Abdullah University of Science and Technology (KAUST) stands as a prime example of Saudi Arabia's commitment to innovation and diversity. Established in 2009 with an endowment exceeding $20 billion, this 36-square-kilometer campus in Thuwal has become a major economic and scientific hub, joining other economic zones as a key attraction to the Saudi labour market.[63] The Kingdom continues to invest in cultural institutions and platforms to promote international exchange and collaboration.[64]

High-skilled migrants bring international expertise and best practices to Saudi Arabia's growing tech sector. They contribute to knowledge transfer in emerging technologies and help establish innovation hubs across the Kingdom. Their experience with global technology standards and practices helps accelerate the adoption of new technologies and the development of local capabilities.[65]

The cultural and social impact of skilled migrants in Saudi healthcare is significant, creating more diverse and inclusive healthcare environments while bringing valuable international perspectives to Saudi medical institutions. This diversity enhances the system's ability to provide culturally competent care to a diverse patient population. Public attitudes reflect this positive impact, with research showing that 49% of Saudis support employing both nationals and migrants. This growing acceptance aligns with Saudi Arabia's ambitions to become a global biotechnology hub, particularly in areas such as vaccine development, pharmaceutical manufacturing, and medical research. The Kingdom's strategic focus on biotechnology development, supported by skilled international talent, positions it to potentially capture 5% of the global biotechnology market by 2030.[66]

Conclusion

High-skilled migrants have proven to be vital contributors to Saudi Arabia's economic transformation, particularly in technology and healthcare sectors. Their impact extends beyond addressing workforce shortages to driving knowledge transfer and enhancing service quality. GOSI and GAStat data indicate continued growth in high-skilled migration, with increasing registrations of professionals and technicians, especially in emerging sectors like green energy.

Skilled migration remains essential for Saudi Arabia's future economic success, enabling innovation and development of a knowledge-based economy. The key challenge lies in balancing international talent attraction with local capability development. This balanced approach can create a vibrant entrepreneurial ecosystem that leverages both expatriate and local talent, advancing Saudi Arabia's vision for a decarbonised, knowledge-based economy. Current trends suggest a gradual shift from traditional sector-focused recruitment toward specialised roles aligned with Vision 2030's objectives.

The demand for highly skilled migrants in Saudi Arabia is expected to grow, particularly in sectors aligned with Vision 2030 goals such as technology and healthcare. The Saudi Ministry of Economy and Planning projects a 30% increase in highly skilled migrant workers by 2030, with significant growth in fields such as artificial intelligence, renewable energy, healthcare, and biotechnology.[67]

The impact of skilled migration on Saudi Arabia's development, as demonstrated in the report, sets the stage for considering future trends and necessary policy adjustments. Looking ahead, several key policy recommendations emerge from this analysis to enhance the Kingdom's position in the global competition for talent.

1. **Further visa reforms:** Khoo et al. (2017) suggest that streamlining visa processes and offering more pathways to permanent residency could significantly boost Saudi Arabia's appeal to highly skilled migrants.[68] However, the current Saudi Arabian Citizenship System (Royal Decree No. M/4) maintains highly restrictive naturalisation policies, requiring a minimum of 10 years continuous residence, professional qualifications, and Arabic language proficiency.[69] While the 2019 Premium Residency System introduced new options – including permanent residency for SAR 800,000 and temporary residency for SAR 100,000 annually – these pathways remain limited compared to other major destination countries.[70] The United States, Canada, and Australia, for instance, offer clearer citizenship pathways within 3–5 years, more transparent processes, and lower costs.[71] Although the Premium Residency Program provides benefits such as self-sponsorship and property ownership rights, the high costs and complex application processes may deter potential skilled migrants. A clear path to settlement serves as a reassurance factor about the future, particularly for family and long-term settlement considerations. The implementation of more accessible and transparent pathways could enhance Saudi Arabia's ability to both attract new talent and retain existing skilled professionals, aligning with the country's economic diversification goals.

2. **Policy and institutional changes**: implementing comprehensive workplace protection policies, developing clear career advancement pathways, creating improved integration programmes, and establishing fair and transparent compensation systems could also boost Saudi Arabia's attractiveness to highly skilled migrants. Additionally, providing professional development opportunities and supporting family integration and settlement are crucial for retaining these valuable professionals and ensuring their continued contribution to the Saudi healthcare sector.

3. **Improve work-life balance:** A study by PWC Middle East (2021) recommends enhancing work-life balance policies to align with global standards, which could make Saudi Arabia more competitive in attracting international talent.[72] A comprehensive approach to work-life balance in Saudi Arabia extends far beyond basic policies of remote work and extended leave. Implementation strategies should encompass holistic lifestyle enhancement programmes that address both the professional and personal needs of international talent. Saudi Arabia's appeal to international talent extends beyond conventional financial incentives. The tax-free salary structure, coupled with comprehensive housing, transportation, education, and healthcare allowances, creates a compelling compensation package that outperforms many global destinations in terms of disposable income.[73] The built-in cultural elements of the Saudi workday, including prayer breaks and extended lunches, naturally foster a balanced work rhythm that many professionals find conducive to productivity and personal well-being. This environment is further enhanced by the country's ongoing transformation under Vision 2030, which has introduced

modern entertainment facilities, cultural venues, and lifestyle options that rival established global cities. For career-focused individuals, Saudi Arabia offers unique opportunities to engage with megaprojects and emerging sectors, providing both leadership roles and valuable international exposure. The combination of traditional values with modern infrastructure creates an environment where families can thrive, supported by high-quality international schools, healthcare facilities, and strong expatriate communities. The country's strategic location also facilitates international travel, adding another dimension to its lifestyle appeal. When marketing these advantages to global talent, the focus should be on tangible lifestyle comparisons, authentic experiences of current expatriate professionals, and clear demonstrations of the professional growth opportunities available in this dynamic market.

4. **Enhance research and development infrastructure:** Rahman et al. (2020) argue that increased investment in R&D facilities and collaboration with international research institutions could make Saudi Arabia more attractive to researchers and scientists.[74] KAUST is a great example of an innovation hub and a leader in research. Similarly, fostering innovation through entrepreneurship is seen as a crucial driver of innovation. By supporting entrepreneurs, Saudi Arabia can accelerate the development of new technologies, products, and services, particularly in sectors aligned with Vision 2030 goals. These two interconnected strategies for attracting high-skilled migrants by both fostering innovation and collaborating with international research institutions would create a sustainable ecosystem that adds to the attraction of the Saudi market. Balancing highly skilled migration with local talent development through skills-matching programmes will also help in this endeavour. Alsheikh (2015) proposes implementing more robust skills-matching programmes to ensure that highly skilled migrants complement rather than substitute local talent.[75] Nurunnabi (2017) emphasises the importance of structured knowledge transfer programmes, where highly skilled migrants mentor and train local professionals.[76] It is instrumental to focus on mentorship initiatives and shadowing programmes to create channels of knowledge transfer between local and international talent.

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B

Attractivity of Saudi Arabia to the highly skilled and to Asian sending countries

5

The Global Competition for Talent: How Does Saudi Arabia Compare with Gulf and Global Peers?

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Abstract

A critical but under-studied aspect of Saudi Arabia's Vision 2030 agenda is its objective to attract migrants, particularly highly skilled ones, to help grow and diversify the economy. Some other Gulf states have similar goals and compete for talent with Saudi Arabia and international peers. This paper examines the kind of migrants Saudi Arabia wants to attract. It then looks at some of the literature on what makes countries attractive to migrants, which provides a framework for assessing Saudi Arabia and its GCC peers on a theoretical basis, drawing on various benchmark indices. Empirical data from local and third-party sources is also examined to determine how Saudi Arabia is performing in practice in attracting and retaining talent. This analysis leads to recommendations for policies that could make the Kingdom even more competitive.

Why Should KSA Attract Migrants and Which Ones Does It Want?

Rapidly growing economies often look to migrants to provide skills that are not available domestically, to fill labour shortages, and to contribute to investment and entrepreneurship. A good example of this was Saudi Arabia in the 1970s. Its first two five-year development plans put a strong emphasis on attracting migrants. They did this because the government wanted to expand the oil sector, spurred on by nationalisation of Aramco and the oil boom, and then use the oil revenue to build out the rest of the economy. Migrant worker numbers surged, increasing over that decade from only a seventh of the workforce to more than half the total. This influx of migrants brought social and logistical challenges but also facilitated a period of rapid economic development. Migrant numbers continued to increase in the following decades, except in the 1990s, driven by demand from employers. This happened despite periods of weak oil revenue and a shift towards Saudisation policies that were based on an assessment that migrants were crowding out Saudi nationals from private sector jobs.

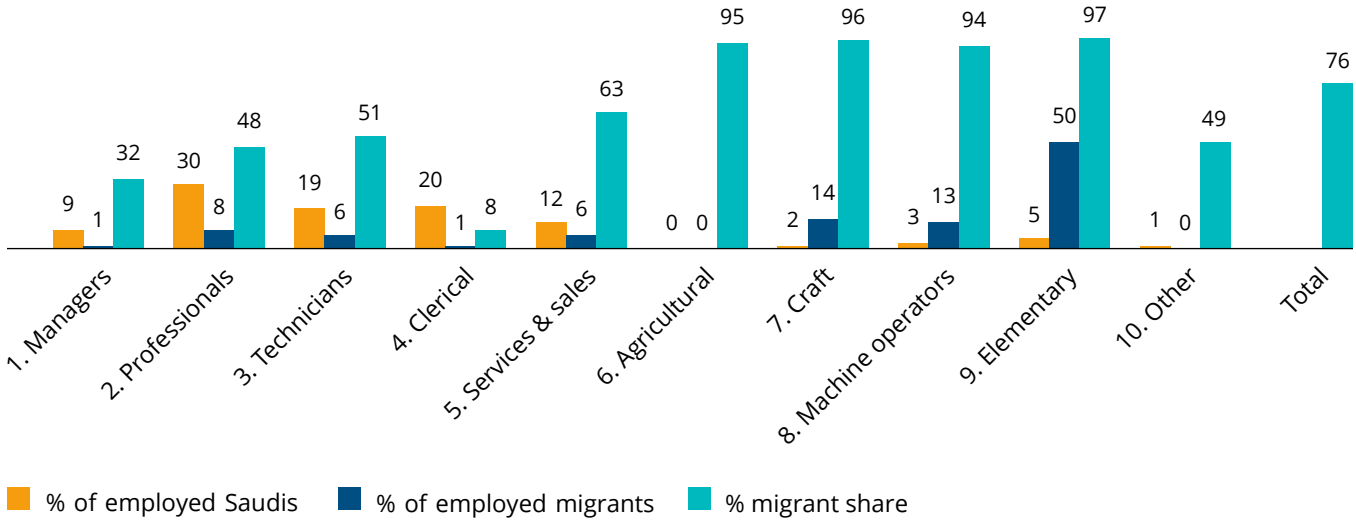
However, over the last decade, the government has once again sought to attract migrants in large numbers in the context of Vision 2030, to build ambitious projects and develop new sectors that diversify the economy.[1] One of the explicit objectives of Vision 2030 is to: "Create an attractive environment for world talents." The National Transformation Program, which is one of the Vision Realisation Programs, has linked this objective to the Kingdom's ranking in an index from IMD (which is discussed below) and also includes indicators related to improving working conditions for expats (NTP, 2020). So far, this strategy appears to have been extremely successful in creating jobs for both Saudis and migrants, even at a time when many Saudi women have been entering the labour force. Unemployment amongst Saudis fell to a record low of 7.1% in Q2 2024. The number of employed Saudis was also close to a record high, in absolute and relative terms, with an employment-to-population ratio of about 47%, up from just 36% in 2015 (this includes an increase from about 60% to 64% for Saudi men and 12% to 31% for women).[2]

Despite the overall positive trends in employment for Saudis, there is of course competition with migrants in certain roles and sectors. Understanding where this is happening can help the government shape incentives and restrictions that attract migrants where they are most needed while at the same time ensuring there are sufficient suitable jobs for Saudis. Although attracting migrants with specialist skills is particularly important for developing some key sectors, such as advanced manufacturing and financial services, lower-skilled migrants are also still needed across many sectors. This includes jobs offering pay and conditions that are unappealing for Saudi nationals, as well as jobs that might be appealing to them, but where the demand for labour exceeds the current supply of nationals.

It is worth looking at the roles migrants currently play in the workforce, which provides a rough indication of the kinds of occupations where migrants may be needed, although this will evolve over time. The quarterly Labour Market Statistics, based on administrative data, break down private-sector employment[3] in various ways, including by nationality and ISCO 08 occupation groups (Graph 1).[4] The ISCO groups roughly correlate with skill and salary, with the ILO categorising roles in groups 1–3 as corresponding with the highest skill levels (3 and 4).

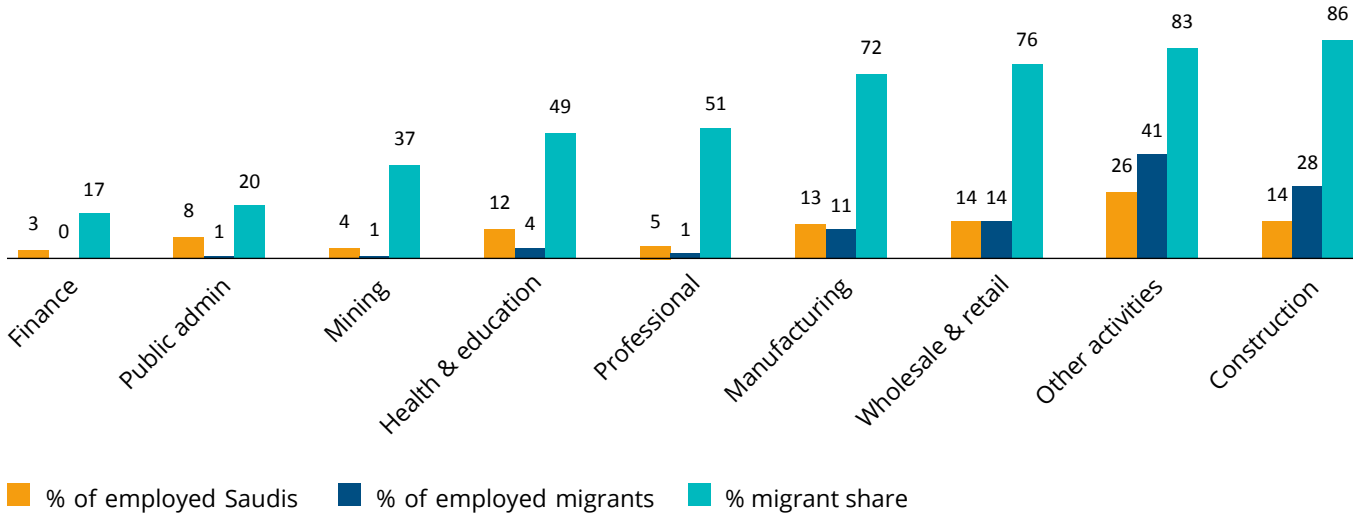
More than 90% of Saudi nationals working in the private sector are concentrated in the highest skilled occupational groups, 1–5, whereas half of all migrants are in the lowest group, elementary occupations, and a further quarter are in groups 7–8 (crafts and machine operators). Migrants also

Figure 1: Distribution by Occupational Groups (Q2–24)



Source: General Authority for Statistics, Register-based labour market statistics; Jobs covered by social.

Figure 2: Distribution by Economic Activities (Q2–24)



Source: General Authority for Statistics, Register-based Labour Market Statistics, Q2 2024.

comprise nearly two-thirds of group 5 (services and sales) and around half of two highly skilled groups, 2 and 3 (professionals and technicians). Notably, the occupational group in which Saudis are the most dominant is clerical support work (group 4), in which they comprise 92% of the total. The main reason for this is that many of the roles within this group are among over a hundred occupations that are legally reserved for Saudis (such as human resources, secretaries, clerks, etc.); other clerical roles may not be on the reserved list but are still a good fit for nationals without advanced educational qualification and for companies looking to increase their Saudisation level.

The distribution of employees by economic activities (Graph 2) provides some more insights into where Saudis and migrants are working. Although migrants predominate in sectors such as construction and wholesale & retail trade, these sectors are large enough that there are also substantial numbers of Saudis working in them. The sectors in which Saudis are in the majority are finance, public administration (public categorised under social insurance regulations rather than the civil service, where they are even more heavily represented), and mining (which includes oil). The workforce is more evenly split between nationals and migrants in the health, education, and professional services sectors. It would be useful for analysis if the labour market data included crosstabs between occupational groups and economic activities, but unfortunately, these are not publicly available. They would likely reveal that most of the Saudis in the construction sector, for example, are in managerial, technical, or clerical roles, whereas the vast majority of migrant construction workers are in elementary occupations. Conversely, in a sector like finance, many migrants are likely in professional or managerial occupations. (N. B. Section 3 returns to this data set to look at recent trends in employment by nationality).

What Makes Countries Attractive to Migrants?

Talent competitiveness is not just a concern for Gulf states but also for many other countries looking to attract highly skilled migrants to support their economic growth or fill labour gaps in key sectors, such as healthcare workers in the UK. There have been several excellent studies on this topic including Boston Consulting Group's recent "Dream Destinations and Mobility Trends" (Blair et al., 2024) and the OECD's Indicators of Talent Attractiveness project (Tuccio, 2019; OECD, 2023). There are also two annual global benchmarking reports from rival business schools in France and Switzerland, namely the Global Talent Competitiveness Index (INSEAD, 2023) and the World Talent Ranking (IMD, 2024). These projects are mainly focused on policymakers and companies. There are also studies that are designed to inform potential migrants about their options, such as the long-running Expat Insider Index (InterNations, 2024).

The OECD's methodology appears to be the most comprehensive, but its scope is limited to its member countries. It was developed through consideration of the INSEAD and IMD rankings, as well as earlier literature and projects, including a one-off index developed by the Economist Intelligence Unit back in 2011. Tuccio's foundational paper for the OCED index questions the soundness of previous approaches in part because "no solid theoretical framework is provided to justify the selection criteria used to identify sub-indices and single variables" and as a result, "the list of indicators selected appears opportunistic and mostly based on data availability." Many of these indicators are outcome-based, such as the adult literacy rate or the country's share of high-value exports, which may have correlations with skilled migration but are questionable as actual drivers of talent attractiveness. Tuccio notes that the INSEAD methodology is skewed mainly to factors that make countries attractive to businesses while IMD, although also considering some information on labour market conditions, looks more to historic outcomes rather than the employment opportunities which are more likely to be a driver of attractiveness for individual migrants. The indices also draw on subjective measures, such as surveys of executive opinions which, according to Tuccio, "may not properly depict a country's situation, thereby leading to measurement error bias." In the Gulf, for example, there may be a tendency in surveys for executives to be more positive than, say, a counterpart from Europe would be in an equivalent situation. Another problem with these indices is that the definition of what counts as a "talented" migrant, which is usually based on their level of tertiary education, is not always suitable. Moreover, there is a general problem with almost any composite indicator that tries to boil down many complex factors into a single number or rank to compare countries. That said, individuals themselves do weigh many different considerations when making migration decisions, so efforts to try and model this are understandable and the talent attractiveness indices are of some value, particularly when observing trends over time. The OECD's more sophisticated approach was to select relevant and distinct indicators that were specific to the profiles of three categories of talented migrants (workers, entrepreneurs, and students). In constructing its index, it had the advantage that the OECD countries have more extensive, high-quality, and consistent data to draw on than most countries. Therefore, the approach could not easily be extended to a wider group, including the Gulf states, which lack much of this data.

The BCG study included a survey of over 150,000 people across 188 countries, which provides the largest available dataset focused on the question of what attracts migrants. Its pool of respondents was skewed toward highly skilled migrants (53% had some management experience, 69% had at least bachelor's degrees and a quarter had master's degrees or higher). BCG's methodology was heavily influenced by the OECD's conceptual framing that migrants are

attracted to destinations by a mixture of factors that are intrinsic to their lives, plus extrinsic factors that relate to the destination itself, some of which can be shaped by government policy. The survey concluded that the most important intrinsic factors were language familiarity and personal recommendations, with others including proximity to the destination and prior familiarity with it. The three most important extrinsic factors were, unsurprisingly, the quality of job opportunities available, which was mentioned as a determinant by 65% of respondents, the perceived quality of life (54%), and financial considerations (48%), which include tax and the cost of living. Another major determinant was the safety and stability of the destination (36%). Other factors that ranked lower, but were still important for some migrants, included whether the culture was welcoming and whether the destination had a family-friendly environment. The various factors are likely weighed differently by the pool of global talent looking for opportunities in certain occupations or sectors. For example, software engineering roles may attract younger people who prioritise travel connectivity and career advancement, whereas senior management roles may best suit mid/late-career professionals who place a high value on living somewhere that is family-friendly. Therefore, while understanding the overall priorities of migrants as a group is helpful, if specific talents are required then policies and promotional efforts may need to be targeted to appeal to the kind of people who have those skills.

InterNations is the largest global expat network, with 5.4m members across 420 cities, who it provides with information and services to help them settle in and build a community. Every year since 2014 it has taken an online survey of its members on their experiences, which it uses to rank the appeal of destination countries.[5] Its sample, which usually has over 10,000 responses, skews even more highly skilled than BCG (In 2024, 83% had degrees, including 49% with postgraduate qualifications) and most respondents originate from Western countries. This reflects the demographics of people who are most involved with InterNations. The survey asks about satisfaction on a 1–7 scale regarding 53 factors of the expat experience, spread across five categories: Work, Personal Finance, Quality of Life, Ease of Settling In, and "Expat Essentials" (which includes practicalities such as bureaucracy and availability of housing). Its overall ranking of the best countries for expats is based on a simple average of the five categories plus a final question that simply asks: "How happy are you with your life abroad in general?" The survey also asks expats about the primary motivation for their move abroad: In 2024, about a third moved for jobs, a quarter for lifestyle reasons, and a tenth for education--about a fifth moved for family reasons, such as to follow a partner. These responses suggest that giving equal weight to the five categories may not be the most accurate way to assess overall satisfaction, but perhaps this should be skewed toward the motivations for the move. On the other hand, while one particular issue may have been the primary driver for relocation, a wider variety of factors are likely to determine whether a migrant remains in the destination country, and so the broad nature of the survey has merits. Also, not all of the expats who responded to the survey are of interest from the perspective of global talent competitiveness, such as non-working spouses, although their satisfaction levels could influence whether the working partner remains in the country.

HSBC used to commission a similar annual survey of expats and used it to calculate a ranking in its "Expat Explorer". The HSBC survey asked questions across three pillars: economics (work prospects, disposable income, etc.), experience (quality of life, ease of integrating, etc.), and family (education, child well-being, etc.). There are significant overlaps in questions with the InterNations survey, but there are differences in categorisation and in the contribution each factor makes to the overall result, which is a simple average of the three categories. There are, therefore, significant differences in the rankings across the two indices, including for Gulf states. For example, in 2015, Saudi Arabia ranked 26th/39 for HSBC but did more poorly in the InterNations survey that year at 60th/64. Unfortunately, the HSBC index, which was published during 2007–2021, appears to have been discontinued and few of the old reports are readily available online.

The Global Talent Competitiveness Index from INSEAD (Institut Européen d'Administration des Affaires, in France) has been published annually since 2013 and the latest edition spans 134 countries. It is not based on a survey of expat satisfaction but instead constructs its index from existing third-party indicators, including some survey data (mainly of companies). Its 2023 edition spans 69 indicators across six pillars: Enable, Attract, Grow, Retain, Vocational and Technical Skills, and Global Knowledge Skills. Although all the pillars have useful information, the Attract pillar is the most relevant for assessing the appeal of destinations to migrants rather than the overall pool of talent in the country relative to its peers. Key indicators under "Attract" include Brain Gain, taken from the World Economic Forum's annual Executive Opinion Survey ("To what extent does your country attract talented people from abroad?"), and Tolerance, taken from the Gallup World Poll (Is your country "a good place or not a good place to live for immigrants?").

