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Artificial Intelligence Readiness Assessment Report

ACKNOWLEDGEMENTS

This publication reflects the collective effort of the Saudi Data and AI Authority (SDAIA), numerous governmental entities, industry partners, academic institutions, and international experts who have contributed to advancing Saudi Arabia's AI journey. Saudi Arabia has fostered a comprehensive and inclusive approach to the development of its AI ecosystem, engaging extensively with stakeholders through workshops, public consultations, strategic partnerships, and advisory committees. Our deepest gratitude to the UNESCO headquarters who has contributed to these efforts, making significant strides in shaping the Kingdom's AI landscape.

Since its inception in 2019, SDAIA has led the charge in establishing a robust AI and data governance framework for the Kingdom, supported by its three sub-entities, the National Data Management Office (NDMO), the National Information Center (NIC), and the National Center for Artificial Intelligence (NCAI). Beyond this SDAIA-centric ecosystem, we also acknowledge the invaluable contributions of several government entities, including the National Cybersecurity Authority (NCA), the Ministry of Communications and Information Technology (MCIT), the Digital Government Authority (DGA), the Communications, Space & Technology Commission (CST), and the Public Investment Fund (PIF), which have played critical roles in contributing to Saudi Arabia's AI journey. This collaborative framework has been instrumental in advancing Saudi Arabia's AI agenda.

Through these collective efforts, Saudi Arabia is not only advancing its national AI agenda but also contributing to the global discourse on responsible AI development, ensuring that the Kingdom remains at the forefront of AI innovation and ethics.

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ACRONYMS AND ABBREVIATIONS

AI	Artificial Intelligence
API	Application Programming Interface
CAGR	Compound Average Growth Rate
CCRF	Cloud Computing Regulatory Framework
CITC	Communications and Information, Technology Commission
CoE	Centre of Excellence
CSP	Cloud Service Provider
CST	Communications, Space & Technology Commission
DGA	Digital Government Authority
DM	Data Management
DMO	Data Management Offices
DSF	Digital Skills Framework
EGDI	E-Government Development Index
EPI	E-Participation Index
FII	Future Investment Initiative
GAIA	Generative AI Accelerator
GCC	Gulf Cooperation Council
GCI	Global Cybersecurity Index
GDP	Gross Domestic Product
GenAI	Generative Artificial Intelligence
GERD	Gross Expenditure on Research and Development
GPU	Graphics Processing Unit
GSB	Government Service Bus
GSN	Government Secure Network
HRDF	Human Resources Development Fund
IAIO	International AI Olympiad
ICAIRE	International Center for Artificial Intelligence Research and Ethics
ICESCO	Islamic World Educational, Scientific and Cultural Organisation
ICT	Information and Communication Technology

IEEE	Institute of Electrical and Electronics Engineers
IRCAI	International Research Centre on Artificial Intelligence
ISO	International Standardisation Organisation
IoT	Internet of Things
IT	Information Technology
ITU	International Telecommunication Union
K-12	Kindergarten to 12 th Grade
KACST	King Abdulaziz City for Science and Technology
KAIMRC	King Abdullah International Medical Research Center
KAUST	King Abdullah University of Science and Technology
KPI	Key Performance Indicator
KSA	Kingdom of Saudi Arabia
LLM	Large Language Model
MCIT	Ministry of Communications and Information Technology
MENA	Middle East and North Africa
MoC	Ministry of Culture
MoE	Ministry of Education
MoH	Ministry of Health
MOI	Ministry of Interior
NCA	National Cybersecurity Authority
NCAI	National Center for Artificial Intelligence
NCBE	National Committee of Bioethics
NCS	National Cryptographic Standards
NCSI	National Cyber Security Index
NDB	National Data Bank
NDI	National Data Index
NDMO	National Data Management Office
NeIC	National eLearning Centre
NIC	National Information Center
NLP	Natural Language Processing
NSDAI	National Strategy for Data and AI
ODIN	Open Data Inventory Ranking
OE	Operational Excellence
OGDI	Open Government Data Index

OSI	Online Service Index
PDPL	Personal Data Protection Law
PIF	Public Investment Fund
PNU	Princess Noura University
R&D	Research and Development
RAM	Readiness Assessment Methodology
RDIA	Research, Development and Innovation Authority
SAMA	Saudi Central Bank
SASO	Saudi Standards, Metrology and Quality Organisation
SCAI	Saudi Company for Artificial Intelligence
SCC	Saudi Communication Commission
SCI	Smart City Index
SD-WAN	Software-Defined Wide Area Network
SDA	Saudi Digital Academy
SDAIA	Saudi Data and AI Authority
SDGs	Sustainable Development Goals
SGI	Saudi Green Initiative
SON	Self-Organising Network
SPGA	State Properties General Authority
SPI	Statistical Performance Indicators
SPINE	Saudi Private Integration Network Exchange
STC	Saudi Telecom Company
STEM	Science, Technology, Engineering, and Mathematics
STV	Saudi Technology Ventures
TB	Terabyte
UNESCO	United Nations Educational, Scientific and Cultural organization
UNPSA	United Nation Public Service Award
VC	Venture Capital
WCAG	Web Content Accessibility Guidelines
WSIS	World Summit and Information Society
WWT	Worldwide Technology

FOREWORD



We have officially entered the Age of Artificial Intelligence. The world is now set to change at a pace not seen in decades, even centuries. AI-based tools and applications make our lives easier, smoother, and richer. They help us move efficiently, get informed, get credit, get a job, and get our taxes done.