The indicators in the Retain pillar seem to be more focused on retaining domestic talent than migrants, although there is some overlap; indicators from other pillars, for example on the availability of educational opportunities, could also contribute towards retention.

The World Talent Report from IMD (The International Institute for Management Development, in Switzerland) has been published since 2014 and is split into three pillars: investment in domestic talent, the availability of skills, and the country's appeal to migrants. This third pillar is of most relevance to this paper. It is based on 12 indicators which are mainly the result of an executive survey, including one question that directly asks whether "foreign highly skilled personnel are attracted to your country's business environment," as well indicators quantifying factors such as the cost of living and even air quality.

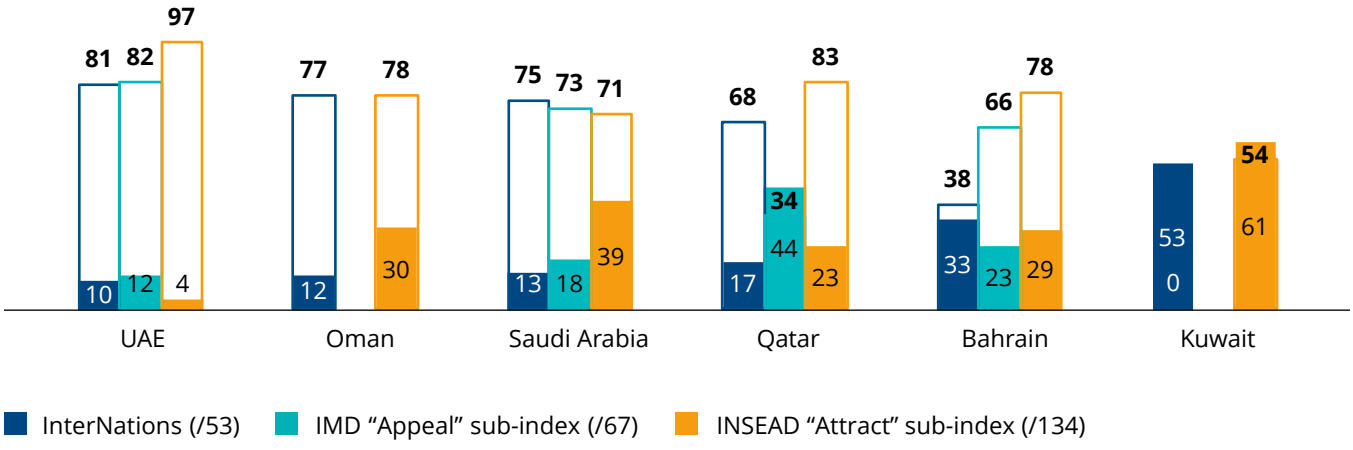
It is possible to debate the usefulness of the various indices, and no empirical studies appear to have been conducted on the extent to which their rankings correlate with actually observed skilled migration levels. That said, most of the more highly rated countries are shared across the indices and are indeed known to be popular amongst expats, including in the InterNations and HSBC surveys. Moreover, the indices provide a useful guide to some of the factors that may influence migration decisions. It may even be the case that consulting the indices contributes to relocation decision-making by firms and individuals.

How Attractive Is Saudi Arabia to Global Talent Relative to Peers?

Most of the other Gulf states are included in the indices discussed above, except Oman and Bahrain which are not in IMD's. Figure 3 summarises the latest GCC rankings using the InterNations overall rank, the IMD "Appeal" sub-index and the INSEAD "Attract" sub-index, as these two better fit the focus of this paper than their overall indices. As well as the ordinal rank, the graph also shows each country's percentile position across the three indices. This has been included to provide better comparability between indices with very different sample sizes; for example, in the InterNations survey, Oman ranked as the 12th most appealing country for migrants out of 53 surveyed countries, placing it in the 77th percentile, which is close to its 78th percentile position in the more extensive INSEAD index, in which it ranked 30th out of 134 countries. In other words, ranking 12th in the InterNations survey is roughly equivalent to 30th in the INSEAD index.

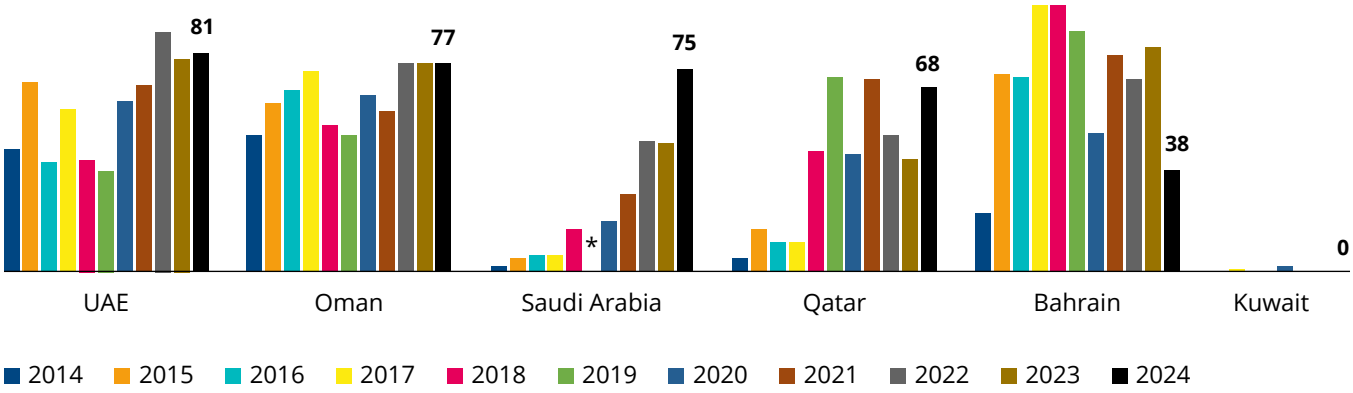
Saudi Arabia ranks in nearly the top quartile in the 2024 editions of the three indices shown in the graph, and it performs even better in BCG's survey, at 26th/188, in the top septile and up two places since 2023.[6] The National Transformation Program actually use the overall IMD ranking as a KPI, aiming to reach 27th by 2025. Saudi Arabia's overall IMD rank in 2024 was only 32nd, but the Appeal sub-index, which is shown in Figure 3, was 18th.

Figure 3: Attracting Migrants 2024 (Ranks in Coloured Columns; Percentile in Bold)



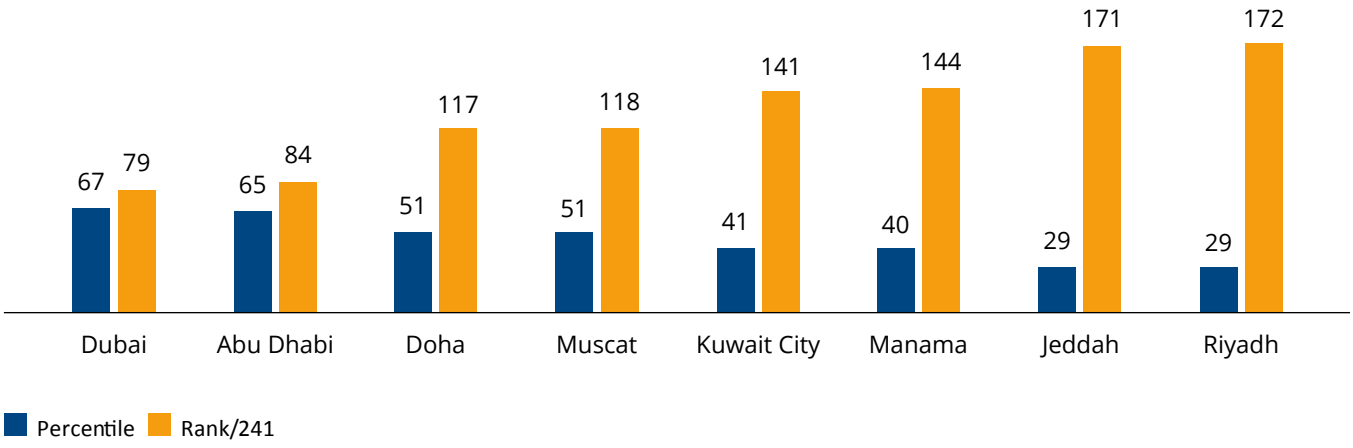
Source: Khalij Economics.

Figure 4: Best Countries for Expats (Percentile, High is Better)



*Source: InterNations, Khalij Economics, 53 countries in 2024, varies from 52–68 in other years; *KSA not included in 2019.*

Figure 5: Livability of Major GCC Cities (Mercer, 2023)



Source: Mercer, Khalij Economics.

Most of the other Gulf states, led by the UAE, also rank reasonably well across these indices. The exception is Kuwait which ranks at the very bottom of the InterNations survey. Qatar has a weak rank in the IMD survey, at 44th, but that was likely just a quirk in the 2024 edition because its rank averaged 24th in the four previous years. Similarly, Bahrain's relatively weak rank of 33rd in the InterNations 2024 survey may be a one-off, as it averaged 16th in the four previous years and there have not been any major policy or economic changes in 2024 that would seem to explain such a sharp decline in its appeal.

These fluctuations highlight the risks of polling errors when indices are based on surveys that have small sample sizes for some countries, and also widely varying sample sizes by country. Methodological changes in index construction can also result in significant shifts. An example is Saudi Arabia's rank in INSEAD's "Retain" sub-index, which fell sharply from 42nd in 2020 (and an average of 32nd in 2013–19) down to 81st in 2021, and held around that level in 2022–23. This decline was primarily the result of the introduction of a new indicator for Personal Rights, based on an index produced by the US-based Social Progress

Imperative in which Saudi Arabia ranks at the bottom of the 134 INSEAD countries. Therefore, in assessing relative attractiveness between countries and changes over time, it is important to look into the details of the indices rather than just their headline or even sub-index results. Some of the individual indicators are particularly instructive, for example, in the survey question on Brain Gain used by INSEAD, taken from the World Economic Forum's annual Executive Opinion Survey, Saudi Arabia ranked sixth globally in 2023.

Looking into trends, the most notable one is in the InterNations survey. Over the last decade, Saudi Arabia has advanced in most years, rising from close to the bottom of the rankings in 2014–17, to 13th/53, or the 75th percentile, in 2024. Qatar and the UAE have also seen significant improvement over this period, although not to the same extent, while other Gulf states have been more static – notably Kuwait at the bottom of the rankings – or have declined.

In addition to the talent-focused indices, quality-of-life indices are helpful in assessing talent competitiveness, because this is one of the major factors that highly skilled migrants say motivates their decisions. One of the most prominent and publicly accessible quality of life studies comes from consultancy Mercer and is focused on the city level. There are similar city indices produced by The Economist Intelligence Unit (EIU) and Oxford Economics, although these are behind paywalls.[7] All these indices are focused on serving companies that are relocating staff internationally and are developed alongside cost-of-living indices, which help firms determine relocation benefits for their staff. The Mercer survey of 241 cities, shown in Figure 5, includes all the GCC capitals, as well as Dubai and Jeddah. It ranks the Saudi cities as the weakest in the region, placing them in the bottom 29th percentile out of the 241 cities in the survey, whereas Dubai tops the GCC at 79th globally, or the 67th percentile. The EIU's index shows a similarly weak result with Riyadh at 103rd/140 (the bottom 26th percentile) and Jeddah at 107th in its June 2023 edition (SPA, 2023).

How Successful Is Saudi Arabia in Attracting Highly Skilled Migrants?

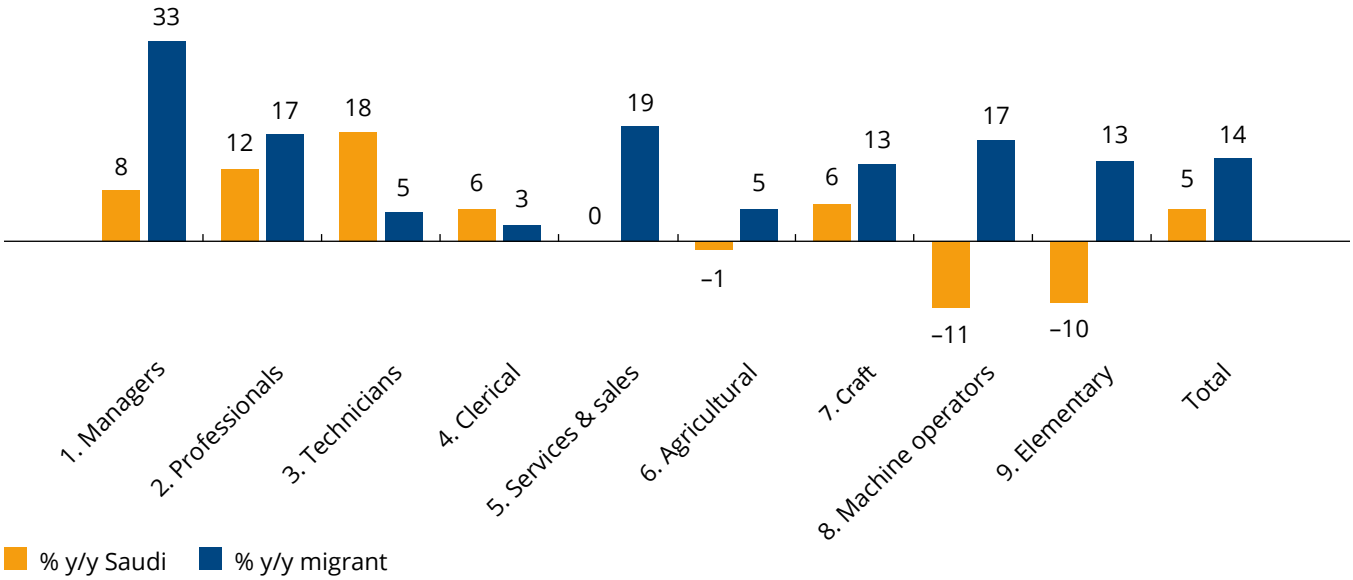
The theoretical rankings of relative attractiveness do not necessarily translate into actual migrant flows. It is, therefore, useful to look at empirical evidence from both official data and third-party sources to give some sense of the current migrant flows, particularly of highly skilled workers.

The labour force survey data that was examined in Section 1 provides some insights into recent trends in employment and migration. It shows that during the first six months of 2024, there was a 5% increase in the stock of Saudi employment and a 14% increase in the stock of migrant employment. It is notable that while migrant employment has grown across most of the occupational groups in the first half of the year 2024 (Figure 6), the strongest growth was in the managerial group, where migrant numbers surged by a third. These are among the most educated and highly paid employees and suggest that the Kingdom is doing well in attracting these kinds of migrants, perhaps staffing new regional HQs or overseeing gigaprojects. There was also a strong 17% growth in the professionals group. Both these occupational groups also saw higher than average growth amongst Saudis, alongside the surge in migrants. This points to the high level of demand for these occupations and the economy's capacity to create jobs for both migrants and nationals. There seems to be more of a Saudisation trend underway in the technician roles, given that this group saw the strongest growth for Saudis (18%) but the second lowest migrant growth (5%). Growth in Saudi employment was also stronger than that of migrants in clerical occupations, in which the vast majority of workers are nationals. Meanwhile, the decline in Saudi numbers for some of the more menial occupations, which are clearly in demand given the high migrant growth, could perhaps indicate that nationals are being recategorised and promoted, rather than being out-competed by migrants.[8]

The trends by economic activities (see Figure 7) show strong growth in migrants across several sectors in which they predominate. The professional services sector saw strong growth, and this provides further evidence that the Kingdom is succeeding in attracting highly skilled migrants. There was also a dramatic surge of migrants in the mining sector, 45% y/y, although this probably relates to lower-skilled workers in metal and minerals mining, a sector which is expanding rapidly, rather than highly skilled oil workers. The exception was wholesale and retail trade, where growth was slow and the number of Saudi employees declined, suggesting weak employment demand in the sector (although this is a little surprising given that wholesale and retail trade, combined with hospitality, was the sector with one of the strongest rates of real GDP growth in Q2, at 6.8% y/y).[9]

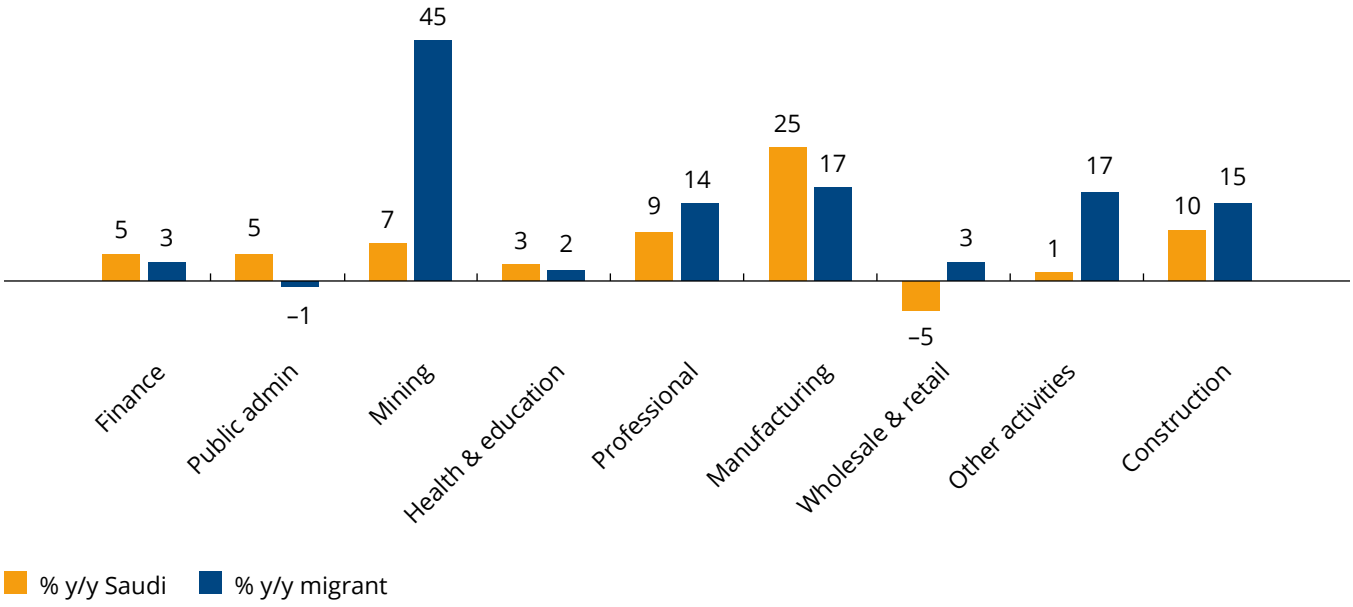
A third-party source for migration is a dataset drawn from the professional social network LinkedIn (World Bank, 2024). It uses changes in the residency reported on members' profiles as a guide to international migration. This is

Figure 6: Growth by Occupational Groups (Q2–24)



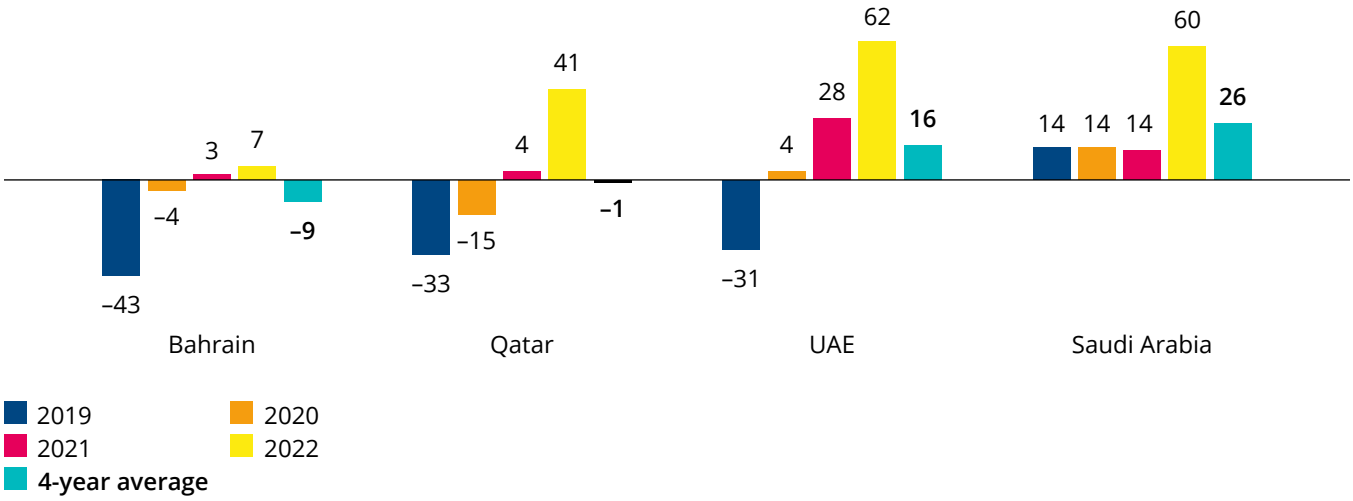
Source: General Authority for Statistics, Register-based Labour Market Statistics.

Figure 7: Employment Growth by Activity (Q2–24)



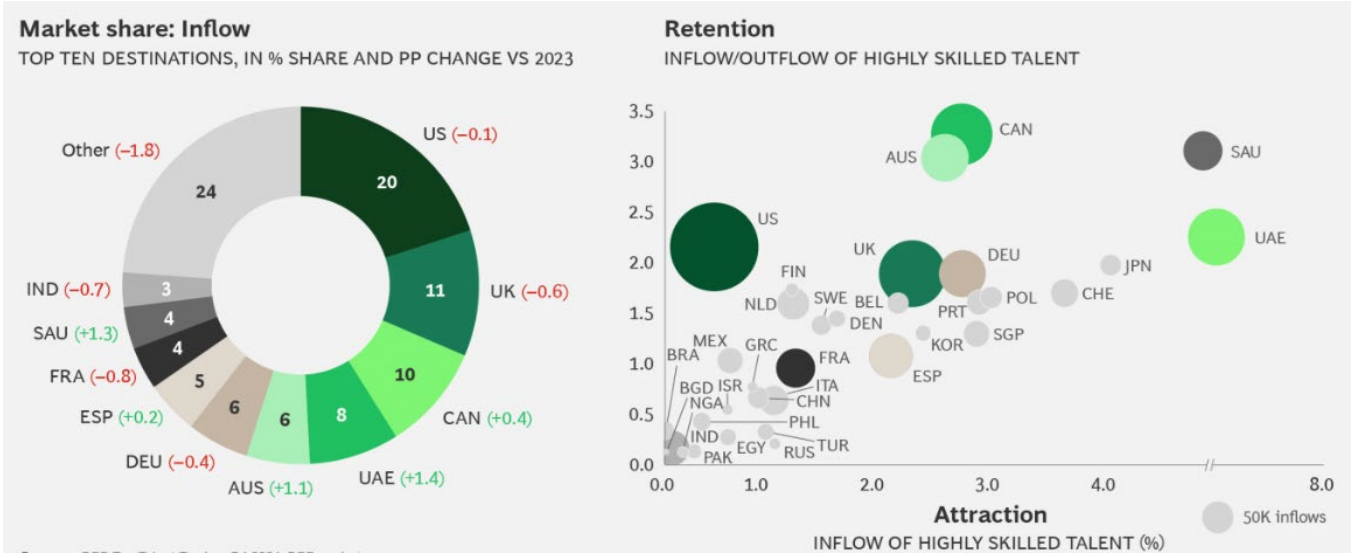
a relatively recent dataset and is only available for 2019–2022, a period that was heavily distorted by Covid, and therefore it will be helpful to see the 2023 data, when it is available. Still, it is notable that even during the Covid years, there was evidence of positive net migration into Saudi Arabia, with the number of people in the highly educated category arriving in the Kingdom exceeding the number departing by on average 14% in 2019–21, rising to 60% in 2022 (Figure 8). The 2022 ratio was the 10th highest globally, only narrowly surpassed by the UAE; the remaining 8 countries in the top 10 were all in Europe and North America. Looking at the four-year average, Saudi Arabia's

Figure 8: LinkedIn Highly Educated Relocations (% Arrivals/Departures)



Source: World Bank/LinkedIn, Khaliy Economics.

Figures 9 and 10: Attraction and Retention of Highly Skilled Talent



Source: BCG Top Talent Tracker.

+26% net inward migration ratio was well ahead of its Gulf peers. The LinkedIn dataset also provides growth trends by sector, although this is across all educational levels. The strongest increases in Saudi Arabia in 2022 were in construction (147% y/y), oil (82%), and professional services (74%). That fits with other evidence of a surge in employment in construction, to work on gigaprojects, and in professional services, as many consultancies established themselves in the Kingdom to advise on Vision 2030 and related economic activity.

A more recent and even larger mobility survey is BCG's Top Talent Tracker, which partnered with workforce analytics firm Revelio Labs to collect a year of mobility data (until September 2024) from a variety of professional social networks that included around 200 million highly skilled workers, of whom 2.4m were mobile during the year (Harnoss et al, 2024). Its data found that the UAE was the fourth most popular location and Saudi Arabia the 9th, attracting 8% and 4% of the relocating migrants in the sample. The Gulf states were also the countries registering

the largest annual increase in their shares of inflows, with Saudi Arabia's share increasing by +1.3pp (Figure 9). In addition, Saudi Arabia recorded the second-highest retention ratio, after Canada, with an inflow/outflow ratio of over 3, as shown on the y-axis in Figure 10, which is even higher than in the 2022 LinkedIn data (it would be equivalent to +300% in Figure 8).

What Policies Might Enhance Attractiveness?

This paper has argued that Saudi Arabia has an economic interest in attracting migrants, particularly (but not only) highly skilled ones in sectors relevant to its economic development. It has looked at various studies and measures of talent competitiveness and attractiveness to migrants and noted that the Kingdom performs reasonably well in some of these, although it lags behind some GCC peers, particularly the UAE. The empirical data on migration from domestic and third-party data suggests there has been a strong inflow of highly skilled migrants in recent years. However, more could certainly be done to both attract and retain migrants. The following is a non-exhaustive list of proposals for possible reforms and initiatives that might help.

Enhancing Immigration and Residency Policies

- Saudi Arabia has made significant progress in recent years in simplifying the immigration system and improving labour mobility. This has included changes to the labour law in 2021 which permitted workers to change employers when their existing contract expires and removed the need for employers to approve exit permits.

- The launch of Premium Residency, which does not require a sponsoring employer, was another important development.[10] However, the main Premium route is costly (SAR 800,000 or SAR 100,000/year), and some other Gulf states have much more accessible options, such as the UAE's 5-year Green Visa, which costs only 3% of Saudi Arabia's annual Premium Residency (Khaleej Times, 2022). There was a welcome expansion of the programme this year with the launch of several new and more affordable categories, including the "Special Talent Residency" for scientists and healthcare professionals.

- There are advantages in reducing the general cost and complexities of visas and pathways to stable long-term residence. This could also be fast-tracked for other high-priority sectors, such as finance, technology and professional services.

- Establishing partnerships in key source countries could help promote the Kingdom, streamline recruitment, facilitate mutual recognition of qualifications, and reduce bureaucratic hurdles.

Improving the Quality of Life

- The results from the city liveability indices fit with anecdotal reports that this is a barrier to working and residing long-term in Saudi Arabia. More importantly, improving liveability is also beneficial for nationals.

- There is a wide availability of literature on urban liveability, spanning issues such as access to services, congestion and pollution, access to green spaces, and leisure opportunities. Many of the developments underway in Saudi Arabia should help towards this goal. The Riyadh Metro will improve mobility and congestion, King Salman Park will provide a major green space and leisure opportunities, as will other developments such as Riyadh Boulevard, a high-end retail and entertainment district, and Qiddiya, a theme park city being developed on the edge of Riyadh.

- Affordable housing options are often a challenge for expatriates (and indeed for nationals), particularly in Riyadh. Improving access to a range of housing suitable for both single professionals and families would improve the overall attractiveness of the Kingdom.

- Quality of life is one of the central goals in the development of NEOM, a gigaproject in the northwest. If properly realised it could make the region an attractive destination for global talent.

Supporting Migrant Families

- Surveys reveal that highly skilled migrants with families place a high priority on living conditions for their dependents. This is partly related to quality of life overall, but it also includes specific family-related policies.
- Facilitating work permits for spouses would be supportive of migration and beneficial to building talent because highly skilled migrants often have highly skilled spouses.
- Access to good schools is a major disincentive for relocation to Saudi Arabia and some workers place their families in neighbouring countries such as the UAE for this reason. This has been recognised as an issue and there has been an encouraging surge of investment into education, with the number of investment permits issued rising by 86% y/y in Q2 2024 (Barakati, 2024) and a coordinated effort by the Ministry of Investment and Royal Commission for Riyadh City, alongside the Ministry of Education, to attract international schools (Saudi Gazette, 2024). However, there is a significant lead time to establish successful schools.
- The dependents levy, which costs SAR 4,800 ($1,280) annually to renew the residency permits of dependent spouses and children, is both a financial disincentive and arguably sends a message that families are not welcome. The Minister of Finance, Mohammad al-Jadaan, mentioned that changes to the levy are being considered as part of plans to attract talent (Arab News, 2024).

Improving Working Conditions and Protections

- Strengthening labour rights, including protections against unfair termination and implementing reforms such as offering flexibility in working hours, remote work options, and improving employee welfare would enhance work-life balance. As noted above, Saudi Arabia scores poorly on the "personal rights" indicator in INSEAD's Global Talent Competitiveness Index. The National Transformation Program targets several KPIs, including compliance with the wage protection programme, which ensures reliable payment of salaries, and what seems to be an internally assessed indicator of improvements in working conditions.
- Saudi Arabia has made significant progress in recent years in inclusive policies that promote gender equality and encourage women's participation in the workforce. As these changes continue and become more widely understood, Saudi Arabia should become more attractive, especially for highly skilled female professionals.
- A longstanding issue in the GCC is that remuneration can be linked to a migrant's country of origin rather than their skills and expertise. It means that in some case a migrant with multiple nationalities can receive substantially different remuneration when applying for a job under one of their passports instead of another (say Canadian rather than Lebanese). This practice has been reported in Saudi Arabia, and discouraging it would help attract talented workers, regardless of their nationality.

Facilitating Social Integration

- Offering language and cultural training programmes for expatriates can help skilled migrants integrate more easily. Promoting multiculturalism and fostering inclusiveness will improve the experience of living in the region.
- Establish or support national, professional networks and industry associations for expatriates (along with nationals) in key sectors. Such networks can provide support in getting established, career growth opportunities, and help in integration into the local workforce. They could also help in outreach to attract new talent.

The GCC region is one of the most appealing destinations for highly skilled migrants and Saudi Arabia has made significant progress in the last five years in improving its offering to expatriates. However, there is more that can be done to attract talent and create a legal and social environment that encourages them to not just fly in as short-term consultants but to bring their families, establish roots, and invest their skills and energy to contribute toward the Kingdom's long-term development objectives.

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Endnotes

1 This perspective on migrants is discussed in detail in my paper *Enablers or Obstacles? The Approaches of Gulf States to Migrants in Relation to Their Economic Visions* (Alexander, 2025).

2 It is important to note that while there does seem to have been extremely positive employment trends in recent years, there is some uncertainty as to the magnitude of the change because of weaknesses in historical data for population and hence the labour force survey ratios. The 2022 census led to significant downward revisions in estimates for the population of Saudi nationals, including by a quarter in 2010 (see Alotaiba and Mikayilov, 2024).

3 This analysis is based on employment that falls under social insurance regulations. The employees subject to social insurance are mainly in the private sector, but about 5% of this group are public sector workers outside of the civil service. The civil service is not included in this data set and employs about a third of Saudis but very few migrants (they comprise just 3% of the civil service). Domestic service is also not in the social insurance dataset and employs nearly a third of migrants, but no Saudis. Given this stratification, which is unlikely to change, the civil service and domestic work sectors are not of interest when considering the competition between migrants and Saudis for jobs. There may be a need to attract some skilled migrants into certain roles within the civil service, but there is no data in the labour market surveys to shed light on their occupational groups, and anyway this is a very small part of the migrant labour force. The recruitment of domestic workers also differs from efforts to attract highly skilled migrants, and is outside the scope of this paper.

4 More information on the ISCO 08 classification is available here: https://ilostat.ilo.org/methods/concepts-and-definitions/classification-occupation/. The Ministry of Human Resources and Social Development also has a Saudi Standard Classification of Occupations, which is based on the main ISCO 08 groups, available at https://www.stats.gov.sa/en/page/292.

5 It is important to note that there are likely to be biases to the results from the sampling methodology and the widely different numbers of respondents by country. Inclusion in the index requires at least 50 responses from a country, which is less than 0.5% of the survey size, whereas in 2024 nearly 10% responses were from Germany and 6% from the UAE.

6 The BCG report, unfortunately, does not show the full rankings, only the top 10 destination countries – which are all in the OECD, bar Singapore – and the top 30 destination cities, in which the only Middle Eastern cities are Dubai and Abu Dhabi, ranked at 3rd and 4th, after London and Amsterdam (which makes it surprising that the UAE didn't make the top 10 countries). A press release from BCG mentioned that Riyadh ranked at 54th (BCG, 2024).

7 The EIU's Global Liveability Index and Oxford Economics' Global Cities Index.

8 The number of employees in Occupational Group 10, which is the catchall for other occupations and comprises less than 1% of the total, nearly halved compared with a year before. This is a surprising result and probably indicates that some of the roles here have been recategorised into other occupational groups. It has therefore been excluded from the trends graph.

9 https://www.stats.gov.sa/sites/default/files/GDP%20Q2%202024E_V3.pdf.

10 https://pr.gov.sa/.

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International Science Faculty in Saudi Arabia: Research Experiences and Challenges

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Abstract

Saudi Arabia's Vision 2030 aims to transform Saudi's oil-dependent economy into a more diversified and innovative one. Central to this mission is the development of scientific innovation hubs in the country centred around its universities. This has led to increased demand for qualified personnel with the requisite scientific training and skills to produce research in the priority areas identified by the Saudi government. But has this vision of increased research productivity materialised? Our empirical analysis of an open-source dataset, consisting of approximately 240 million publications and spanning over a century of scientific research, reveals a significant increase in the number of authors, productivity, and impact of research articles published by Saudi institutions over the past decade, with KAUST the clear leader. We also conducted an online survey of 152 non-native faculty and postdoctoral researchers working in either the biological sciences or computer science at Saudi universities. Aligned with our big data analysis, faculty survey respondents reported an improvement in their research productivity after moving to Saudi and expressed strong job satisfaction. However, follow-up interviews with 32 faculty members across 11 universities in the country revealed six key research challenges: (1) Insufficient and hard-to-access research funding, (2) workload and time management issues, (3) inadequate research facilities and supply chain issues, (4) the lack of availability and poor quality of research support staff and students, (5) a lack of career advancement opportunities and job insecurity, and finally, (6) inefficient research administration and management. The prevalence of these issues varied across different types of universities but, taken together, our findings highlight specific areas the Saudi government should focus on in order to strengthen its nascent university research ecosystem and make the country more attractive to overseas scientific talent.

Introduction

Launched in 2016, Saudi Arabia's Vision 2030 aims to transform the Kingdom's oil-dependent economy into a more diversified and innovative one (Kingdom of Saudi Arabia 2016). Key to this mission is the development of scientific innovation hubs in the country, centred around its universities (Mitchell and Alfuraih 2018). There is a clear mandate for these universities to not only educate the next generation of Saudi scientists but also produce high-quality research that benefits the nation economically and raises the international profile of Saudi's higher education sector (Kazim et al. 2024). This has led to increased demand for qualified foreign personnel with the requisite scientific training and skills to staff these universities and produce research in the priority areas identified by the Saudi government (Alsudairi, Hai and Alahmad 2023). However, given the relative nascence of these Saudi research hubs, recruiting and retaining scientific talent to the country can be challenging if the research environment in these institutions has not yet matured (Mazi and Altbach 2013; Kazim et al. 2024).

This paper assesses the contemporary scientific research landscape in Saudi Arabia in two of the country's priority areas – the biological sciences and computer science. From our analysis of an open-source dataset that consists of approximately 240 million publications authored by 100 million authors and spanning over a century of scientific research, we find that there has been a noticeable increase in Saudi institutions' research productivity and impact over time. The concomitant rise of citations of Saudi-produced publications further signals the growing recognition and influence of Saudi research, driven largely by its universities and research centres. We followed up this large-scale analysis with an online survey of 152 faculty and postdoctoral researchers working in either the biological sciences or computer science at Saudi universities, and in-depth interviews with 32 faculty members across 11 universities in the country, to investigate foreign scientists' personal experiences conducting research in Saudi Arabia. Aligning with our big data analysis, our survey data reveals that faculty experienced an overall increase in their research productivity after moving to their current Saudi institution, though there was a clear distinction between faculty at the King Abdullah University of Science and Technology (KAUST) and other universities. During their interviews, faculty detailed their ongoing research challenges. Our findings highlight specific areas for improvement that the Saudi government and university leadership should focus on in order to strengthen the country's university research ecosystem, improve research quality, quantity and efficiency, and make the country more attractive to overseas scientific talent.

Background to Saudi Arabia

Higher education in Saudi Arabia is a relatively modern phenomenon, with its first university, King Saud University (KSU), only established in 1957 more than 20 years after the country's formation. The remainder of the 20th century saw a small number of additional universities established to address specific regional and national needs. But as it entered the 21st century, Saudi Arabia embarked on an ambitious journey to reform and upgrade its educational landscape. In 2002, the country launched its National Science, Technology, and Innovation Plan to develop a competitive scientific R&D sector by 2025 (Alsudairi, Hai and Alahmad 2023). In 2005, Saudi launched the King Abdullah Scholarship Program (KASP), the largest student overseas programme worldwide (Bukhari and Denman 2013). Originally intended to run for only one year with the USA as the only destination for Saudi students (Ottaway, 2012), the number of overseas Saudi students sponsored by KASP rose to 185,000 by 2014 and now covers more than 20 countries (Hilal et al. 2015). The goal of KASP was to give Saudi youth access to the best university education in the world and create a skilled workforce that could contribute to national needs upon their return to Saudi Arabia.

At the same time KASP was launched, the country began upgrading its domestic university sector. In 2009, the King Abdullah University of Science and Technology (KAUST) was founded as a graduate-only research university focused on the domains of food and health, water, energy, environment, and IT (AlSaywid et al., 2024). While most Saudi universities are tightly controlled by the government with university presidents nominated by the Minister of Higher Education and appointed by the king, KAUST was set up as an autonomous university, allowing it to attract, recruit, and retain world-renowned researchers without government intervention or endorsement. KAUST has quickly established itself as a rising star in the region, having ranked 19th in the world in Nature's 2016 listing of fastest-rising research universities [1], in the top 10 among fastest rising young universities under 50 years in 2019[2], and number one in the Times Higher Education's (THE) Arab University listings in 2023 [3], Other universities in Saudi operate under a different mandate, with greater emphasis on teaching, but they too have been under increasing pressure to increase their research footprint and international standing (see Table 1).

Given the relative infancy of its higher education sector (comprising 29 public [4] and 37 private [5] universities), the rapid rise of Saudi Arabia's universities is remarkable. Three Saudi universities are now in the top 200 of the QS World University Rankings list for 2025: King Fahd University of Petroleum and Minerals (KFUPM), King Abdulaziz University (KAU), and King Saud University (KSU) [6]. Meanwhile, the Times Higher Education global rankings for 2024 place KFUPM and KAU in the top 201–300 universities in the world [7].

Table 1: Top Universities in Saudi Arabia

University	Year Founded	Size of Student Body	% of International Students	Size of Faculty Body	% of International Faculty	QS World Ranking	THE Ranking
King Abdullah University of Science & Technology	2009	1,054 (Grad only)	64	145	97	Unranked	Unranked
King Fahd University of Petroleum & Minerals	1963	10,000+ (Grad & Undergrad)	17.50	1,015	76	180	201–250
King Abdulaziz University	1967	59,538 (Grad & Undergrad)	4.56	4,566	41	143	251–300
King Saud University	1957	30,006 (Grad & Undergrad)	13.20	3,869	50	203	401–500
King Khalid University	1998	34,491 (Grad & Undergrad)	13.50	4,957	65	761–770	501–600

Sources: University websites, Times Higher Education and QS 2024 World University websites.

The focus on improving the country's university sector is in line with Vision 2030, an ambitious plan launched by King Salman in 2016 to diversify the country's economy and initiate social reform (Kingdom of Saudi Arabia 2016). As part of this vision, significant attention was given to education, particularly in the STEM fields (Mitchell and AlFuraih, 2018). The plan aims to transform Saudi Arabia into a knowledge-based economy by enhancing its higher education institutions and establishing collaborations with international universities and research centres. Funding for research has also been substantially increased in recent years (AlHuthali and Sayed 2022).

Biological and health research has been identified as a priority area, given the relatively frequent incidence of genetic disorders in the indigenous population and the desire for agricultural advancements that account for Saudi's desert climate. In the domain of computer science, artificial intelligence (AI) is another focal point for investment, along with cybersecurity, 'smart city' digitisation, and autonomous robotics (Alsudairi, Hai and Alahmad 2023). In response, Saudi universities have been revising their STEM curricula to align with global standards and there is growing focus on industry-relevant projects. However, there are contradictory reports on the success of these efforts. Some scholars have found that Saudi researchers are publishing more STEM-related papers in international journals (AlHuthali and Sayed 2022), but others report that publication rates are below the world average and not very impactful (Alharbi 2016; AlShayea 2015). It is also not clear how recent Saudisation efforts are impacting the competitiveness of the higher education sector (Bunaiyan 2019). These conflicting reports highlight the need for a more systematic assessment of the changing research landscape in Saudi Arabia and how scientists in the country view their research productivity.

Analysis and Findings

The data used in this paper is drawn from a larger project studying scientist migration to the Arabian Gulf countries of Saudi Arabia, Qatar, and the UAE. The project employed a mixed-methods approach, combining large-scale data analysis of the institutional trajectories of faculty at universities in these three countries, an online survey of non-native research scientists working there, and in-depth interviews with a smaller group of these scientists. Among these three Gulf countries, Saudi Arabia has produced the largest number of publications and hosted the largest number of scientists over the past decade, followed by the UAE and then Qatar.

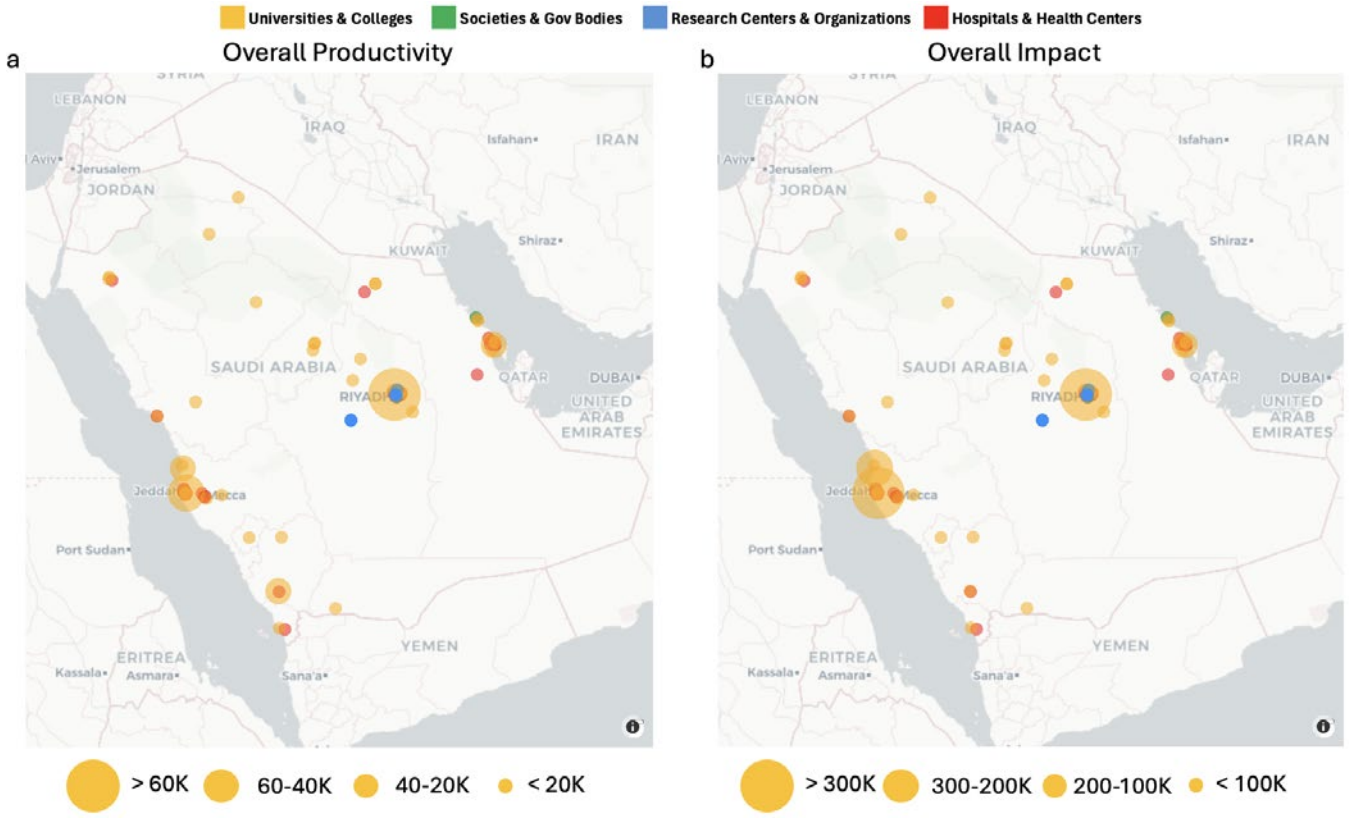
Big Data Analysis

To gain a comprehensive overview of the publication and migration patterns in Saudi Arabia, we utilised OpenAlex[8] (OA), a widely used, open-source dataset that consists of approximately 240 million publications authored by 100 million authors spanning over a century of scientific research. The dataset includes information such as authors' affiliations, fields of study, publication years, citation networks, and more. Using the affiliation data from OA, we identified 125 institutional affiliations in Saudi Arabia, which we categorised into four groups: (1) Universities and Colleges, (2) Societies and Governments, (3) Research Centres and Organisations, and (4) Hospitals and Health Centres. To measure the impact of these publications, we used both c_2 and c_5, pre-established measures in the literature on the workings of scientists, that calculate the number of citations up to two and five years post-publication.

We began our exploration by examining the research landscape of Saudi Arabia, focusing on the distribution of research productivity and impact across different cities. We found that most Saudi research originates from Riyadh, Jeddah, and Thuwal (home to KAUST), and that the majority of this research is produced by universities and colleges (see Figure 1). Furthermore, as seen in Figure 2, there has been a noticeable increase in both productivity and impact over time, with two significant spikes corresponding to the launch of KAUST and the announcement of Vision 2030. This trend is also evident in the rise of citations, indicating growing recognition and influence of Saudi research.