But in its current form, AI reproduces and amplifies many of the social challenges we face. It is not acceptable that around a third of the world's population still lacks adequate internet access. Upstream, the AI industry is highly concentrated, with just two countries – the United States and China – and a dozen companies accounting for a major share of the sector. This can lead only to greater inequality of outcomes – including gender disparities – downstream. Non-diverse AI teams, unrepresentative datasets, and opaque and biased algorithms can cause harm, particularly to those who are already vulnerable, whether companies or individuals, children and young people, women, or entire democracies.

That is why UNESCO drafted the Recommendation on the Ethics of Artificial Intelligence, which was adopted in 2021 by 193 countries to make sure AI delivers fair, sustainable, and inclusive outcomes. The Recommendation is based on the protection and promotion of human rights, human dignity, and environmental sustainability, and these values are then translated into principles such as accountability, transparency, and privacy. The Recommendation also sets out concrete policy actions that governments can draw on to steer technological developments in a responsible direction, premised on the belief that light-touch regulation, which has until now remained the norm, is insufficient. We need capable governments that are well equipped, in terms of competencies, institutions and laws, to frame responsible AI development and protect the rule of law online, and public and private developers who are accountable for putting human rights and fundamental freedoms – not profits or geopolitical considerations – first.

The Readiness Assessment Methodology (RAM) is a diagnostic tool intended to assist Member States in upholding their commitment to the Recommendation by helping them understand how prepared they are to implement AI ethically and responsibly for all their citizens. By highlighting any institutional, regulatory, or data gaps and obstacles, it enables UNESCO to tailor support for governments to fill those gaps to ensure an ethical AI ecosystem aligned with the Recommendation.

This report throws a spotlight on the rapid evolution of the AI landscape in Saudi Arabia. RAM identifies several key strengths bolstering this burgeoning ecosystem. The Saudi Data and AI Authority (SDAIA) has developed a robust governance framework committed to providing strategic oversight and aligning AI development with ethical standards. Significant investments in AI research, infrastructure, and education, including initiatives like the KAUST-SDAIA Centre of Excellence, are fostering innovation and talent development. Additionally, efforts to promote inclusion and diversity, such as the Elevate Program, underscore a commitment to bridging digital gender gaps and empowering women in AI-related fields. We have also been delighted to see the recent launch of the International Center for Artificial Intelligence Research and Ethics (ICAIRE) as a Category 2 Centre under the auspices of UNESCO and look forward to a fruitful collaboration on advancing ethical AI.

The assessment also identifies significant challenges that must be overcome to ensure that Saudi Arabia reaches its full potential in AI. These include a shortage of AI talent, limited infrastructure readiness among government entities and private businesses, and difficulties translating research into scalable AI products. While the Kingdom's regulatory framework is evolving, sector-specific sandboxes and more effective public-private partnerships will help refine AI applications. Gender disparities in STEM and a slow-growing startup ecosystem further underscore areas requiring attention. The report provides key recommendations to address these challenges through targeted reforms, capacity building, and improvements to the investment ecosystem, to ensure that Saudi Arabia continues to grow its AI landscape in an ethical, inclusive and sustainable manner.

Overall, this report presents a fundamentally optimistic vision that we at UNESCO share: that ethical governance and responsible regulation of AI is entirely consistent with innovation and economic growth and is essential for ensuring a technological ecosystem that benefits the public good. With the RAM data and this report, the Kingdom of Saudi Arabia has a clear roadmap for how to get there.

It was a pleasure working with the Government of the Kingdom of Saudi Arabia to conduct this exercise. We are grateful for their engagement with the RAM, and I am sure that by following the path laid out in this report, the Kingdom will be able to reap the benefits of AI while making sure that AI technologies deliver fair, sustainable, and inclusive outcomes.

Gabriela Ramos

Assistant Director-General for Social and Human Sciences, UNESCO

EXECUTIVE SUMMARY

The rapid advancement of artificial intelligence (AI) globally presents both unprecedented opportunities and significant challenges. UNESCO has been at the forefront of global efforts to ensure that the rapid advancements in AI are aligned with ethical principles that protect human rights, dignity, and the environment. In 2021, UNESCO's 193 Member States adopted the Recommendation on the Ethics of Artificial Intelligence, which serves as a global standard to guide countries in leveraging the positive impacts of AI while addressing its inherent risks.