Amongst the top five most productive and impactful universities in Saudi Arabia, King Saud University (KSU) led in terms of both overall research productivity and impact (see inset graphs in Figure 2). However, when considering the most impactful research based on average citations per publication, particularly in recent years, KAUST emerged as the leader with an average of 13.4 citations per publication versus 6.9 for KSU, demonstrating its growing influence and the high quality of its research contributions. (For a full list of the universities and colleges in Saudi Arabia and their ranking according to our dataset in terms of productivity and impact, refer to Supplementary Table 1.)

Figure 1: Saudi Arabia's Research Landscape.



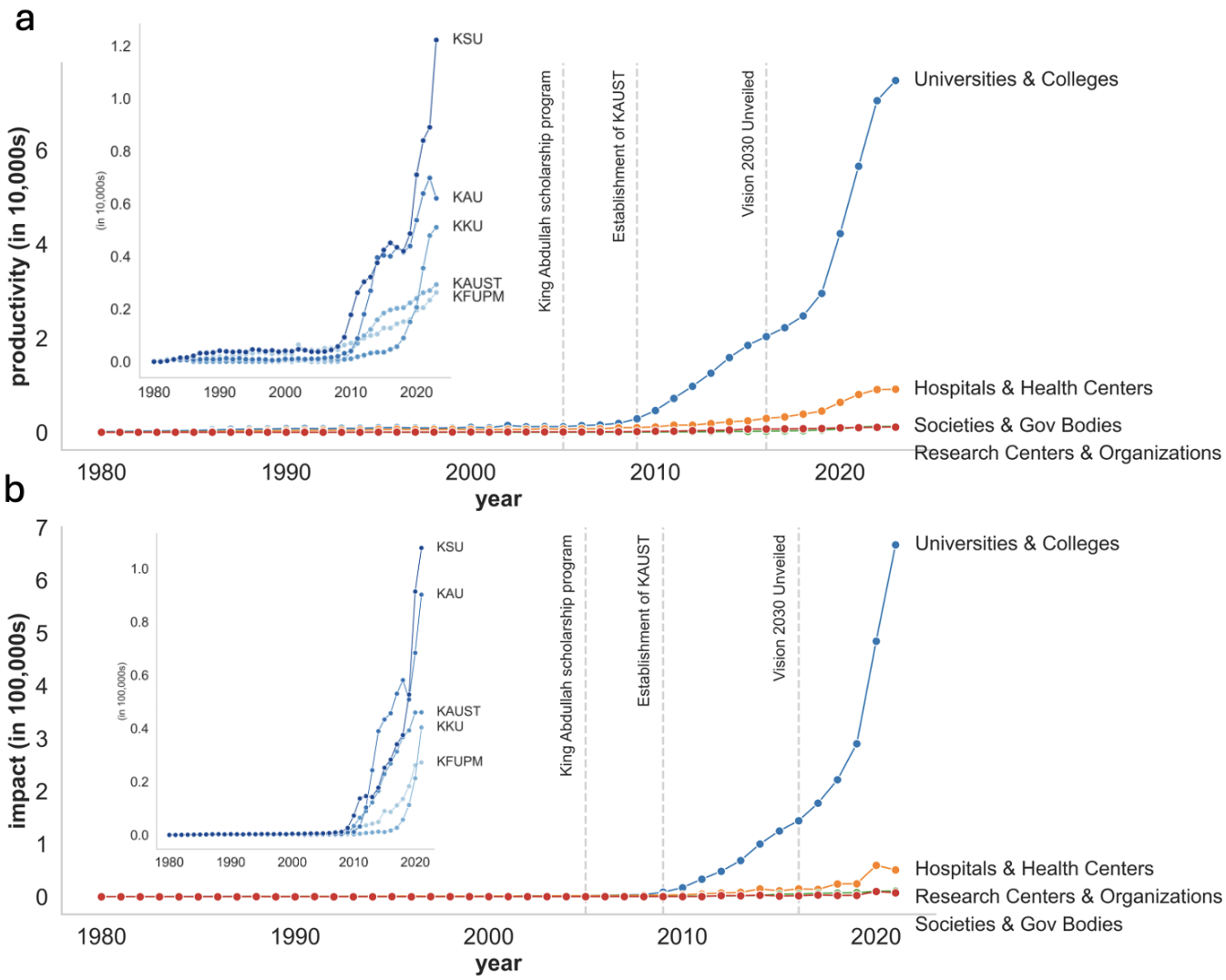
(a) presents the overall distribution of research productivity across different cities in Saudi Arabia. The size of the circles indicates the number of publications, while the colour of the circles represents the type of research institute producing them. **(b)** shows the same distribution but for research impact (c_2) instead of productivity. A similar plot for c_5 can be found in Supplementary Figure 1.

We subsequently limited our analysis to universities and colleges and delved into the authors and fields that Saudi Arabian universities attract by plotting the number of authors in the 19 main fields of science over time (see Figure 3a). We also tracked the number of publications from such universities and colleges in each field to assess their impact. As Figure 3 shows, we found that the top five fields that have attracted the most authors over time are medicine, biology, chemistry, computer science, and physics. Not only did these fields draw the most authors, but they also led in terms of research productivity and impact. Notably, biology stood out as the top field in terms of both productivity and impact, underscoring its central role in Saudi research output.

Moving forward, our focus narrowed to two of the top five scientific fields in Saudi Arabia by the number of scientists (Figure 3a): biology and computer science. Biology was chosen for its leading role in both productivity and impact (as mentioned earlier), while computer science was selected for its distinct nature, which significantly differentiates it from the other top scientific disciplines: biology, medicine, chemistry, and physics. Unlike these fields, computer science is inherently much more interdisciplinary, rapidly evolving, and deeply integrated with recent technological advancements, making it a unique area of study (Dabu 2017). By examining computer science alongside biology, we aimed to explore a diverse range of research dynamics. This comparison also allowed us to uncover valuable insights into how these two fields contribute to the broader scientific progress in Saudi Arabia, and their unique challenges and opportunities.

Building on the results above, we directed our analysis toward the top three Saudi institutions (KSU, KAU, and KAUST) attracting biologists and computer scientists who

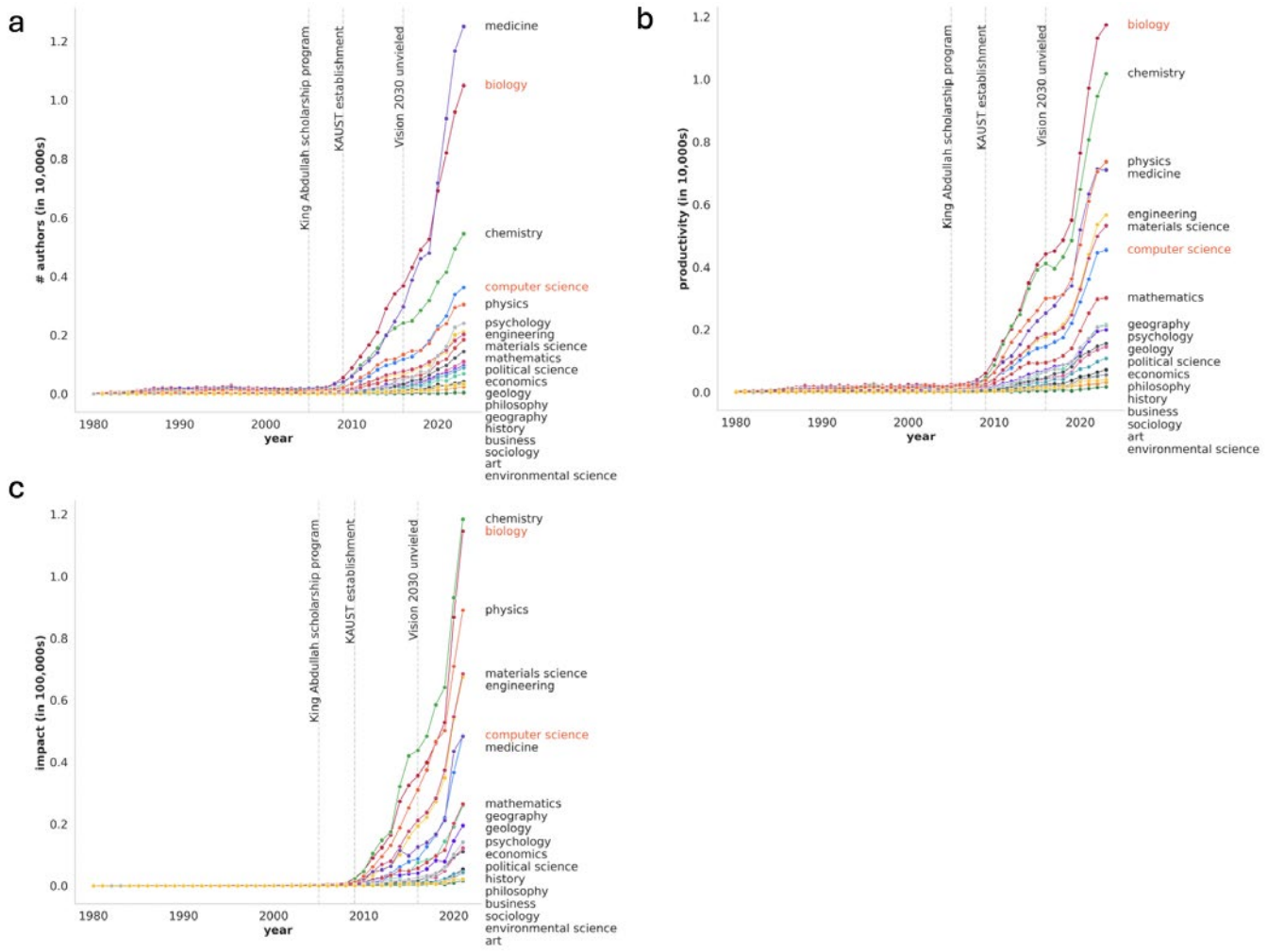
Figure 2: Research Productivity and Impact Over Time.



(a) depicts productivity trends across our four categories of research-producing institutions. The inset highlights the productivity of the top five most research-productive universities in the country. **(b)** presents similar trends over time but focuses on research impact (c_2) instead of productivity.

are either migrating or moving back to Saudi (see Supplementary Tables 2 and 3), focusing on the countries of the institutions these scientists were previously affiliated with. (Given that we did not have the ability to discern nationality from the author names, this analysis includes Saudi scholars who were trained overseas and were returning to their country of citizenship.) To gain deeper insight into the factors attracting established scientists to Saudi Arabia, we refined our analysis to include only those with at least five years of research experience prior to relocating. We then conducted a preliminary comparison of their average annual productivity, impact per publication, and number of collaborators before and after their move to Saudi Arabia. To analyse this, we used each scientist's first year of publication at a Saudi institution as a proxy for their migration year (labelled as year 0). We then examined their average annual productivity over a period of five years *before* the move (years –5 to –1) and five years *after* the move (years 1 to 5). This allowed us to assess changes in different outcomes before and after their migration to Saudi.

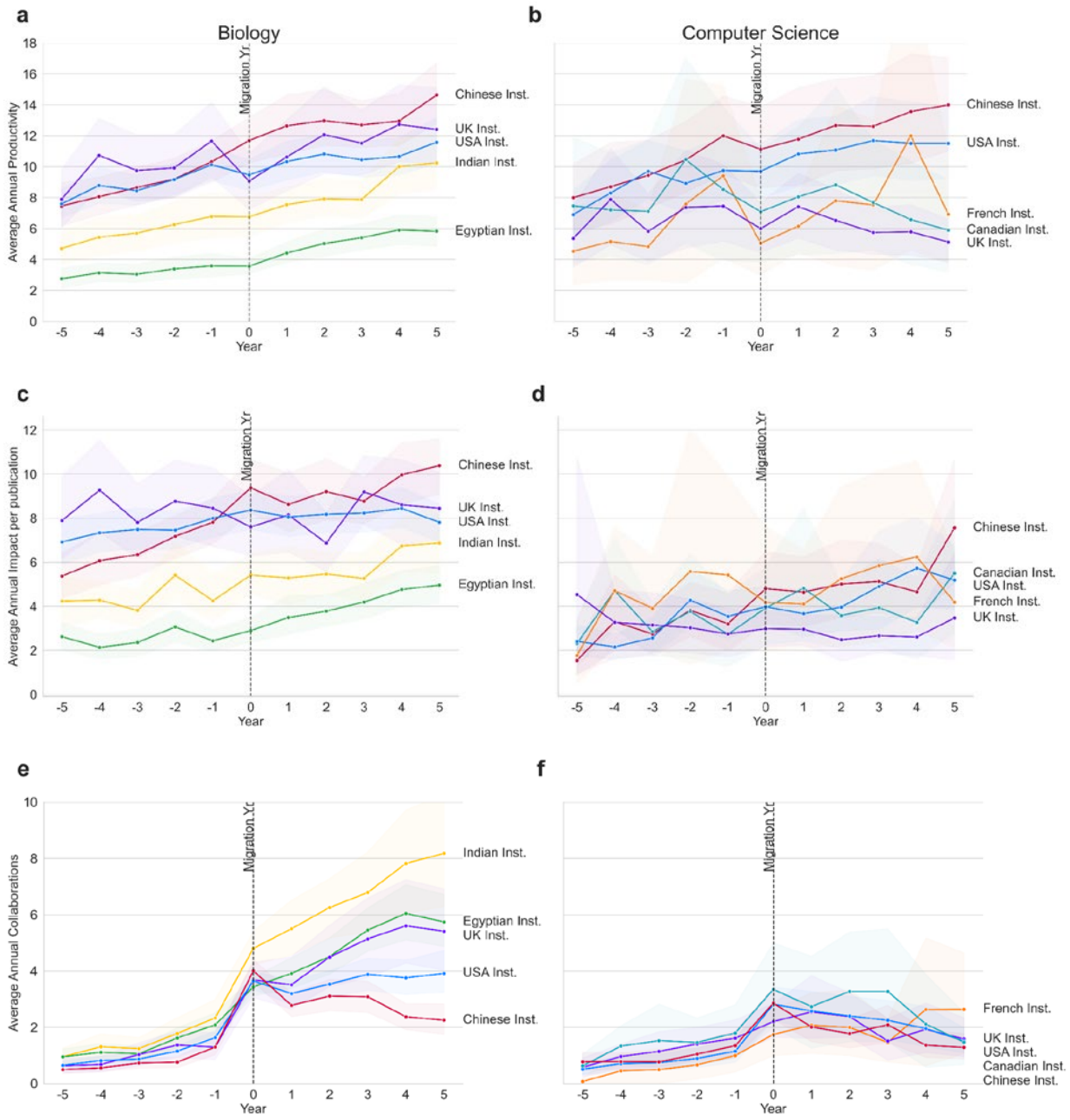
Figure 3: Distribution of Scientists, Publications, and Impact Over Time and Across Different Fields of Science.



(a) presents the number of authors across 19 fields of science over time in all research-productive universities and colleges in the country. **(b)** depicts similar trends in terms of productivity, highlighting the number of publications produced. (c) depicts similar trends but in terms of impact (c_2). A similar plot for c_5 can be found in Supplementary Figure 2.

In Figure 4, we focus on the top five countries that scientists were affiliated with prior to moving to Saudi institutions in either biology or computer science. As shown in Figure 4a, biologists who made the transition appear to have steadily increased their productivity over time, with significant growth observed after their relocation. This suggests a positive impact on their scientific output post-move. However, in the case of computer scientists, the positive trend is primarily observed among those coming from US and Chinese institutions, while scientists from other countries show less pronounced or stagnant productivity increases (Figure 4b). Additionally, biologists seem to have benefited not only in terms of increased productivity but also in terms of annual impact and number of collaborators (Figure 4c and e). In contrast, the same level of improvement is not clearly seen among computer scientists from the top countries that Saudi Arabia attracts talent from (Figure 4d and f).

Figure 4: Trends in Scientific Productivity, Impact, and Collaboration Before and After Moving to the Top Three Saudi Institutions, Segregated by Top 5 Countries of Prior Institution.

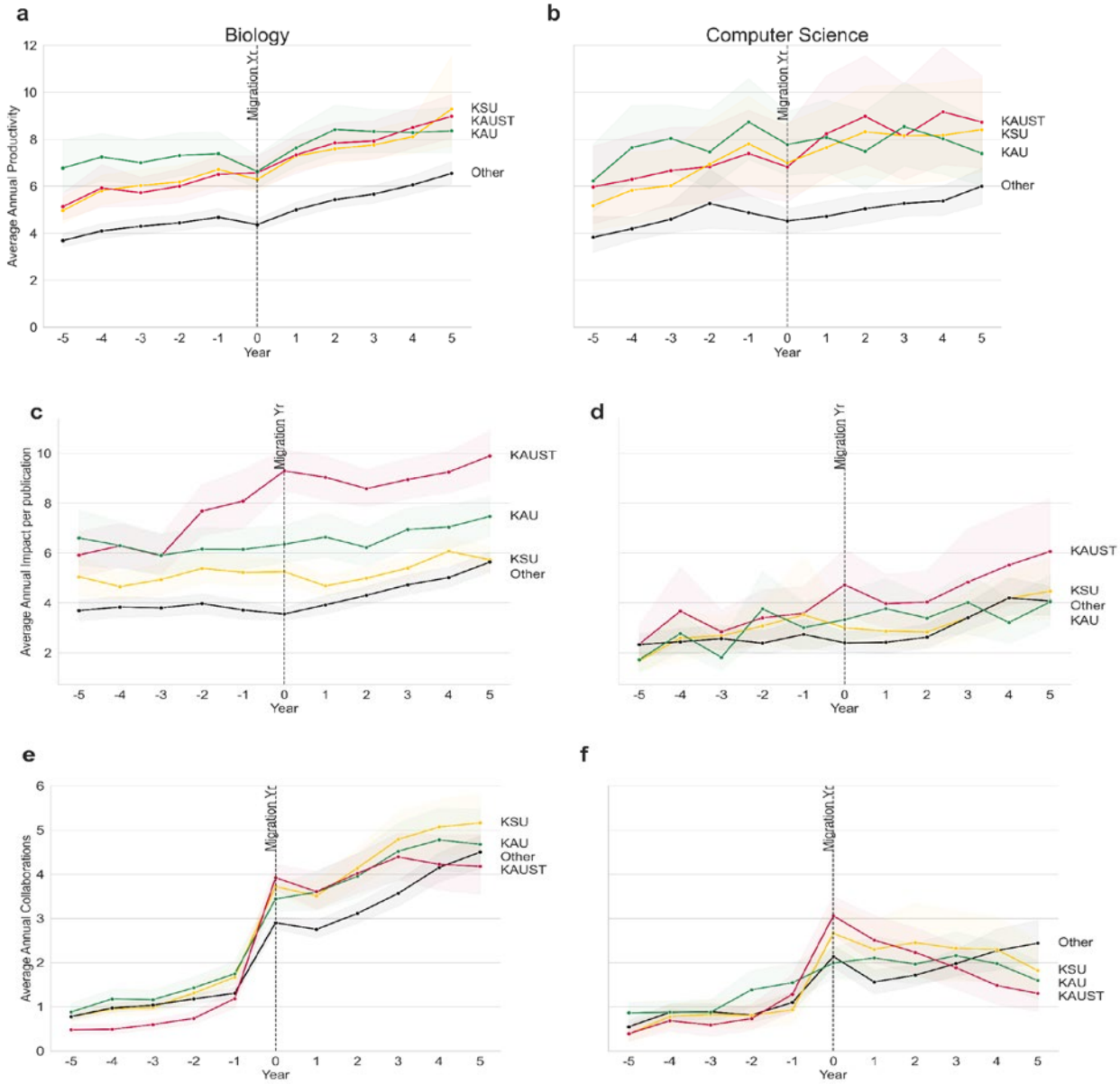


(a)–(b) Productivity trends of biologists and computer scientists respectively from the top five countries they were affiliated with prior to moving to Saudi institutions. **(c)–(d)** Impact trends for biologists and computer scientists respectively. **(e)–(f)** Collaboration trends for biologists and computer scientists respectively.

We also analysed the trends of scientists at each of the top three Saudi institutions – KAUST, KSU, and KAU – compared to other institutions in Saudi Arabia. Scientists migrating to KAUST, KSU, and KAU generally showed a strong post-migration performance in terms of productivity and impact (see Figure 5). However, KAUST appears to have a slight competitive edge, with its scientists demonstrating superior productivity and impact (Figures 5a-d). Similar positive trends are observed in the collaboration patterns of biologists, with the exception of KAUST.

Interestingly, for computer scientists, while there is an initial surge in collaboration immediately following the move, this number declines significantly over time. Despite KAUST

Figure 5: Trends in Scientific Productivity, Impact and Collaboration Before and After Migration to the Top Three Saudi Institutes, Segregated by Top 3 Saudi Universities.



(a)–(b) Productivity trends of biologists and computer scientists respectively from the top three Saudi universities compared to the rest of the universities and colleges in Saudi. **(c)–(d)** Impact trends for biologists and computer scientists respectively. **(e)–(f)** Collaboration trends for biologists and computer scientists respectively.

scientists being the most productive and impactful, the data shows that they tend to engage in fewer collaborations compared to their peers at other institutions. This could suggest a more selective approach to choosing collaborators, which also might contribute to their high productivity and impact.

Survey and Interview Analysis

In addition to this bird's eye view of the changing research landscape in Saudi Arabia, we also wanted to hear directly from scientists about their personal experiences conducting research in the country. We first conducted a survey of scientists who met the following eligibility criteria:

- Hold a PhD or equivalent terminal degree in biological science or computer science broadly defined
- Work as a faculty member, principal investigator or postdoctoral researcher in a university or research institute
- Currently live and work in Saudi Arabia
- Not a citizen of the country.

Given that Saudi will need to recruit non-native faculty to its universities in its bid to develop its knowledge economy, it is useful to understand non-native scientists' experiences in the country. We chose not to include Saudi nationals in our study as they could have unique personal reasons for choosing to work in Saudi Arabia. It is the attractiveness of Saudi Arabia as a destination for *international* research talent – those without extant personal ties to the country – that can attest to its growing standing within scientific circles.

In order to identify as many eligible participants as possible, we compiled a list of research universities in Saudi Arabia. From this list, we then compiled a list of all research scientists working in these universities and institutes in the fields of computer science or biological science by extracting them from Google Scholar. Authors not belonging to the computer science or biological sciences fields were filtered out. Once we had a complete list of all relevant scientists in a given university, we manually collected each scholar's professional email address, since Google Scholar does not offer this information publicly. From our initial list of 6,285 scientists, we were able to locate the contact information for 5,509 with valid professional email addresses.

Institutional Review Board (IRB) approval for the project was secured in December 2023. Thereafter, we emailed these scientists with an invitation to complete an anonymous 10- to 15-minute online survey about their research and migration experiences. Out of the 5,509 scientists we emailed, the response rate for the surveys was 6.5 percent. At the end of the survey, respondents who self-identified as faculty were asked whether they would be willing to participate in an anonymous 90-minute interview. Interested participants were offered a $50 Amazon gift card redeemable in their country. For this paper, we focus on the data collected from non-native scientists in Saudi Arabia: 106 survey responses from faculty members, 46 survey responses from postdoctoral research fellows, and 32 faculty interviews. Interviews were conducted in person or via Zoom and were recorded with the interviewee's permission. All individual and institutional names have been anonymised so as to protect interviewees' identities.

Findings from the Survey Data

Table 2 provides demographic information about our 106 Saudi-based faculty and 46 postdoctoral respondents. With respect to the faculty, the vast majority were male and married, and more than half were Muslim. Despite the lack of representativeness in our survey data, we note that the high proportion of Muslim scientists in our sample speaks to the unique appeal of Saudi Arabia (and the Gulf more broadly) for Muslim scientists. In terms of nationality, 40 percent of faculty came from South Asia, with another 20 percent coming from the Middle East and North Africa region. India was the largest source country with 25 percent of faculty holding Indian nationality, followed by 14 percent holding Pakistani nationality. Only a quarter of faculty held European or North American nationality. Interestingly, there were several points of divergence between the faculty and postdoctoral researchers we surveyed, indicating the two groups may choose Saudi Arabia as a research destination for different reasons. While most postgraduate researchers were male and married, only a quarter of them indicated that they were Muslim. Instead, the most common category was "Atheist/Agnostic" (just under 40 percent). Meanwhile, the top region of nationality among postdoctoral researchers was Europe (42.2 percent).

Table 3 provides some professional details about our survey respondents. Both faculty and postdoctoral researchers were quite evenly divided between biological scientists versus computer scientists. Amongst our faculty respondents, there were slightly more assistant professors (35.9 percent) than associate and full professors (26 percent for each group). But there were significant differences between faculty and postdoctoral researchers in terms of the countries where they completed their PhDs. Amongst faculty, the most common PhD countries were India, the United States, the United Kingdom, Germany, and Malaysia in declining order, demonstrating how Saudi universities recruited faculty from a wide range of countries. Overall, only 40 percent of faculty respondents held PhDs from Western universities. Meanwhile, for postdoctoral researchers, the top PhD country was Saudi Arabia with a quarter of these respondents staying on after completing their PhD in Saudi itself. The other common PhD countries for postdoctoral researchers were France, Germany, Brazil, and Italy.

Table 2: Demographic Characteristics of Survey Respondents in Saudi Arabia

Characteristics	Faculty N = 106	Postdoctoral Researchers N = 46
Gender		
Male	69.8%	69.6%
Female	23.6%	23.9%
Prefer not to say/Blank	6.6%	6.7%
Religion		
Muslim	62.3%	26.1%
Christian	13.2%	8.7%
Hindu	2.8%	–
Atheist/Agnostic	8.5%	39.1%
Prefer not to say	13.2%	26.1%
Top Region of Nationality		
South Asia	41.5%	13.0%
Middle East and North Africa	19.8%	4.4%
Europe	17.0%	41.3%
North America	10.4%	8.7%
Sub-Saharan Africa	5.7%	4.4%
East Asia	1.9	19.6%
Age		
<30 years	–	6.5%
30–40 years	12.3%	67.4%
40–50 years	40.6%	13.0%
50–60 years	34.0%	4.4%
60+ years	8.5%	2.2%
Blank	4.7%	6.5%
Marital Status		
Married	87.7%	65.2%
Never been married	1.9%	26.1%
Other (Divorced, Widowed, etc.)	5.7%	2.2%
Blank	4.7%	6.5%
Number of Children		
0	8.5%	47.8%
1	17.0%	21.7%
2	36.8%	19.6%
3 or more	33.0%	4.4%
Blank	4.7%	6.5%

Table 3: Professional Characteristics of Survey Respondents in Saudi Arabia

Characteristics	Faculty N = 106	Postdoctoral Researchers N = 46
Rank[#]		
Assistant Professor (or equiv. rank)	35.9%	–
Associate Professor (or equiv. rank)	26.4%	–
Full Professor (or equiv. rank)	26.4%	–
Other (Research Scientist, Lecturer, etc.)	11.3%	–
Research Area		
Biological Sciences	50.9%	54.4%
Computer Sciences	49.1%	45.7%
Top 5 Countries of PhD		
	India – 22.6%	Saudi Arabia – 26.1%
	United States – 7.6%	France – 8.7%
	United Kingdom – 7.6%	Germany – 8.7%
	Germany – 5.7%	Brazil – 6.5%
	Malaysia – 5.7%	Italy – 6.5%

[#] Respondents who had already indicated that they were faculty, were asked to indicate their rank. Four options were given: "Assistant Professor or its equivalent," "Associate Professor or its equivalent," "Full Professor or its equivalent," and "Other." Respondents who selected "Other" were asked to write out their title.

Finally, Table 4 presents the migration histories and research experiences of our survey respondents, focusing only on the faculty, but distinguishing between faculty at KAUST versus at all other Saudi universities. We decided to separate out the KAUST faculty respondents because of (as mentioned earlier) the unique set-up of KAUST as a graduate-only research university where the research support structures were designed to be as conducive as possible. On average, faculty reported that the ease of the decision to move to Saudi had been 2.9 on a 1–5 scale, meaning that it was slightly difficult for them. This was consistent across both KAUST and non-KAUST faculty. However, the factors that had influenced their decision to move to Saudi Arabia were quite different. Amongst KAUST faculty, job-related reasons were twice as important as it was for non-KAUST faculty. Religious acceptance was not considered important at all amongst KAUST faculty, while it was the third most important factor for non-KAUST faculty. Overall, faculty reported an improvement in their research productivity after moving to their current Saudi institution (3.9 on a 1–5 scale) and also expressed strong job satisfaction (3.9 on a 1–5 scale), but again there were significant differences between the KAUST and non-KAUST faculty, with the former group reporting much greater improvement on both fronts.

In order to drill down further, we asked faculty to compare specific aspects of their employment experience in their current institution versus their previous one, on a scale of –2 ("previous institution was much better") to +2 ("current institution is much better"). A score of "0" indicates that both institutions are on par with each other on a particular dimension. KAUST faculty expressed strong satisfaction with their salary and benefits, research funding, research facilities, time for research, and even leadership opportunities, relative to their previous institution. But non-KAUST faculty only expressed strong satisfaction with their salary and benefits. Meanwhile, faculty at KAUST reported that it had a weaker "institutional status and reputation" compared to their previous institution, most likely linked to the newness of KAUST and the pedigree of the universities these faculty were recruited from. These differing experiences between

Table 4: Experiences of Faculty Respondents in Saudi Arabia

Characteristics	All Saudi-based faculty N = 106	KAUST faculty N = 24	Non-KAUST faculty N = 92
Ease of Decision to Move* (on a 1–5 scale)	2.9	2.9	2.9
Change in Research Productivity% (on a 1–5 scale)	3.82	4.25	3.74
Overall Job Satisfaction (on a 1–5 scale)	3.92	4.33	3.82
Top 3 Reasons Influencing Move			
Job-related factors	36.8%	58.3%	30.5%
Better standard of living	8.5%	8.3%	8.5%
Religious acceptance	8.5%	0%	11.0%
Average No. Years in Country	10.65 years	7.88	11.47
Present Experience vs Previous Institution$ (–2 to +2 scale)			
Salary and benefits	1.34	1.75	1.22
Research funding	1.00	1.96	0.71
Research facilities	0.83	1.54	0.61
More time for research	0.63	1.46	0.36
Research community	0.19	0.38	0.13
Institutional status/reputation	0.09	–0.21	0.19
Leadership opportunities	0.12	1.08	–0.19
Job security	–0.01	0.42	–0.14
Work-life balance	0.59	0.58	0.59

Notes:

* Ease of decision to move was calculated on a 5-point scale, with 1 being "extremely difficult" and 5 being "extremely easy."

$ Respondents were asked to rate their experience in the current institution compared to their previous one, on a 5-point scale, with 2 being "current institution is much better" and –2 being "previous institution is much better." If the respondent indicated that both institutions were on par with each other, they were given 0.

% Respondents were asked to indicate if their overall research productivity had improved after moving to their current institution, on a 5-point scale.

KAUST and non-KAUST faculty point to the need for greater nuance in assessments of the Saudi higher education sector and an acknowledgement that it has multiple tiers, each with specific characteristics and research challenges.

With respect to challenges, we also asked faculty respondents to share in an open-text field any challenges they had experienced with being a researcher at their current university. Altogether, 58 (55 percent) of our 106 Saudi-based faculty mentioned one or more challenges in free-form comments. In order to extract the main themes of the challenges faced, we used a Large Language Model (LLM) to propose eight main categories from the corpus of comments (seven research-related categories + one for unclear and non-research-related challenges which we called "Miscellaneous Challenges") (see Table 5). Each free-form comment was independently mapped to one or more categories by two raters. The inter-rater reliability was 96.6 percent. The discrepant tags were resolved through consensus, and the relative frequency of each challenge was then tallied. The two most mentioned challenges were "Research Funding" and "Workload and Time Management" (both at 31 percent). The next most mentioned complaints were "Research Staff and Student Issues" and "Research Facilities and Supply

Table 5: Common Research Challenges Faced by Faculty Respondents in Saudi Arabia

Research Challenge	Frequency (%)	Representative Comments
Research Funding	31	"Lack of research funding" "Very little institutional funding"
Workload and Time Management	31	"High teaching load" "A relatively high amount of admin work"
Research Facilities and Supply Chain Issues	22	"Procuring supplies is extremely difficult and delayed" "Time it takes to get clinical kits"
Research Staff and Student Issues	22	"Very poor preparation of local students" "No research assistants" "Having equipment without expert technicians to run the equipment"
Career Advancement and Job Security	17	"Leadership opportunities for expatriates are not available" "Promotion rules are difficult for expatriate faculty" "After 10 years contract renewal is tough" "As we are not Saudis, our salary is not increased annually"
Administration and Management	17	"Micromanagement, centralised decisions, slow pace to get tasks done" "Unrealistic expectations on the part of the Saudi management"
Research Culture and Collaboration	14	"This is still more of a teaching institution" "Difficulties in finding collaborators" "Inability to absorb the research results into a business community"
Miscellaneous and Non-Research Issues	17	"I miss forests and rain" "Air quality is very poor, weather is insanely hot 6 months of the year"

Notes:
N = 58.

Chain Issues" (both at 22 percent). When we subsequently conducted our interviews, the same issues were raised repeatedly by our interviewees, and so we dug deeper into each of these challenges in the following section.

Findings from Interviews

Our interviews with 32 faculty members at 11 different Saudi universities gave us even deeper insights into the research ecosystem within the Kingdom's higher education sector. All 11 were in the top 20 list of universities in Supplementary Table 1, based on their research productivity. These 11 universities included public and private institutions, as well as national institutions like KAUST and KFUPM, and more regional universities like Jazan University which has a large undergraduate student body and a heavier teaching focus. While the interviews averaged about 75 minutes each and covered a wide range of topics, we focus here on interviewees' experiences conducting research in Saudi Arabia. As with the survey data, many interviewees shared that their research output had increased after moving to Saudi Arabia and, in several cases, extended in interesting new directions. Many scientists had maintained their prior research collaborations, while also adding new local collaborations with colleagues in their existing universities or other

universities in Saudi Arabia. At the same time, interviewees spoke of a range of challenges they had encountered while trying to maintain an active research agenda in the Kingdom. The challenges they mentioned aligned closely with the ones mentioned in the survey responses (see Table 5). For this reason, the paragraphs below outline six of the key research challenges that emerged across many of our interviews, in the same order as in Table 4.

In presenting these six key challenges, we try to distinguish between issues experienced across all 11 universities versus those that affected only a subset of universities. For instance, there were clear differences between the research challenges experienced at KAUST versus all other universities in Saudi Arabia. There were also differences in the challenges experienced at institutions with a large undergraduate student body versus smaller universities. We make notes of such distinctions as we elaborate on each challenge.

Challenge #1: Research Funding

A theme that came up repeatedly in many of our faculty interviews as well as in the survey responses related to the research funding structures in Saudi universities, both in terms of the volume of available research funding, and the procedures for securing it. While KAUST faculty were provided with generous research start-up packages and annual research stipends that covered the cost of consumables and equipment and even the hiring of multiple PhD-holding research staff, faculty in other universities often did not receive any start-up research grants and were instead expected to apply for competitive research grants to support their own and their university's research ambitions. Ahmed, an Indian assistant professor of computer science at a large public university, recalled that his offer letter only mentioned his salary, without any mention of funding support. "Research is a separate entity," he shared, noting that he was still expected to publish the requisite two papers a year to maintain his contract, despite not being guaranteed any research funding. Fadil, an Indian assistant professor of bioinformatics, shared that his type of research did not need lab supplies but did require access to high-performance computers – a resource which his small university did not have. When Fadil asked an acquaintance at another Saudi university if he could use their supercomputer clusters to run some genome analyses, he was told it would cost him "US$300–$400 each month" to use their cluster. "That was a very big amount. So I just use my MacBook Pro," he shared, having resigned himself to such research constraints. As Noor, an assistant professor at a public university in Saudi's Eastern Province, summed up: "It's just expectations to produce without any real funding, and without any real support – neither money-wise nor time-wise."

Some interviewees were more hopeful, however, noting that more and more grant competitions were being announced at university, regional, and national levels in recent years, especially after Vision 2030 was launched. Others, who had been in the country for a significant period of time, shared that their university had introduced more systematic procedures for evaluating the merit of internal grant applications. Ahmed, a senior physiologist at a large public university in the Eastern Province, proudly declared that "scientifically they have come a long way."

> *Now they are very organised. Now, they do not give grants to every Tom, Dick and Harry. Now, they properly scrutinise the project. The money's still there, but you have to prove the worth of your project. [...] They ask, "Will you get a patent out of this study?" They ask you, "What is the advantage to the university of this project?"*

Unfortunately, this was not the experience for all the faculty we interviewed. Other interviewees complained about the unprofessional management of funding calls and the slow processing of fund disbursements and reimbursements even after a successful grant application. Indira, an associate professor of computer science at a university in Riyadh, recalled how challenging it had been for her to apply for a national funding grant from a Saudi research agency because the agency "kept changing rules," did not indicate a designated contact person on their website, and only had a general email address which never responded to queries. Other interviewees complained that they were expected to pay out-of-pocket for many of their research expenses (including their article publication charges, the consumables for their lab, etc.) and could only claim reimbursement if they managed to publish their findings in a top-tier journal from a pre-approved list. In addition, Shazia, an Indian associate professor of pharmacy at a regional university, noted that all her university's funding application forms were only in Arabic and so she could never apply for a grant on her own. Together, these issues point to the at-times challenging (but also uneven) funding landscape that can dissuade some foreign scientists from pursuing more ambitious (and often more expensive) research agendas in Saudi Arabia.

Challenge #2: Workload and Time Management

An equally pressing issue, raised primarily by non-KAUST faculty, related to the time they could devote to conducting quality research when their teaching and administrative

responsibilities took up most of their time. During their interviews, KAUST faculty barely talked about teaching, given that it was a graduate-only, research-focused institution and their teaching load was minimal. But they did talk extensively about the challenges of setting up a brand-new university and the time it had taken to establish research policies and systems from scratch. But those issues were largely behind them and KAUST faculty seemed much less bogged down by such start-up tasks in the present day, enabling them to focus more on their research.

However, senior faculty at other universities *still* talked about the amount of teaching and administrative responsibilities they had to shoulder. Jamil, a biologist who had been hired to set up a new department at a top private university roughly 15 years ago, shared that, from the very start, his role had required him to focus on administrative responsibilities, followed by teaching. Research always came last and, as a result, his research productivity had fallen dramatically over the years and never really recovered:

> *As an administrator and as a teacher, I would say that I am one of the best. But as a researcher, […] I am just doing whatever comes into my mind as a new research question. Whether it fits well with the Saudi vision or not, doesn't matter. Just for the sake of doing something and getting published.*

Junior researchers who had moved more recently to public universities in Saudi Arabia also complained about their lack of time to pursue their research agenda and indicated that it was their teaching responsibilities that kept them busy. Noor, a computer scientist whose public university had over 40,000 students, estimated that "the effort of the instructors is 80 percent teaching" at her university. Noor put it down to Saudi Arabia's rapidly rising enrolment numbers, especially among women, noting that her university's number of students had doubled in two years:

> *And then you can imagine that the pressure on all facilities including buildings, but also teaching capacity is very high. I'm not sure how big the spurt will be when it will level out, but it doesn't look like levelling out now.*

Meanwhile, Indira complained that "the university wants results in research, but it doesn't allocate research days. So we have teaching everyday, [but] we don't have research days." To some extent, these complaints about heavy workloads and insufficient research time are universal ones raised by faculty everywhere. However, some of the faculty we interviewed at large public universities also linked their heavy teaching loads to the shrinking number of foreign faculty in their departments. Shazia, a biologist who taught at one such university, explained how neither her Saudi faculty colleagues nor her Saudi students were happy to see so many foreign faculty have their contracts terminated:

> *When we talk to our HODs [Heads of Departments] and our Saudi colleagues and faculty members, they are helpless. They can't do anything. They said, "Doctor, it's not in our hands." Because they already know that without us, they can't work. They also know that.*

Shazia understood the goal of Saudisation to create private sector employment for qualified Saudi citizens, but she felt the policy was being implemented too quickly in Saudi universities in a way that was hurting Saudi students as well as the remaining foreign faculty who had more experience than the young Saudi faculty being hired. "The problem is, they are doing everything so quickly," Shazia concluded. She worried that the remaining faculty was expected to carry much of the outstanding workload: "And they don't have resources to do the things. So they will face problems in the future."

Challenge #3: Research Facilities and Supply Chain Issues

Interviewees across all university types also frequently cited supply chain issues that slowed or otherwise limited their capacity to conduct ambitious research. Examples affected nearly every stage of the procurement process, from lab set-up and budget authorisations to importation delays and equipment maintenance issues. Scientists constantly expressed frustration about what they perceived as avoidable bureaucratic delays that exceeded normal expectations for procurement. "The system is that there is no system," stressed one computer science faculty member at a top public university:

> *And the rule is that nobody wants to take responsibility, signing off anything. And so we spent, like, six months going through a procedure, and then they told us "Oh, no, sorry, this is the wrong procedure." So we have to start all over again. […] Every signature takes like three to four months to get signed.*

In this atmosphere of uncertainty, scientists could not rely on predictable timelines and therefore missed opportunities to pursue interesting research idea or scaled back their ambitions. A late-career bioscientist with over a decade of experience in Riyadh provided an example of receiving a large research grant from his university but not being able to spend the money because of equipment delays:

> *One of the key things that we needed was this instrument, which only arrived by the time my grant ended. I had to go*

to the airport to pick it up because it had been sitting in the warehouse for I don't know how many months. And by the time we got it, it was unusable.

Interviewees responded in creative ways. Despite extraordinarily high mark-ups to import essential laboratory equipment, those with resources stockpiled supplies in order to cope with long delivery delays. In the most extreme examples, bioscientists described trips abroad to pick up reagents and even biosamples from a friend's overseas laboratory, sneaking the materials past Saudi customs officials in clothing pockets, shoes, and even the boot of their car.

Even when supplies could be acquired in a timely fashion, the overall laboratory set-up in some universities was not always geared towards conducting research. Unlike the situation at KAUST, some interviewees in public universities shared that there was no dedicated lab space for research, such that they had to use their department's teaching lab when it was not being used for classes. Other faculty members, who were in more teaching-oriented universities, lamented that their research lab had only rudimentary equipment: "What we have, we can still do something maybe at the level of high school students' study. Or maybe early university years. But nothing in depth," shared one faculty member at a private university in Riyadh. In response, some scientists relied on their overseas collaborators to conduct all the experimental research they needed and focused only on writing up their results in Saudi. Others turned to their prior institutions. Sameera, an assistant professor of biology at a regional university, shared how she used her two-month summer vacations back in India to conduct all her research experiments because she still had access to her doctoral university's laboratories which were better stocked than what she had available to her in Saudi Arabia:

I go to my parent university, and my local area [...]. And there I go with the agenda. [...] So I design the research accordingly, so that in four weeks, [...] mostly four to five weeks, I finish the experiment in these weeks, and come up with my data and after – writing and all – I do here [in Saudi Arabia].

Challenge #4: Research Staff and Student Issues

Several scientists also voiced concerns about the recruitment and retention of high-quality research support staff, such as graduate research assistants, postdoctoral research fellows, and administrative personnel. This was not as much of a problem at KAUST, where faculty members share a full-time administrative assistant with only two to three other faculty. A senior computer scientist at KAUST boasted:

I get to spend all my time doing research, supervising students in research, teaching advanced graduate courses. [...] All I do is send them [the administrative staff] an email, say, here's what needs to be done, and they will take care of it. I will not need to follow up at all, ever.

KAUST researchers also referred to their ability to hire entire teams of researchers, which freed them to pursue more lines of inquiry and apply their expertise to higher-order work. Still, KAUST scientists sometimes struggled to find qualified lower-level research staff. One faculty member surmised:

[T]he students we get here are the ones who could not make it to the US or Europe, in general. This is an oversimplification, but I find myself doing a lot of the thinking for my team, rather than working with them. And that's really exhausting.

This scientist gave examples of tasks – like managing the lab's basic day-to-day logistics and editing English-language papers his team produced – that he had to take on himself, because his pool of postdoctoral researchers could not handle them reliably.

At other Saudi institutions, research personnel issues tended to be even more pronounced. Jamil, a senior Pakistani faculty member at a private university, was lured to Saudi by a tripling of his salary but had to sacrifice research output in exchange. "I need to have competent research staff who can work for me," he complained. "Yeah, that we do not have. Although space [is] now available, people are not available." Many interviewees also noted how their universities did not yet have doctoral programmes, and so they lacked doctoral students who could work on their projects with them.

This shortage of competent research support staff and students points to a key area where change is needed in the coming years. Without these "workhorses" of the lab (Paul 2021), it is difficult for a scientist to take on large-scale research projects. However, several interviewees did note that their universities were planning to establish doctoral programmes in their sub-field in the upcoming years. Building a pipeline of graduate students to work in scientists' labs will definitely assist in providing the necessary research manpower, though quality issues may remain.

Challenge #5: Career Advancement and Job Security

Related to long-standing issues with Saudi's immigration regime, several interviewees raised concerns regarding their career advancement prospects and long-term security in the country. While KAUST had adopted the American-style tenure system to offer job security and promotion prospects to its faculty hires, interviewees outside of KAUST shared that they were on one-year contracts that could be terminated at relatively short notice. Faculty at private universities were reasonably confident that they would have their contracts regularly renewed as long as they met their annual targets. However, amongst faculty in public universities, there was often a sense of insecurity lurking in the back of their minds.

This worry has grown in recent years. Interviewees who had joined Saudi universities around 2010 noted that they had never worried about contract renewal or glass ceilings because, at the time, their universities desperately needed qualified foreign faculty to establish and lead new departments and undergraduate programmes in a range of scientific fields. However, in recent years, with the return of large numbers of overseas-trained Saudis, many foreign faculty were not having their contracts renewed to create space for these returning Saudis. Foreigners were also no longer being considered for top leadership positions, as these were all being reserved for Saudi nationals.

Shazia, an Indian associate professor of biology who moved to a regional university in Saudi in 2015, shared that many of her colleagues from India, Sudan, Egypt, etc. have had to leave over the last two years:

> *Lots of international faculty members – they already go from here. They terminated a lot of faculty members last year. So very few are left. Because their motive is to make Saudi free from non-Saudis.*

Shazia admitted that she too planned to leave Saudi in the next couple of years because she felt that she had "no social life" in her small city anymore as the size of its Indian community had declined by half.

In their survey responses, several faculty members noted that they were not eligible for an annual salary increment because they were foreigners. In the interviews, however, a few clarified that they could technically ask for one, but did not do so out of fear that it could jeopardise their contract renewal chances. As Abad, an Egyptian biologist who had worked in Saudi Arabia for 12 years, before having his contract terminated in 2021, shared bitterly, "This is their control. No, you can't talk [about] this salary." But more importantly for the purposes of our paper, this one-year contract renewal system also had a deterrent effect on foreign faculty's research plans. Hakim, a newly hired assistant professor of biochemistry at a top public university, shared that his short-term contract directly impacted his desire to stay long-term at his university:

> *Ah truly, I am stressed. [...] Especially for life sciences – at least five years should be contracted. Professors like us, if I start any project, it will continue for four years, five years.*

Hakim had already decided to look for faculty positions in the United States in two or three years after acquiring some research and teaching experience at his current university, because he wanted a job that could offer him more long-term stability. Hakim and Shazia's independent decisions to leave Saudi Arabia in the coming years speak to the likelihood of significant scientific brain drain from the country if these issues are not fixed. Their stories also highlight the need to balance the desire for Saudisation with the equally important goal of building Saudi's research and innovation sector. While these two objectives are not intrinsically incompatible in the long run, they may be in the short-term.

Challenge #6: Administration and Management

The final issue we elaborate on here relates to a more fundamental challenge that several interviewees raised: a misalignment between the overall institutional vision for research at their university and the institutional rules and processes set up to achieve this vision. This mismatch manifested itself in multiple ways but specifically in the setting of specific publication targets that at times felt haphazard or even counterproductive when they were not supported by commensurate research funding, equipment, and time allocation.

Most Saudi universities had a requirement that faculty publish at least two articles in a first- or second-quartile journal in their field each year. But some scientists worried that these publication targets were not sufficiently tailored to individual specialisations. Hakim noted that the targets did not distinguish between computational researchers versus scientists who need more time to run experiments in the lab or conduct fieldwork and therefore publish at a slower pace. In some departments, Indira noted, such high publishing expectations could also doom faculty recruitment. She shared, "We have crazy [job] requirements, and we cannot find people."

Worse still, multiple faculty members raised concerns that the misalignment between vision and resources could encourage unethical practices to meet these unrealistic publication targets. Respondents in several universities spoke of suspicious practices, including the "system" of paying overseas researchers to list Saudi-based peers as co-authors on their publications:

> *So this person is from Turkey, from Pakistan, from somewhere in Asia. They have people over there. They are maybe paying a monthly sum, whatever. And these people are producing papers and sticking their names to those papers as authors. It's not real research.*

While no interviewee admitted to engaging in such practices themselves, several did acknowledge they tended to prioritise publishing the minimum number of papers each year, rather than focusing on the quality or novelty of the research. As Malik, a senior computer scientist recruited to a top public university, shared:

> *They are totally obsessed with metrics. The first time I've heard about Q1, Q2 and Q3 [journals] and the QS ranking [for universities] is when I came to Saudi Arabia. In the UK, [...] they ask you, "What's the impact of your research?" This is what we're assessed on. And nobody would ask you about [the journal's] impact factor. Nobody would ask you about what is the rank of the journal. So it was a total new environment for me.*

When ambitious Saudi institutions *did* offer the requisite resources, however, scientists were quick to offer praise. "There was a really highly motivating environment," remarked a former researcher at a fast-rising private university who has since moved to the UAE. "[You] feel support everywhere. Administration, colleagues, other departments, the whole hierarchy, really supporting you. They are strong believers...that the cornerstone for the success of an institution is the manpower. It's the faculty members."

Interestingly, multiple faculty at different public and private universities expressed deep satisfaction and pride with how the *teaching* systems in their universities had improved significantly over the last 10 years. These interviewees noted the divergence between their university's teaching versus research support systems:

> *Teaching is very well established. You can see in our university, teaching – we have clear, clear objectives...But research is very obscure. You can say nothing is clear; we have to find our own way.*

Conclusion

Our comprehensive analysis of the drivers and challenges associated with attracting international faculty to Saudi Arabia highlights several key findings integral to the future development of the Kingdom's research ecosystem. Our data reveal a significant increase in research productivity and impact among Saudi institutions, particularly those like KAUST, which benefit from substantial autonomy and funding. Foreign scientists in Saudi Arabia have generally experienced a boost in their research output, although this varies significantly between institutions. However, ongoing challenges persist, including the need for better research funding structures, efficient supply chains, and increased support for balancing teaching and research responsibilities.

The experiences shared by the foreign faculty we surveyed and interviewed underscore the importance of tailored research support and administrative alignment to advance Saudi Arabia's Vision 2030. Addressing these challenges is crucial to not only bolster research quality and efficiency but also make Saudi Arabia a more attractive destination for global scientific talent, accelerating its transformation into a knowledge-based economy.

In light of these findings, several policy implications emerge that could guide future improvements to Saudi's university-based research ecosystem. First and foremost, both the government and university administrators must improve the allocation and management of research funding. Streamlining bureaucratic processes for grant applications and disbursements can significantly reduce research delays and foster a more conducive research environment. Additionally, establishing longer-term contracts for foreign faculty will provide more job security and incentivise greater commitment to ambitious, long-term research projects. Many scientists we interviewed in public universities in the UAE spoke of being on three-year, renewable contracts, and this might be a useful benchmark if Saudi universities are not willing to switch to an American-style tenure system with more job security measures. Developing robust support systems for research infrastructure, including reliable supply chains and high-performance computing resources, is also essential. Establishing more doctoral and postdoctoral programmes at a wide range of universities in the country and offering generous fellowships to encourage young, aspiring scientists to study and train in Saudi Arabia will also help provide the necessary manpower to support

faculty in their research efforts. Finally, fostering a balanced approach between teaching and research responsibilities, perhaps by introducing dedicated research days, can help alleviate the workload pressures on faculty, allowing them to focus more on innovative research. By implementing these policies, Saudi Arabia can strengthen its nascent university research ecosystem, enhance its global competitiveness, and attract and retain top-tier international scientific talent, while balancing its desire for increased Saudisation in the higher education sector.

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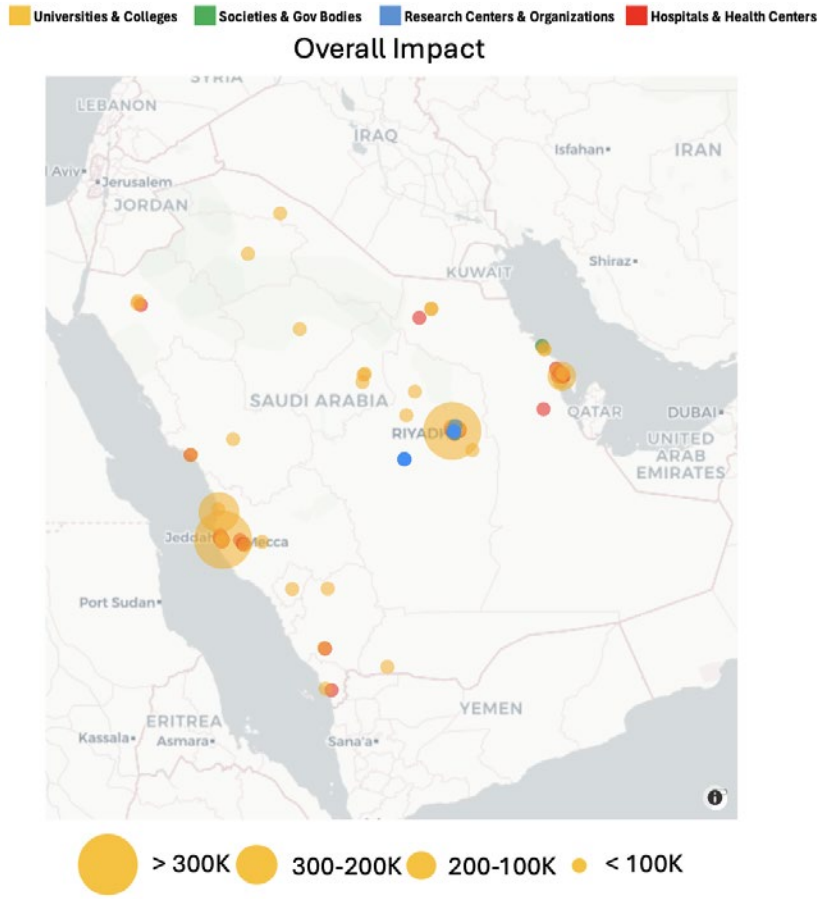
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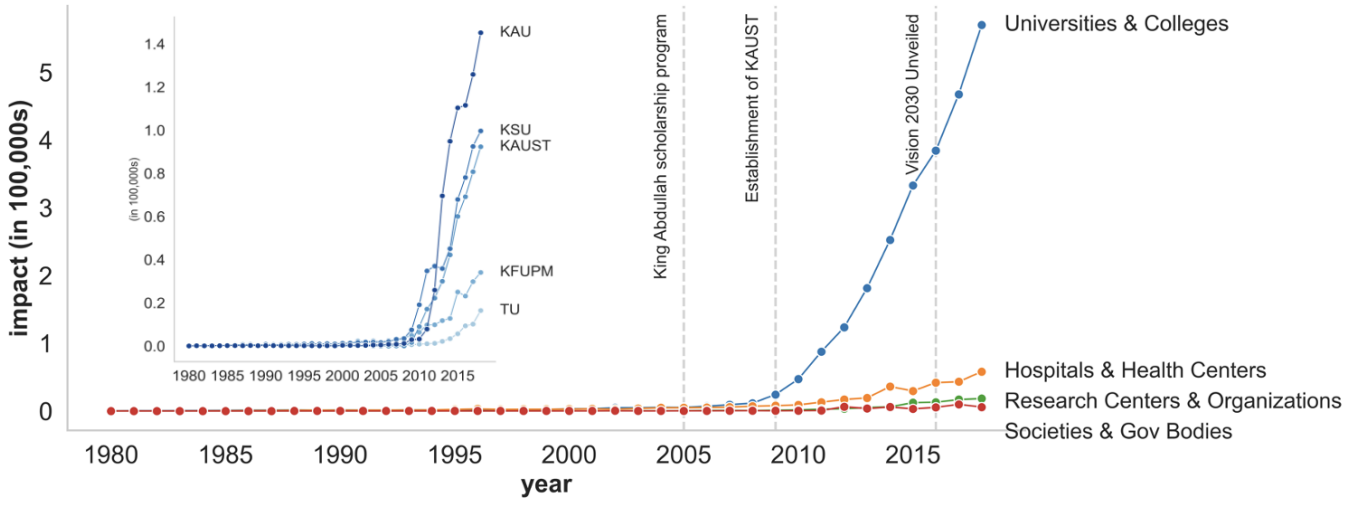
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Supplementary Figure 1



The overall distribution of research impact but using c_5 across different cities in Saudi Arabia. The size of the circles indicates the number of publications, while the color of the circles represents the type of research institute producing them.

Supplementary Figure 2



Impact (c_5) trends across our four categories of research-producing institutions. The inset highlights the impact of the top five most research-productive universities in the country.

Supplementary Table 1

Distribution of productivity (n= 325,195 publications) and impact (m= 2,526,151 citations) across the different universities & colleges (ordered by the overall productivity). The highlighted universities are: (i) the most productive and impactful overall, and (ii) the one with the highest average impact per publication.

Order	Institution Name	Overall Productivity	Overall Impact	Average Impact per Publication (Overall)	Productivity in 2023	Impact in 2021 (C2)
1	**King Saud University (KSU)**	**64,276**	**445,149**	6.93	8,380	79,777
2	King Abdulaziz University (KAU)	42,202	445,007	10.54	4,153	63,286
3	King Fahd University of Petroleum and Minerals (KFUPM)	21,276	147,073	6.91	1,915	21,348
4	**King Abdullah University of Science and Technology (KAUST)**	19,823	265,028	**13.37**	2,113	35,746
5	King Khalid University (KKU)	16,538	126,449	7.65	3,466	30,042
6	Taif University	11,720	95,105	8.11	1,530	33,329
7	Umm al-Qura University	11,405	71,969	6.31	2,199	15,009
8	Prince Sattam Bin Abdulaziz University	11,314	95,981	8.48	2,436	24,650
9	Qassim University	9,414	48,884	5.19	1,756	10,925
10	Princess Nourah bint Abdul-rahman University	9,173	64,548	7.04	2,676	13,701
11	King Faisal University	8,902	51,023	5.73	1,506	10,091
12	Imam Abdulrahman Bin Faisal University	8,832	64,162	7.26	1,246	15,432
13	Taibah University	8,105	51,921	6.41	1,068	10,296
14	Jazan University	7,147	44,351	6.21	1,489	9,597
15	King Saud bin Abdulaziz University for Health Sciences	6,521	36,916	5.66	948	7,573
16	Al Jouf University	5,608	44,499	7.93	1,070	9,451
17	Jeddah University	5,578	43,302	7.76	1,024	8,590
18	University of Ha'il	5,165	33,864	6.56	1,003	8,625
19	Imam Mohammad ibn Saud Islamic University	5,054	25,094	4.97	1,073	4,750
20	University of Tabuk	4,976	36,861	7.41	968	7,439
21	Alfaisal University	4,346	35,657	8.2	771	5,814
22	Prince Sultan University	4,001	33,844	8.46	811	7,570

Order	Institution Name	Overall Productivity	Overall Impact	Average Impact per Publication (Overall)	Productivity in 2023	Impact in 2021 (C2)
23	Majmaah University	3,881	30,322	7.81	616	6,299
24	Najran University	3,785	29,225	7.72	902	4,496
25	University of Business and Technology	2,806	19,424	6.92	664	3,531
26	Shaqra University	2,693	14,811	5.5	530	2,906
27	Al Baha University	2,684	12,703	4.73	553	2,690
28	Northern Border University	2,368	13,934	5.88	393	3,137
29	Prince Mohammad bin Fahd University	1,968	20,130	10.23	342	3,215
30	University of Bisha	1,643	11,302	6.88	334	3,198
31	Islamic University of Madinah	1,520	9,376	6.17	305	1,917
32	Riyadh Elm University	1,436	6,406	4.46	121	952
33	Saudi Electronic University	1,397	9,422	6.74	377	2,323
34	University of Hafr Al-Batin	1,381	11,480	8.31	316	3,268
35	Buraydah Colleges	775	4,019	5.19	197	699
36	Yanbu University College	747	4,636	6.21	82	1,277
37	Ibn Sina National College for Medical Studies	707	1,595	2.26	93	263
38	Effat University	685	4,291	6.26	119	844
39	Jubail Industrial College	600	2,954	4.92	94	278
40	Sulaiman Al Rajhi Colleges	470	2,739	5.83	99	735
41	Dar Al Uloom University	394	2,098	5.32	95	883
42	Al-Farabi College	324	1,345	4.15	7	66
43	Al Yamamah University	309	1,633	5.28	51	156
44	Naif Arab University for Security Sciences	251	1,036	4.13	28	350
45	Jubail University College	209	1,238	5.92	5	244
46	Fahd bin Sultan University	173	747	4.32	19	251
47	Al-Ghad International Health Sciences Colleges	157	719	4.58	10	159
48	Dar Al-Hekma University	147	740	5.03	50	134
49	Arab Open University	139	414	2.98	37	83
50	King Fahd Security College	124	464	3.74	16	107
51	Prince Mohammad Bin Salman College of Business and Entrepreneurship	46	261	5.67	3	76

Supplementary Table 2

The number of Biologists in the top 10 institutions in Saudi Arabia (a total of 2,291 scientists which constitutes 53% of the total number of Biologists in Saudi).

	Institution	Num of Scientists
1	King Saud University	731
2	King Abdulaziz University	512
3	King Abdullah University of Science and Technology	495
4	Taif University	121
5	Umm al-Qura University	112
6	King Khalid University	98
7	Qassim University	94
8	King Fahd University of Petroleum and Minerals	67
9	Prince Sattam Bin Abdulaziz University	42
10	Princess Nourah bint Abdulrahman University	19

Supplementary Table 3

The number of Computer Scientists in the top 10 institutions in Saudi Arabia (a total of 476 scientists which constitutes 47% of the total number of Computer Scientists in Saudi).

	Institution	Num of Scientists
1	King Abdulaziz University	127
2	King Abdullah University of Science and Technology	104
3	King Saud University	101
4	King Fahd University of Petroleum and Minerals	43
5	Umm al-Qura University	22
6	King Khalid University	21
7	Taif University	21
8	Prince Sattam Bin Abdulaziz University	17
9	Qassim University	13
10	Princess Nourah bint Abdulrahman University	7

Supplementary Table 4

The top 20 countries from which Biologists, with a minimum of five years of experience prior to migration (Total Count of Biologists from the top 20 countries is 2,462 out of a total of 4,343 Biologists in Saudi Arabia, i. e., 57%), have relocated to Saudi Arabia's top 5 universities between 2009 and 2018, ranked by the number of scientists. [Plot 2]

	Country Scientist Migrated From	Number of Scientists who Migrated to Saudi's top 3 universities
1	United States	448
2	Egypt	267
3	China	249
4	India	154
5	United Kingdom	153
6	Germany	128
7	Canada	111
8	Pakistan	86
9	Japan	71
10	France	61
11	Australia	53
12	South Korea	50
13	Spain	44
14	Italy	42
15	Singapore	38
16	Switzerland	29
17	Malaysia	28
18	Netherlands	27
19	Taiwan	24
20	South Africa	18

Supplementary Table 5

The top 20 countries from which Computer Scientists, with a minimum of five years of experience prior to migration (Total Count of Computer Scientists from the top 20 countries is 475 out of a total of 1,005 Computer scientists in Saudi Arabia, i. e., 47%), have relocated to Saudi Arabia's top 5 universities between 2009 and 2018, ranked by the number of scientists. [Plot 2]

	Country Scientist Migrated From	Number of Scientists that Migrated to Saudi's top 3 universities
1	United States	86
2	China	76
3	United Kingdom	38
4	Canada	25
5	France	20
6	Egypt	18
7	Pakistan	17
8	Germany	16
9	Malaysia	16
10	India	13
11	Taiwan	11
12	South Korea	10
13	Australia	9
14	Tunisia	9
15	Italy	8
16	Singapore	6
17	Sweden	6
18	Greece	6
19	Hong Kong	6
20	Jordan	6

Endnotes

1 https://www.nature.com/nature-index/supplements/nature-index-2016-rising-stars/tables/institutions (accessed on 2 August 2024).

2 https://www.nature.com/nature-index/news/top-ten-fastest-rising-universities-under-fifty-twenty-nineteen (accessed on 2 August 2024).

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7

A View from South Asia Countries of Origin: Changing Contexts, Perceptions, and Policies towards Migrating to Saudi Arabia

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Abstract

As the strongest Arab economy, the Kingdom of Saudi Arabia (KSA) is home to 13.4 million foreign residents. Hence, much of the success of the ambitious Vision 2030 reform masterplan hinges upon how migrant labour is considered within these reforms. This makes enhancing the understanding of migration dynamics in the Saudi socio-economic context critical.

Against this backdrop, this paper aims to expand the understanding of drivers, policies, and perceptions linked to migration to Saudi Arabia from South Asian countries of origin. The report looks at how the migration stakeholders in South Asian countries of origin perceive the institutional context and migratory environment in Saudi Arabia, and how these perceptions shape labour migration. Additionally, the study examines how future changes in migration policies, and socio-political and economic dynamics in South Asian countries of origin influence labour migration to Saudi Arabia.

The study adopts a corridor approach by focusing on South Asian countries including Bangladesh, India, Pakistan, and Sri Lanka. The analysis relies on existing literature and secondary data supplemented by qualitative data collected via key informant interviews (KII), where possible.

Introduction

The Kingdom of Saudi Arabia (KSA) is a stable economy with a GDP of USD 1.07 trillion that stood as the 19th largest economy in the world as of 2023 (The World Bank 2024, Vision 2030, 2016). Two prominent characteristics of the Saudi economy are its dependence on oil and foreign labour. Traditionally, much of Saudi Arabia's economy has depended on natural resource revenue, and for many years the government has been attempting to reduce this over-dependence. In recent years, the revenue generated by oil has been over 40% of Saudi Arabia's GDP. Similarly, much of Saudi Arabia's labour force is composed of foreign workers. After numerous efforts over the years, beyond nationalisation and Saudisation policies, data for the fourth quarter of 2024 shows the share of migrant workers in the total labour force (including domestic workers) at 77%, and the share of foreign workers in the private sector alone at 79% (GLMM 2025a; GLMM 2025b).

The ambitious Vision 2030 reform masterplan, launched in 2016, is the latest effort to diversify Saudi Arabia's economy and society. One of its key themes is a thriving economy, which aims to place Saudi Arabia among the top 15 economies in the world, making the labour market reforms under this theme highly relevant to migrant workers. The reform programme aims to invest in education and training to build a national workforce that is ready to take up future employment opportunities in the Kingdom and focus on enhancing efforts to ensure that education and vocational training systems are aligned with market needs. Saudi Arabia is indeed concerned about the relatively low labour force participation rate of nationals, which was 51.3% as of Q4 2023, relative to 73.8% of non-nationals (General Authority of Statistics 2023), and the prevalent skill mismatch in "the labour market as citizens may not be well equipped with skills that are needed by the private sector" (Hasanov, et al. 2021, 5270). Therefore, the reform document further underscores the goal of "attracting the talents we need" and states that "[a]chieving our desired rate of economic growth will require an environment that attracts the necessary skills and capabilities both from within the Kingdom and beyond our national borders" (Vision 2030 2016, 37). To achieve this, Vision 2030 outlines ambitions to improve living and working conditions for expatriates by enabling foreigners to own real estate in certain areas, improving their quality of life, and allowing for the establishment of more private schools to accommodate more foreign-born students. Moreover, the reforms aim to adopt a simplified and more efficient system for issuing visas and residence permits. All these efforts are aimed at attracting and retaining the best nationals and non-nationals in the workforce in Saudi, since the having "the finest Saudi and foreign minds…in the Kingdom will contribute to economic development and attract additional foreign investment" (Vision 2030 2016, 37).

Despite the prominence of non-nationals in the country's labour force and their expected input in the ambitious national socioeconomic reform process, some key features of the Saudi labour market are a cause of concern for sending countries' societies and migration stakeholders. One is the employment segregation of nationals and non-nationals in the public and private sectors. The public sector employs the larger share of nationals entering the market, while private sector employment is dominated

by non-national workers as stated earlier in this introduction. As noted by Hasanov et al. (2021), the public sector jobs – where most nationals are employed, are well-paid, enjoy more job security and benefits, and involves fewer hours than in the private sector. Another key feature is the distinct wage gap not just between nationals and non-nationals in the private sector, but also among non-nationals based on country of origin. For instance, workers originating from Western countries are often paid more than those originating from Arab countries. In contrast, the latter are paid more than Asians (GLMM 2017), while migrant workers originating from Sub-Saharan African countries are at the bottom of the pay scale. Such significant wage disparities by countries of origin are largely due to variations in reservation wages of migrant workers based on the standard of living and employment opportunities in their countries of origin, as well as the minimum wages set for them in Saudi Arabia negotiated through Bilateral Labour Agreements (BLAs).

The foreign workers in Saudi Arabia mainly originate from neighbouring Gulf countries, African countries, Southeast Asian countries, and South Asian countries. In 2022, 46% of all of the non-national population in Saudi Arabia originated from the five South Asian countries of Bangladesh, India, Nepal, Sri Lanka, and Pakistan (GLMM 2022). Hence, much of the success of Vision 2030 hinges on how the migrant population, specifically those originating from South Asia (SA), perceive it and feel associated with it. Against this backdrop, this paper aims to expand the understanding of drivers and perceptions linked to migration to Saudi Arabia from South Asian countries of origin. The analysis aims to provide evidence on how the migration stakeholders in South Asian countries perceive the institutional context, policies, and migratory environment in Saudi Arabia, and how such perceptions shape migration flows from South Asia to Saudi Arabia. Additionally, the study examines how future socio-political and economic dynamics in South Asian countries of origin influence labour migration to Saudi Arabia. The study adopts a corridor approach by focusing on South Asian countries including Bangladesh, India, Pakistan, and Sri Lanka, and relies on existing literature and secondary data supplemented by qualitative data collected via key informant interviews, where possible (see annex for details of interviewees).

South Asia – Saudi Arabia Corridor

In Saudi Arabia's labour market, migrant workers originating from South Asia play a key role. In Q4 of 2023, of the total employed population over 15 years of age in Saudi Arabia, 75% were non-nationals (GLMM, 2023). In 2022 a total of 7,459,892 South Asian origin migrants were in Saudi Arabia. Of them, 16% were from Bangladesh followed by 14% each from India and Pakistan.

Similarly, Saudi Arabia plays an important role as a country of destination in each of these South Asian countries. In 2023, Saudi Arabia was the key destination for Bangladeshi migrant workers (Siddiqui, Sultana, and Nasrin, et al., 2023) while, in Nepal, Saudi Arabia accounted for 30% of all departures in 2021/22 (Ministry of Labour, Employment

Table 1: Stock of South Asian Origin Population in Saudi Arabia (2022)

	Male	Female	Total	% of all non-nationals in Saudi Arabia
Bangladesh	1,950,943	165,249	2,116,192	16
India	1,712,780	171,696	1,884,476	14
Pakistan	1,647,704	166,974	1,814,678	14
Nepal	293,049	4,512	297,651	2
Sri Lanka	50,300	34,500	84,794	1
Total South Asia	**6,201,581**	**1,258,419**	**7,459,892**	**56**
Total non-Saudis	**10,244,464**	**3,138,498**	**13,382,962**	**100**

Source: Saudi Arabia census 2022, retabulated and reprocessed in: GLMM (2024) https://gulfmigration.grc.net/saudi-arabia-non-arab-asian-population-by-country-of-citizenship-and-sex-census-2022/.

and Social Security, 2022). Saudi Arabia also received 17% of all registered migrant workers from Sri Lanka in 2022 (SLBFE, 2022). From Pakistan, in 2023, nearly 61% of migrant workers headed to Saudi Arabia. Based on available emigration clearance data, in 2023, a total of 200,713 Indian migrant workers headed to Saudi Arabia (ADBI, ILO and OECD, 2024).

Data Availability

As seen in the above discussion, Saudi Arabia is a key destination for all South Asian countries considered. Among South Asian migrant workers, most are relatively lower-skilled. In the context of data production, the General Authority for Statistics (GAStat) conducts censuses as well as labour and economy related surveys on a regular basis. The Ministry of Human Resources and Social Development regulates and manages employment in the Kingdom, and the General Organisation for Social Insurance (GOSI) registers foreign employees. The Gulf Labour Markets and Migration (GLMM) programme serves as a reliable retabulation of Saudi official data and meta data source for the stock of South Asian migrant workers in Saudi Arabia.

Recently published Saudi data[1] enables disaggregation of workers by gender, education level, and sector of employment, (excluding the domestic sector). With regards to sending countries, Pakistan and Sri Lanka have rich administrative data produced by the Bureau of Emigration and Overseas Employment (BEOE) and the Sri Lanka Bureau of Foreign Employment (SLBFE), respectively. In the case of Bangladesh and Nepal, the Centre for the Study of Labour and Mobility (CESLAM) and the Refugee and Migratory Movements Research Unit (RMMRU) are key institutions producing reports with migration data. Compared to these four countries, the migration data available in India is limited. This is mainly due to the nature of the institutional framework for regulating migrant workers in India (see section 3 for discussion on institutional framework). See Table 2 for a summary of data sources used in this study.

Table 2: Summary of Data Sources Used for This Study

Country	Details
Bangladesh	RMMRU compiles annual statistics of Labour Migration from Bangladesh, which includes those going to Saudi Arabia. https://www.rmmru.org/newsite/publications/migration-trends-report/ The Bureau of Manpower Employment and Training (BMET) provides administrative data publicly. However, due to language barriers, this analysis relied mainly on data from RMMRU.
India	The report by IOM (2023) on Data Needs Assessment Regarding International Migration from India provides an update on data availability in India. https://india.iom.int/sites/g/files/tmzbdl2296/files/documents/2024-06/data-needs-assessment-report-final-04-03-2024.pdf
Nepal	CESLAM publishes reports related to migration from Nepal. These reports include bilateral migration to Saudi Arabia. https://www.ceslam.org/books-and-reports
Pakistan	BEOE compiles administrative data related to regular migration from Pakistan including to Saudi Arabia. The reports published on this website also include statistics. https://beoe.gov.pk/reports-and-statistics
Sri Lanka	Administrative data on migration is regularly collected and reported by the SLBFE. https://www.slbfe.lk/statistics/ Additionally, migration-related data is also compiled and presented by the CBSL. https://www.cbsl.gov.lk/en/statistics/economic-and-social-statistics/chapter-3
Saudi Arabia	The GLMM website has data from Saudi Arabia regarding the stocks of migrant workers including those from South Asian countries.

Source: Author's compilation.

Institutional Framework in South Asia

The five South Asian countries focused on in this study are well established as labour-sending countries and over the years have developed institutional and policy frameworks to govern labour migration in general, as well as specifically to Saudi Arabia. In each of the countries discussed, migration governance is handled by a designated ministry in the central government, while regulation of migrant workers and recruitment agents is handled by an institution falling under the purview of the said ministry (see Table 3). Except for Pakistan and India, all countries have policy frameworks to cover labour migration. In all five countries, recruitment agents play a key role in matching potential migrant workers with employers in Saudi Arabia. All five countries considered have either an MoU or a BLA with Saudi Arabia. Below is a summary of the institutional context in the countries considered.

Such a strong institutional framework for labour migration among South Asian countries is a result of the high outflow of migrant workers from the region, due to socio-economic push factors in each country, as well as pull factors in the Gulf region. South Asian workers became a preferred choice in Gulf countries following the oil boom due to their characteristics such as "docility, political neutrality, flexibility, willingness to work at manageable wages and readiness to work hard" (Rajan and Oommen 2020, 2). Similarly, when Saudi Arabia started reaping the rewards from oil and the demand for migrant workers grew, South Asian countries were experiencing lower levels of economic progress. Hence, migration was a lucrative livelihood option for many South Asians. Their poor socio-economic conditions, wage differentials, and abundant employment opportunities in Saudi Arabia were key factors that contributed to labour migration proliferation from South Asia. As such, temporary labour migration of individuals leaving family behind and regular remittances were common features of labour migration from South Asia to Saudi Arabia (see discussion in Section 6 for more recent trends).

Table 3: Summary of the Institutional Context for Labour Migration from SA

Country	Governance by	Regulation by	Policy	MoU/BLA with Saudi Arabia
Bangladesh	Ministry of Expatriates' Welfare and Overseas Employment	Bureau of Manpower Employment and Training	Overseas Employment Act 2023	MoU 2015
India	Ministry of External Affairs	Protector General of Emigrants	No specific policy, Emigration Act 1983 covers labour migration	BLA 2014 & 2016
Nepal	Ministry of Labour, Employment and Social Security	Department of Foreign Employment	Foreign Employment Policy 2012, Foreign Employment Act 2007 and Foreign Policy Rules 2008	BLA under negotiation
Pakistan	Ministry of Overseas Pakistani and Human Resource Development	Bureau of Emigration and Overseas Employment	Emigration Act of 1979/2023	BLA 2022
Sri Lanka	Ministry of Labour and Foreign Employment	Sri Lanka Bureau of Foreign Employment	National Action Plan for Migration on Employment – Sri Lanka	MoU 2014

Source: Author's compilation.

Perceptions in South Asia about Migration to Saudi Arabia

Over the years, the institutional and policy context in Saudi Arabia has evolved to protect and uplift the well-being of migrant workers and to ensure that migrant labour contributes to achieving national goals and aspirations. However, due to varying national interests and priorities, such efforts within the institutional and policy landscape and practices are often perceived asymmetrically by the policy makers in Saudi Arabia and those in the sending countries. This section now highlights and explains the interpretations and perceptions held by sending countries about Saudi Arabia's institutional landscape and practices for labour migration.

Saudisation/Nationalisation

Saudisation/Nationalisation policies have been in place in Saudi Arabia for a long time to increase the employment of nationals in the Saudi labour market. Traditionally, employment in the public sector in Saudi Arabia is reserved for Saudi nationals, while the private sector predominantly employs foreign workers. The Saudisation/nationalisation efforts aim to reduce the reliance of private firms on foreign workers. However, the sending countries' interpretation of these Saudisation/nationalisation policies in Saudi Arabia is more nuanced. For instance, literature identifies that the nationalisation efforts in Saudi Arabia have, in theory, restricted employment opportunities for non-Saudis in the private sector of the Saudi economy (Jamal 2023, Adham 2023). Similarly, the labour reforms implemented under the ongoing Saudi Vision 2030 are "aimed at employing more Saudis in the private sector to tackle the unemployment rates thereby reducing dependence on foreign migrant labour" (Jamal 2023, 6). However, the literature underscores that "Saudisation policies impact migrants differently based on the professions and the sectors in which they are employed" (Jamal 2023, 7). Qualitative interviews conducted with stakeholders from South Asian countries were also of the view that Saudisation/nationalisation policies would have minimal impact on South Asian migrant workers, as these are mainly involved in low-skilled and blue-collar work that Saudi nationals opt out of. At the same time, stakeholders in South Asian countries expressed doubts about the efficiency of these efforts despite their having been in place for a long time. As such, the stakeholders perceive that Saudisation and nationalisation efforts would have a minimal impact on migration trends from South Asia.

Nitaqat

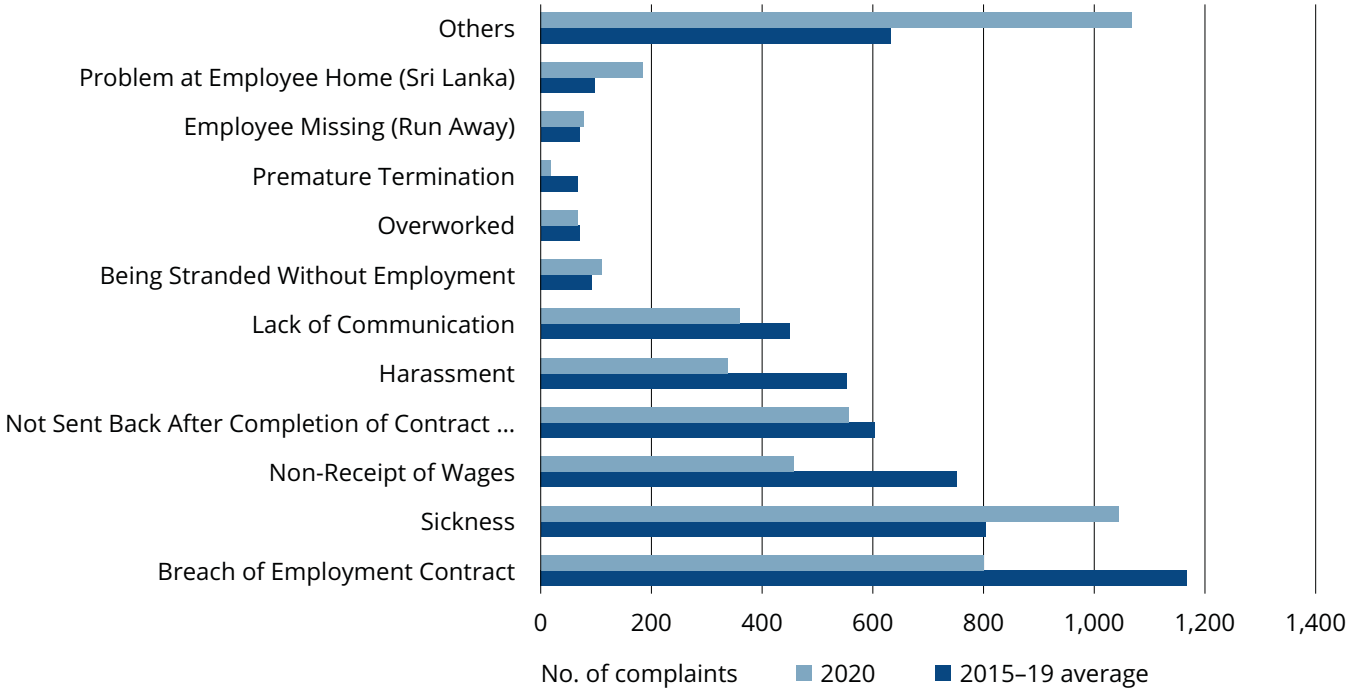
The Nitaqat programme (meaning 'bands' or 'zones') sets out distinct quantitative quotas for firms according to size, economic sector of activity, and profession, while outlining incentives for compliance and penalties for non-compliance. Literature notes that the Nitaqat policy applies to Saudi private firms that employ over ten employees (Peck, 2017). As such, while both Saudisation and Nitaqat are aimed at boosting the employment of Saudi nationals in the private sector, Nitaqat is linked to the employer's commercial activity and size. Nitaqat has intensified in scope and magnitude of previous Saudisation policies to the extent of limiting the entry of migrant workers into the Saudi labour market. Moreover, the political obstacles to migration where "employers are obliged to follow nationality-based quotas limiting the number of workers of certain nationalities, including Indians and Bangladeshis" (Jamal 2023, 7) further limit opportunities for migrants from SA to Saudi Arabia. Literature notes that because Nitaqat imposes strict sanctions on firms for non-compliance, it has "a high compliance rate but imposes significant costs on firms" (Jamal 2023, 6).

The Kafala System

Until the recent reforms intended to cancel the rule for most categories of foreign workers, for decades the '*kafala*' (sponsorship) system has been the main instrument that controls labour migration to Saudi Arabia. Under the kafala system, every migrant worker requires sponsorship by a 'kafeel' (sponsor), which could be a Saudi citizen, entity, or business. In some instances, like for domestic workers, the kafeel could be a non-Saudi individual as long as he or she meets the required conditions to hire a migrant worker (Jamal 2023). Migrants can remain in the country provided they have a working visa or are sponsored by a kafeel. Sending countries often have a negative perception about the kafala system, with literature noting that "both migrants and Saudis manipulate the kafala [system] through the illegal practices of black-market work visa trading known as 'free visa,' which is thought to be the cause of disorganisation of the labour market" (Adham 2023, 1747)

Similarly, the literature underscores that the kafala system ties workers to their sponsors for their residency and work permits, resulting in vulnerability related to this dependency. The previous requirement for workers to obtain an exit permit from their kafeel before leaving Saudi Arabia further contributed to abuse and exploitation by employers.

Figure 1: Nature of Received Complaints (2015–2020)



Source: SLBFE (2020).

For instance, in cases where abuse or other grievances are encountered by workers, it can be very difficult to hold their kafeel accountable. Since the kafeel withholds the workers' passports and dictates their exit from the country, workers may be subjected to blackmail or other forms of physical and verbal abuse when attempting to raise their concerns with their employer or with authorities (Bouri 2023). Similarly, attempts by migrant workers to run away from or leave such employers are often treated with criminalisation or deportation (Bouri 2023). Moreover, Bouri (2023) notes that "the kafala system gives kafeels complete control over migrant labourers and their legal status in ways that undermine the contractual basis of the system." Bouri (2023) explains that domestic workers are often denied reasonable work hours, have to work in more than one home, and often do work that is outside of their agreed-upon scope of work. Similarly, they experienced isolation in the home, mobility restrictions, barriers to seeking help, lack of privacy in living arrangements, physical violence, and verbal abuse. Additionally, a common complaint from migrant workers was that their kafeel did not pay wages on time or at all. Such complaints resonate with Sri Lankan migrant workers in Saudi Arabia. For instance, SLBFE data on complaints from 2015–2020 show that most complaints from migrant workers are from those in Saudi Arabia (see Table 4). Despite the absence of a breakdown of the type of complaint by country of destination of migrant workers, the larger share of complaints from Saudi Arabia allows us to assume that the distribution of the nature of complaints at the total level is reflective of Saudi Arabia. On such a basis, most complaints are related to employment, and by extension to the kafala, such as breach of employment contract, non-receipt of wages, not sent back after completion of the contract period, and overload of work, to name a few (see Figure 1).

The reforms introduced in Saudi Arabia in 2021 aimed to address these issues. As a result, now most migrant workers are allowed to leave the country or switch jobs without their employer's consent upon completing their contracts, or during the contracts if the employer is informed within a specified timeframe (ALJAZEERA 2021, Migrant-Rights 2021). However, despite these reforms having improved the employment conditions for migrant workers, they are criticised by South Asian migration stakeholders as insufficient. In addition to limitations in the reforms, they are criticised for covering only 6.7 million workers, while approximately 3.6 million domestic workers, farmers, shepherds, home guards, and private drivers, and another 3.5 to 4.4 million undocumented workers, "who are already among the most vulnerable and least protected" are systematically excluded from benefiting from reforms (BWI 2024, 7). On the other hand, South Asian stakeholders are of the view that rather than lifting the exit permission requirement, it

only shifts obtaining exit permission from the employer to the Ministry of Human Resources and Social Development (The Kathmandu Post 2021).

Moreover, migration stakeholders in South Asia are sceptical about the limitations of implementing and enforcing these rules and regulations and are concerned about their impact on migrant workers' human rights violations (Bouri, 2023). Moreover, critics perceive that reforms "do not address the systematic discrimination, weak enforcement, and prohibition on migrant workers joining or forming a union" (The Kathmandu Post 2021). The perception of limited implementation of rules and regulations related to labour migration was also echoed in qualitative interviews. Moreover, the qualitative data reveals that previously the kafala system limited the possibility for migrant workers to change employers, and that these restrictions contributed towards migrant workers having a lower preference for Saudi Arabia. However, now with the changes introduced to the kafala system, the preference for Saudi Arabia has improved.

Iqama

Upon arrival in Saudi Arabia, migrant workers are required to apply for a residency permit, also known as an *iqama*, at the Ministry of Human Resources and Social Development. The *iqama*, which is the migrant workers' proof of being legally allowed to live and work in Saudi Arabia, is issued by the Ministry of Interior through the Directorate General for Passports. During a migrant worker's time of employment in Saudi Arabia, for all travel into and out of Saudi Arabia, migrant workers need to apply for an exit/re-entry permit through the Ministry of Interior. As per the Saudi Labour Law, the *iqama* – which is in place to ensure legality and related protection for migrant workers, has to be renewed annually, and the related costs are borne by the employer. Nonetheless, literature underscores that in practice, "this is discretionary and varies based on migrants' experiences with sponsors/employers". (Jamal 2023, 6)

Literature in South Asian sending countries shows that after the increased *iqama* fees, "employers now pay 8,600 riyals (USD 2,300) per year to the labour ministry for each worker's *iqama*," which totals to approximately 11,000 riyals per worker, when the cost of insurance is also added (The Business Standard 2024). This high cost for employers results in their reluctance to obtain an *iqama* on behalf of the workers, leaving migrant workers unemployed or undocumented. Evidence from Bangladesh shows that the BMET receives over 1,000 complaints annually from migrant workers, and approximately 80% are related to *iqama* and employment issues in Saudi Arabia. For instance, there were 2,200 in 2023, while in the six months up to October 2024, BMET had already logged 1,133 complaints.

While the *iqama* and Nitaqat are positive developments regarding the employment of Saudi nationals in the labour market in Saudi Arabia, the stakeholders in South Asia view them as policies that increase the cost for employers to hire migrant workers, and provide an indirect incentive for employers to adopt practices such as delaying the *iqama* and not reporting migrant workers in order to avoid fees. South Asian stakeholders underscore that such practices by employers render migrant workers undocumented, which enables employers to source cheaper labour. For instance, as shown by BWI (2024, p.22), for one Indian worker in Saudi Arabia, when his "*iqama* expired, and he asked the company to renew it, he was ignored- with the expectation that he would illegally continue working, against his consent". At the same time, South Asian stakeholders are of the view that the increase in *iqama* fees on expatriate workers to encourage hiring of Saudis has had a limited effect. As already discussed under the Saudisation policy, nationals are selective in the types of jobs they accept, and do not typically take low-skilled or low-level positions often filled by South Asian workers.

Family Unification and Permanent Migration

The Saudi Arabia migration environment is primarily structured around temporary labour migration with limited opportunities for permanent settlement and family unification. Nonetheless, in recent years, Saudi Arabia introduced reforms encouraging permanent residency and family unification. Yet, the stakeholders in sending countries continue to focus on the limitations of such policies and perceive these efforts in a different light. For instance, literature notes that though the Premium Residency Program and its Gifted Residency and Special Talent Residency seem like a step towards inclusivity, in reality, they contribute to perpetuating existing inequalities (Akıncı, 2022; Ellermann, 2020). Moreover, stakeholders in sending countries view these special types of citizenship opportunities to be out of reach for most long-term middle-class migrants in the country and accessible only to a privileged segment of migrants. As such, migrant workers and stakeholders in sending countries see the process of naturalisation in Saudi Arabia as a rigid and inaccessible option (Jamal 2023, 8).

To ensure successful family unification, Saudi Arabia introduced various strategies, such as allowing only specific occupations to sponsor family dependents, with eligibility being tied to income and profession (Ameen, 2023; De Bel-Air, 2023). However, stakeholders in sending countries perceive these rules and levies as strategic measures to discourage migrants from bringing their family members to Saudi Arabia (Ernst & Young, 2017). For instance, literature highlights that family levies and the implementation of VAT are some of the main reasons forcing some families to leave Saudi Arabia (Jamal 2023, 6). At the same time, one South Asian stakeholder responding to the key informant interviews (KIIs) was of the view that most migrant workers from South Asia to the Gulf are not interested in taking their families to the Gulf, as they can save more if migrating alone. A KII respondent also noted that the restrictive social setup in Saudi Arabia is another reason for migrants to opt to leave their families back in their countries of origin. Among those who bring family to Saudi Arabia, the limited scope for naturalisation prompted them to see Saudi Arabia as an interim stop in their 'stepwise migration' process to other countries of destination, such as those in the West.

Concerns on Labour Migration to Saudi Arabia

Despite the long history of migration between South Asian countries and Saudi Arabia, the existence of an elaborate institutional context, and the recent reforms of labour and migration policies in the Kingdom, South Asian migrant workers in Saudi Arabia and their related stakeholders continue to have a few key grievances. The following section outlines these concerns.

Working Conditions

One of the main areas of concern for South Asian sending countries to Saudi Arabia is poor working conditions. For instance, Weeraratne and Gunawardena (forthcoming) highlight how migrant female domestic workers face various types of harassment, not limited to verbal, mental, and physical abuse during work. A Nepali KII respondent was of the view that, when confronted with poor working conditions, Saudi Arabia adopts various strategies instead of actively working to address the root problem. Some of these strategies include looking for alternative countries of origin, such as Africa instead of SA. Other strategies include signing of double contracts – one for the migrant workers to leave the South Asian countries of origin and a second contract in Saudi Arabia; not allowing any presence of international agencies such as the ILO or IOM to establish in Saudi Arabia; and maintaining an unequal balance of power between the countries of origin and Saudi Arabia.

Vulnerability

Poor working conditions easily translate into high vulnerability among migrant workers. In the case of Sri Lanka, recent statistics on complaints made by migrant workers show that the largest number of complaints is made by those in Saudi Arabia. This is due both to the high number of migrant workers in Saudi Arabia as well as the distinct vulnerability profile there. In 2020, complaints accounted for 16% of departures from Sri Lanka to Saudi Arabia. Strict religious and cultural restrictions also make migrant workers from Sri Lanka more vulnerable. For instance, as highlighted by Weeraratne and Gunawardena (forthcoming), migrant female domestic workers may be (or feel) restricted from going out on their own, which contributes to limiting their access to support when abuse occurs at the place of employment. In reaction to the high vulnerability of Sri Lankan migrant workers, especially females heading to Saudi Arabia, in 2013, Sri Lanka applied a higher minimum age of 25 years for female migrant workers heading to Saudi Arabia, while 23 years was applicable for other Middle Eastern countries, and 21 years for all other countries (Weeraratne 2016). This higher age barrier was specifically imposed to send more mature women to Saudi Arabia who would be less likely to find themselves in a vulnerable situation. Similarly, Nepal had a higher minimum age of 24 years for Saudi Arabia, while for other countries it was 18 years (CESLAM 2019). The imposition of age barriers for labour migration for women is a common response from South Asian countries in protecting their migrant workers.

Forced Labour and Non-Protection of Wages

Forced labour in Saudi Arabia is another concern harboured by South Asian migrant workers and their stakeholders. Literature shows evidence of various aspects of forced labour among migrant workers in Saudi Arabia, including a high prevalence of wage theft. Impact (2023) defines wage theft as delayed payment, underpayment, and non-payment. For instance, Migrant Forum in Asia (MFA) (2021) highlights that "among the countries of destination…Saudi Arabia has registered the highest number of cases of wage theft, at 292 cases [out of 388 cases]." More recently, data from a survey

Table 4: Complaints by Sri Lankan Migrant Workers by Country of Destination (2015–2020)

Country	No. of complaints		Departures	Complaints as a share of departures (%)
	2015–19 Average	2020	2020	2020
Saudi Arabia	2,565	1,460	9,407	16
Kuwait	1,027	1,374	8,040	17
UAE	455	729	10,714	7
Qatar	386	506	9,689	5
Oman	301	394	2,723	14
Malaysia	125	95	522	18
Jordan	99	111	955	12
Romania	28	144	1,370	11
Bahrain	26	31	1,050	3
Lebanon	24	58	538	11
Others	80	228	4,145	6
Total	**5,115**	**5,130**	**49,153**	**10**

Source: Adapted from Weeraratne (2023).

by Building and Wood Workers' International (BWI)[2] (2024, p. 27) on forced labour collected between April and May 2024, shows that "as many as 63% of the 193 respondents… were not able to terminate employment with reasonable notice or leave their jobs when their contracts expired" (see Table 5). As noted by BWI (2024), a Nepali migrant worker who was hired through a manpower agency in Saudi Arabia had a salary lower than directly hired employees and was paid a lower overtime payment than others. When he wanted to leave the job, the company asked him to pay USD 1,390 to approve his exit. Unable to pay this amount, he "continued to work with his employer, against his consent, under forced labour conditions." Another common mechanism for forced labour is retention of the worker's personal documents, such as passports and *iqama*s. BWI (2024) shows that 65% of migrant workers in their sample reported that their employer retained their personal documents. Highlighting all of these, in June 2024, the BWI lodged a complaint focusing on Saudi Arabia's failure to observe ILO conventions on forced labour, in parallel to Saudi Arabia's bid for the 2034 FIFA World Cup.

Human Rights

Migrant workers from South Asia perceive that the protection of their human rights in Saudi Arabia is at a relatively low level. This concern is further validated by the rules in Saudi Arabia, which prevent collective action and migrant workers from forming trade unions. Moreover, the absence of international agencies that can protect and ensure the rights of migrant workers is also a notable feature of Saudi Arabia. This is highlighted by the recent complaint lodged by BWI against Saudi Arabia (BWI 2024).

Asymmetry of Power

Due to the high importance of Saudi Arabia as a country of destination to each of these sending countries in South Asia, none of these governments are able to have a voice in improving the conditions for their migrant workers in Saudi Arabia. Moreover, the diversification policies in Saudi Arabia as a country of destination have led to competition

Table 5: Wage Theft and Human Rights Violation of Migrant Workers in Saudi Arabia (2024)

	%				
Type of Wage Theft and Human Rights Violation	Yes	No	other than Y/N	No Response	Total
Employer restricts workers from leaving the workplace	26	74	0	0	193
Restricted workers' freedom to come and go from the dormitories	26	74	0	0	193
Used violence/threats to intimidate workers	17	83	0	1	193
Delay/withhold wage payments to coerce workers	46	54	0	0	193
Force workers to work, to discipline them or as punishment for participation in a strike	7	96	0	0	193
Deny workers access to their personal documents	65	34	0	0	193
Use threats (i. e., deportation, cancellation of visas, or reporting to the authorities) to force workers to stay at the job	20	80	0	0	193
Use any other coercive tactics to overwhelm workers' ability to make decisions in their own interests	17	83	0	0	193
Worker free to terminate employment with reasonable notice and to leave the job when the contract expires	34	63	0	3	193
Worker with debts to the employer can freely leave the job	19	85	4	1	193
Forced to work overtime under threat of penalty	25	75	0	0	193

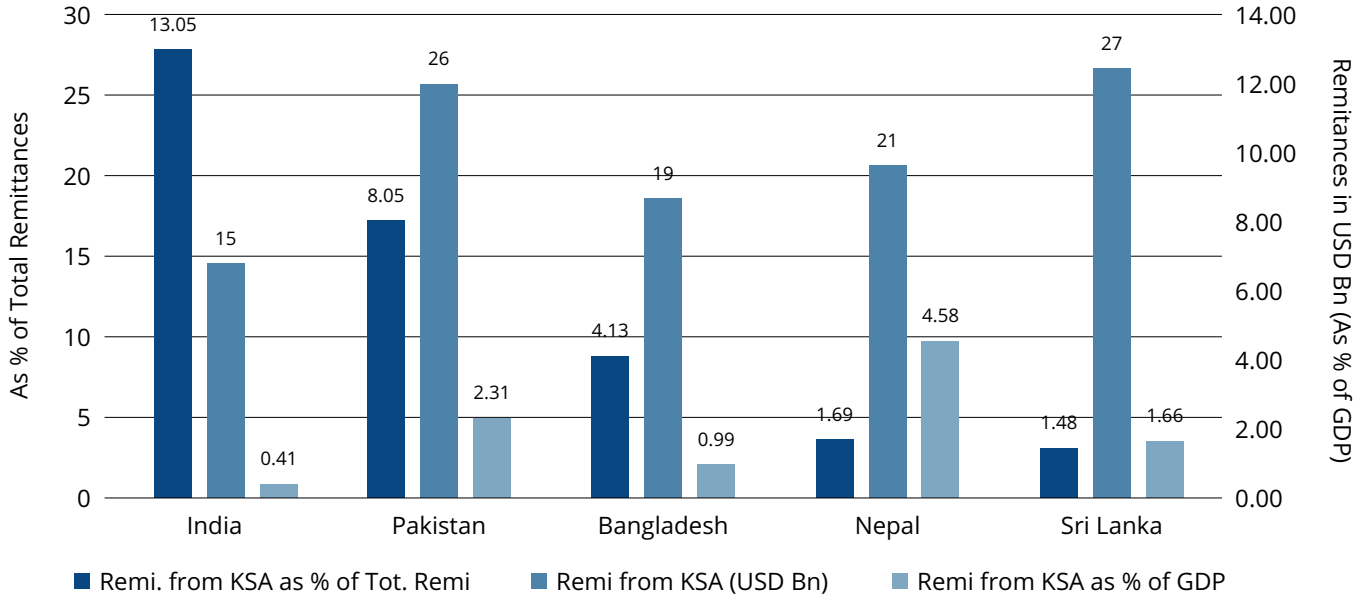
Source: Adapted from BWI (2024) Table 3.1.

amongst each of the South Asian countries, as well as African countries for the same types of skills groups and occupations. Such competition further limits any effective negotiations with Saudi Arabia for improvement. As such, other than banning female workers or imposing higher age restrictions, South Asian countries have not been successful in reacting to conditions in Saudi Arabia.

Comparative Preference

Migrant workers from Nepal prefer to go to more liberal countries than Saudi Arabia for foreign employment. As such, as mentioned by one KII respondent, "Nepali workers are not proud to say that they work in Saudi Arabia." Despite a lower wage, they often prefer to work in alternative

Figure 2: Bilateral Remittances from Saudi Arabia to South Asia – 2021



Source: KNOMAD/World Bank Data (2022).

Table 6: Bilateral Remittance Cost to Remit SAR 750 from Saudi Arabia in February 2024

Country	Fees	Exchange rate margin	Total cost%	Total cost SAR
Bangladesh	31.37	7.79	11.98	89.82
India	26.65	1.52	5.07	38.05
Nepal	28.41	0.90	4.68	35.13
Pakistan	29.28	0.66	4.56	34.23
Sri Lanka	16.82	0.71	2.95	22.10

Source: The World Bank, Remittance Prices Worldwide, available at http://remittanceprices.worldbank.org (The World Bank n. d.).

countries of destination if they have a choice. This is mainly due to the perception that Saudi Arabia applies a more restrictive rights regime in comparison to other destinations, including other Gulf destinations. Another KII representative from Sri Lanka echoed this. He mentioned that, previously, Sri Lankan migrants didn't like to migrate to Saudi Arabia for employment due to the many restrictions, such as dress code and lack of freedom to go out during their off day. Now, with the minimisation of many of these restrictions, the preference for Saudi Arabia is somewhat improving. Still, the religious restrictions in Saudi Arabia compared to other Gulf countries are discouraging. As commented by stakeholders in Sri Lanka, migrants have a lower preference for employment in Saudi Arabia relative to other Gulf countries, yet numbers are high because Saudi Arabia salaries are attractive. Thus, this lower preference is not reflected in departure statistics. A similar sentiment is expressed in the context of all South Asian countries represented by a regional stakeholder. For instance, South Asian migrants may prefer to go to Europe over Saudi Arabia or the Gulf, but some still decide to go there due to attractive salaries, geographic proximity, and relative ease of entry.

Cost of Remittances

Remittances from foreign employment play a key role in the South Asian region's economy. For instance, in 2023, Nepal received USD 10.9 billion in remittances, which accounted for 26.5% of its GDP – the highest share in the region. "The sustained share of remittances, at around 25% of GDP for over a decade, contributed to an estimated 32% reduction in

poverty [in Nepal]" (KNOMAD 2024, 38). Among alternative countries of destination, Saudi Arabia plays an important role in remittances to the region. In Sri Lanka, remittances from Saudi Arabia in 2023 reached USD 542.65 million, which accounted for 9% of total remittances received by Sri Lanka (USD 5,969.56 million) (CBSL 2023). Figure 2 below depicts bilateral remittances from Saudi Arabia to the five South Asian countries considered. The largest amount of remittances from Saudi Arabia was received by India, which was USD 13,052.35 million, while the lowest was received by Sri Lanka, which was USD 1,475 million. However, it is important to note that official remittances to Sri Lanka were on a declining trend due to the socio-political crisis in Sri Lanka. Moreover, statistics from 2021, which were affected by the COVID-19 crisis, may not reflect a normal year.

Preference for a country of destination is also influenced by how much migrant workers can remit to their families left behind. In addition to their salary, in this context, migrants also consider the cost of remittances. Table 6 below depicts the cost to remit SAR 750 to each of the South Asian countries in February of 2024. Among the five countries considered, the lowest cost of remittances is reported for Sri Lanka, which is SAR 22.10. As a percentage of the amount remitted, this was 2.95%. The highest cost of remitting from Saudi Arabia to South Asia is associated with Bangladesh, which is 11.98% of the amount remitted or SAR 89.82. As such, it is important for Saudi Arabia to consider mechanisms to reduce the remittance cost to all countries other than Sri Lanka, which reports over the threshold of 3% identified by the Sustainable Development Goals-related Indicator 10.c.

Reintegration

Saudi Arabia, as a country of destination, is very specific about the temporary nature of the migration inflows. Ideally, in such contexts, efforts for successful return and reintegration should be a "shared responsibility between origin and destination countries" (Wickramasekara, 2019, p.12). South Asian stakeholders believe that, while Saudi Arabia clearly presents labour migration as temporary, it provides limited support or frameworks for migrant workers' return and reintegration in South Asia.

Future Trends

Global drivers

Future projects in Saudi Arabia, such as the 2034 FIFA World Cup and the development activities of Vision 2030, Saudi Arabia's plan to build the tallest building, etc., mean increased infrastructure and construction projects for South Asian stakeholders. This would also mean increased demand for workers, especially migrant workers. However, there are competing global trends that may decrease the supply of migrant workers to Saudi Arabia. One is the increasing global care deficit and the high demand for care workers globally. This excess supply would lead to two main implications. First, workers in other sectors (i. e., hospitality) or occupations (i. e., housekeepers) would also upskill themselves and seek employment in the highly demanded and well-paying care sector, leading to shortages in other sectors and occupations. Second, when Western countries also face demand for care workers, the relatively high preference for employment in such countries with their fewer cultural restrictions, better protection for migrant workers, and potential for naturalisation, would mean a lower supply to Saudi Arabia. Additionally, the relative ease of migrating to competitor countries would also contribute to decreasing the supply of migrant workers to Saudi Arabia. For instance, the introduction of the Job Seeker Visit Visa scheme in the UAE in recent years has served as a great pull factor attracting potential migrant workers to the UAE, as it minimises red tape in migrating for employment. For example, a job seeker's visit visa grants permission to a foreigner to search for a job without requiring a host/sponsor in the country, for one trip[3]. This would significantly influence potential migrant workers' decision between the UAE and Saudi Arabia as a destination.

South Asian Trends

As a region, South Asia is expected to grow at 6% and 6.1% in 2024 and 2025, respectively (World Bank 2024). However, "the region does not create jobs nearly fast enough to provide employment for its growing population" (World Bank 2024, 26). Specifically, with only an average of 10

million jobs created per year in absolute terms since 2000, the working-age population grew on average at 19 million per year. This was a key contributor to the steady supply of migrant workers from South Asia to Saudi Arabia. Another is the growing climate vulnerability of the region. The World Bank (2024) identifies that the agriculture sector in South Asia, which employs almost half of the region's working-age population, is particularly susceptible to climate vulnerability. The World Bank (2024) underscores that when faced with climate change, labour market adjustment in terms of international migration is prominent in South Asian households, while income from remittances adds to their resilience. In the face of growing climate issues and the inadequacy of employment opportunities in the South Asian region, the outflow of migrant workers to Saudi Arabia is expected to continue.

This outlook may be tapered if the region succeeds in "faster job creation, especially the creation of more productive jobs, [that] may also slow emigration" (World Bank 2024). Moreover, given that "much of the strength of output growth in the region is attributable to India" (World Bank 2024, 17). India's economic performance may have an impact on migration outflows from the region. Specifically, India's recent promising performance in employment creation (80 million new jobs between 2017–18 to 2021–22) (Ministry of Finance, India. 2024). If ongoing investment drives in India translate to better prospects locally, this may slow migration from India and South Asia as a whole. As revealed by a KII respondent, India is currently investing heavily in upskilling, infrastructure, and a smart city project, which are bound to yield substantial progress and employment opportunities within India. Similarly, growth projections for India in 2025 are promising, ranging from 6.8%–7.2%, (Business Standard 2024). IMF further expects India to grow by 6.5% in 2025 and 2029, respectively (IMF 2024, 12). At the same time, over recent years, the unemployment rates in India have fallen from 4.2% to 4.1% and 3.2% during 2020–21, 2021–22, and 2022–23, respectively (Ministry of Labour & Employment 2024). For 2028, unemployment in India is projected at 3.68% (Ministry of External Affairs 2024). In such a context, Indian workers may prefer to migrate internally instead of internationally, which might decrease the supply of unskilled migrant workers to Saudi Arabia.

In the case of Bangladesh, the recent socio-political unrest has changed many dynamics in the country. Prior to this unrest and the appointment of an interim government in August 2024, Bangladesh was already facing economic challenges, including high inflationary pressure, slow growth in job creation, unemployment, stagnant private sector investment, and declining foreign reserves (Raihan and Sen 2024). On the political front, the interim government is expected to pave a path for permanent leadership in Bangladesh. Going forward, remittances from migrant workers would continue to be an important driver for growth in the economy, as economic issues related to inflation, unemployment, and possible efforts to increase tax collection may contribute to greater labour migration from Bangladesh in the near future, generally, and to Saudi Arabia in particular. Climate mobility is another growing issue for Bangladesh.

Similar to Bangladesh, Pakistan and Sri Lanka have also experienced socio-economic and political unrest in recent years. In 2022, Pakistan experienced multiple challenges, including political instability, depleting foreign reserves, depreciation of the currency, higher inflation, and severe floods. These contributed to creating major threats to the financial stability of the Pakistani economy. As such, while migration and remittances have been a major contributor to the Pakistani economy, the possible continuation of these social, political, and economic issues would further promote labour migration from Pakistan to the rest of the world, including to Saudi Arabia. The future trends in labour migration from Pakistan to Saudi Arabia are dependent on the economic situation of the country, which in turn is dependent upon the implementation of the IMF Stand-By Arrangement, fiscal restraint, and external financing. However, future migration flows from Pakistan would continue to struggle to diversify the skill composition of migrant workers and continue to send a majority of low-skilled males, mainly employed in transport, construction, and industry sectors.

In Sri Lanka, the economic crisis and the related economic context resulted in a greater push for outward migration from the country, including to Saudi Arabia. These include migration being promoted at the macro level, as well as households resorting to migration as a micro-level coping mechanism. Given that Sri Lanka's economic issues will likely continue into the next 3–5 years, trends in labour migration may continue to be a dominant coping mechanism in Sri Lanka, and the trends in departures to Saudi Arabia are likely to continue. At the same time, Sri Lanka has been struggling for many years to change the skill and destination compositions of migrant workers, to promote greater departure of more skilled workers, and to capture new destinations. Specifically, while Sri Lanka's migration policy of 2008 notes skills and destination diversification as priorities, from 2010 to 2022, on average, Saudi Arabia,

Qatar, the UAE, and Kuwait still accounted for 78% of departures.[4] Similarly, when skilled workers accounted for 23% of all departures in 2010, by 2022, this had increased only to 30%[5]. However, the limited success in these efforts indicates that in the near future, most migrants from Sri Lanka would continue to be low-skilled workers, including female domestic workers heading to the Middle East. The direction that Sri Lanka would take in terms of addressing ongoing political instability and managing the economic crisis and underlying socio-economic issues is subject to the outcome of the upcoming general election. The possible change of power and related socio-political and economic implications may change the dynamics for labour migration from Sri Lanka. Similarly, the progress of the ongoing macroeconomic and fiscal reforms, debt restructuring, and structural reforms will set the tone for the economic situation in Sri Lanka. Unfavourable economic conditions will serve as a strong push factor for labour migration to the rest of the world, including to Saudi Arabia.

Unlike the experience of Bangladesh, Pakistan, and Sri Lanka, the Nepali economy is at a stable position as of late 2024 and saw a near absence of any political or social challenges[6]. Specifically, the World Bank projects a favourable position for the Nepali economy with a GDP growth rate of 5% on average, over FY 25–26, a shrinking trade deficit, a current account surplus, a shrinking fiscal deficit, low inflation, and a stable banking sector (World Bank 2024). As such, there is less likely to be new pressure for labour migration from Nepal to Saudi Arabia, other than the ongoing migration trends, where a large proportion of households have an overdependence on remittances as a 'lifeline' to their income (KNOMAD 2024).

Nepal's key destinations are Qatar, the UAE, Saudi Arabia, and Malaysia. With the end of Qatar World Cup, the demand for labour from Qatar declined, while demand from Saudi Arabia is on the rise. Similarly, Malaysia's demand for Nepali workers has declined. Given that the same type of Nepali migrant workers go to Saudi Arabia, Qatar, and Malaysia, the decline in demand in the last two would translate to a greater supply of migrant workers from Nepal to Saudi Arabia. Stakeholders are of the view that labour migration from Nepal to Saudi Arabia will continue, and within the next 5 years, other countries of destination will be unable to surpass Saudi Arabia in importance as a destination for Nepal.

In general, the South Asian economies suffer from a poor investment climate that will continue to leave a gap in employment opportunities for this region. Moreover, reform delays in countries such as Pakistan, Bangladesh, and Sri Lanka, and related economic instability, will serve as push factors for labour migration from this region in general, including to Saudi Arabia (KNOMAD 2024).

Conclusion and the Way Forward

This paper examined the labour migration trends and provided an evidence-based analysis of how migration stakeholders in South Asia perceive the labour migration environment and priorities in Saudi Arabia and how their perceptions shape migration flows along the South Asia to Saudi Arabia corridor.

The analysis provides valuable insights for shaping the future trajectory of labour migration to Saudi Arabia, and to further align the migration environment in Saudi Arabia with its Vision 2030 Program. As identified in the analysis, a few areas to focus on for further research and improvement of existing policies include:

- Diversify countries of destination: There is a strong demand for South Asian migrant workers in the Gulf – low-skilled workers due to their hard-working nature and lower demands, and high-skilled workers due to their technical competencies. However, large external shocks, such as realignment of global trade, regional instability, and a shifting investment landscape could destabilise this demand. It is thus crucial for sending countries to diversify their migrant workers' destinations as well as have measures in place for urgent repatriation, when and if needed.

- Carefully consider the costs incurred by firms related to foreign workers, as well as the potential implications for undocumented migration in Saudi Arabia, when implementing policies such as Nitaqat and modifying residency regulations.

- Improve implementation and enforcement of rules and regulations pertaining to migrant workers.

- Revisit enabling international organisations such as ILO and IOM to establish offices in Saudi Arabia.

- Pay attention to the type of recruitment conducted in countries of origin to ensure attracting the workers with the required skills to Saudi Arabia.

- Facilitate the return and reintegration of migrants in their countries of origin. Saudi Arabia prioritises attracting temporary migrant workers but pays little attention to their return and reintegration. Saudi Arabia should thus consider strategies to support the return and reintegration of temporary migrant workers, for instance drawing inspiration from South Korea's successful Happy Returns Program.

- Understand the strategies adopted by competitor countries of destination to attract migrant workers, i. e., the UAE and its Job Seeker Visit Visa scheme.

- Reduce cost of remittances from Saudi Arabia to countries in South Asia, to enhance and sustain Saudi Arabia's attractivity to migrants. For example, the UAE introduced in 2023 a framework for "use of local currencies in cross border transactions and cooperation for interlinking payments and messaging systems between India and the UAE" (KNOMAD 2024, 37). This may act as a pull factor for migrants to head to the UAE instead and deter skills and talents useful to Saudi Arabia's reform process to choose to Kingdom as a destination.

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Annex

Table A1: Inflow of Migrant Workers from South Asia to Saudi Arabia (2014–2023)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Bangladesh	10,657	58,270	143,913	551,308	257,317	399,000	161,726	457,227	612,418	497,674
India	329,937	308,380	165,356	78,611	72,399	161,103	44,316	32,845	178,630	200,713
Nepal	86,613	96,887	138,529	72,892	40,962	46,080	39,279	23,324	125,369	55,791
Pakistan	312,489	522,750	462,598	143,363	100,910	332,713	136,376	155,777	514,909	426,951
Sri Lanka	80,480	74,894	63,389	37,745	35,866	35,478	9,402	27,417	53,902	63,929

Source: ADBI, ILO and OECD (2024).

Table A2: Characteristics of KII Respondents

	Affiliation	Type of Institution	Interviewee Expertise
South Asia	ILO Regional Office for South Asia	International Organisation	Research and governance of labour migration in South Asia
Bangladesh	NA	NA	NA
India	International Institute for Migration and Development (IMAD)	Research Institute	Research and governance of labour migration from South Asia and India
Nepal	Center for the Study of Labour and Mobility (CESLAM)	Research Institute	Research, labour migration from Nepal
Pakistan	Sustainable Development Policy Institute (SDPI)	Research Institute	Research, labour migration from Pakistan
Sri Lanka	Ministry of Labor and Foreign Employment	Government ministry in charge of labour migration	Governance, policy maker, labour migration from Sri Lanka

Source: Author's compilation.

Endnotes

1 For a processing of the data please see: https://gulfmigration.grc.net/glmm-database/demographic-and-economic-module/?search=1&cmct=Saudi+Arabia.

2 Specifically, this survey related to BWI (2024), and involved a sample of 193 cases involving migrant workers from India, Pakistan, Nepal, Sri Lanka, Bangladesh; data were collected between 15 April 2024 and 15 May 2024-through legal clinic interviews in the Philippines, face-to-face interviews with workers (in their home country), telephonic interviews with workers (in Saudi Arabia and/or their home country), and online interviews with workers.

3 https://u.ae/en/information-and-services/visa-and-emirates-id/visit-visas/jobseeker-visit-visa

4 Author's calculations based on CBSL data.

5 Author's calculations based on CBSL data.

6 The Report was written before the political upheavals of September 2025.

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