To assist Member States in evaluating their preparedness to implement AI responsibly, UNESCO developed the Readiness Assessment Methodology (RAM). The RAM is a macro-level diagnostic tool that offers a thorough evaluation of a country's institutional and regulatory frameworks needed to govern AI effectively. By pinpointing existing gaps and areas for improvement, the RAM ensures nations are well-equipped with the necessary human resources, policies, and regulations to address the complex challenges posed by AI, guiding AI development in a manner that prioritises ethical considerations.

The RAM comprises eight key stages:

1. **Diagnosis of the National AI Landscape:** This stage provides a comprehensive overview of the Saudi Arabia's national AI journey, including AI governance in the country and the international achievements.
2. **Legal And Regulatory:** This stage provides Saudi Arabia's comprehensive guidelines and legal framework, including the Personal Data Protection Law and AI Ethics Principles, ensuring responsible and secure AI adoption.
3. **Social And Cultural:** This stage illustrates Saudi Arabia's significant progress in promoting diversity and inclusion.
4. **Scientific And Educational:** This stage provides an overview of Saudi Arabia's efforts to advance AI through robust R&D initiatives and significant research output.
5. **Economic:** This section highlights Saudi Arabia's strategic efforts to integrate AI into its economy, addressing the increasing demand for AI talent in the labour market.
6. **Technical And Infrastructural:** This section explores Saudi Arabia's progress in building a robust technical and infrastructural foundation for AI.
7. **Development of a National AI Multi-Stakeholder Roadmap:** In this stage, the assessment focuses on engaging stakeholders from various sectors to gather insights and establish a collaborative approach to AI governance.
8. **Formulation of Policy Recommendations:** The final stage of the RAM process involves creating tailored recommendations that address the country's specific needs, challenges, and opportunities in AI development.

Diagnosis of the National AI Landscape

- **KSA National AI Journey**

Since the establishment of the Saudi Data and AI Authority (SDAIA) in 2019, Saudi Arabia has developed a robust governance framework that drives the nation's AI agenda. SDAIA, chaired by His Royal Highness Prince Mohammed bin Salman bin Abdulaziz Al Saud, Crown Prince and Prime Minister, oversees the National Strategy for Data and AI (NSDAI) and leads efforts in policymaking, regulations, and enablement, supported by its three key entities: the National Information Center (NIC), the National Center for Artificial Intelligence (NCAI), and the National Data Management Office (NDMO).

- **KSA AI Governance**

In 2019, Saudi Arabia embarked on an ambitious AI journey with the establishment of the Saudi Data and AI Authority (SDAIA), tasked with overseeing the national data and AI agenda. The publication of the National Strategy for Data and AI (NSDAI) in 2020 marked a significant milestone in this journey, outlining the Kingdom's vision to become a global leader in AI by 2030. Central to this strategy is the commitment to ethical AI, as embodied in the AI Ethics Principles developed by SDAIA. These principles ensure that AI development in Saudi Arabia is aligned with both national values and international standards, emphasising transparency, accountability, and the protection of human rights.

- **International Presence**

Saudi Arabia has become a key leader in global AI discussions by hosting impactful international events that foster collaboration and innovation. These gatherings not only highlight the Kingdom's leadership in AI but also provide critical platforms for stakeholders to discuss pressing issues, share insights, and explore the transformative potential of emerging AI technologies. Also, Saudi Arabia is an active participant in international AI fora, demonstrating its commitment to ethical AI development, technological innovation, and global collaboration.

- **International Awards**

In addition to the international presence of KSA within the AI field, several initiatives and programmes have achieved international recognition, such as The World Summit on the Information Society (WSIS) and the United Nations Public Service Award (UNPSA).

- **International Indices**

As a testimony to the country's progress on its ambitious AI journey, KSA has achieved notable scores in international AI rankings, for example, Saudi Arabia proudly stands as the top-ranking country in the region and a global leader in AI, securing 14th place globally and 1st place worldwide in "Government Strategy for AI", as recognised by the Global AI Index 2024.

Legal and Regulatory

Saudi Arabia's National Strategy for Data and AI (NSDAI), spearheaded by the Saudi Data and Artificial Intelligence Authority (SDAIA), is the foundation of the Kingdom's ambition to become a global AI leader. This strategy is also complemented by specific guidelines developed by SDAIA, such as the AI Ethics Principles, GenAI guidelines and Deepfakes guidelines. Complementing these AI-specific guidelines is a robust legal framework that includes the Personal Data Protection Law (PDPL), Freedom of Information policy, and Anti-Cyber Crime Law positioning Saudi Arabia as a front-runner in responsible and secure AI adoption.

Social and Cultural

Significant progress has been made in promoting diversity and inclusion, particularly in the workforce. The labour force participation rate of Saudi women increased from 20% in 2017 to 34% in 2022, surpassing the Vision 2030 target ahead of schedule. However, digital gender gaps persist, and there is a need to ensure that AI technologies are developed in a way that is inclusive and culturally relevant. Initiatives like the Elevate Program, which aims to train 25,000 women in AI-related fields, are steps in the right direction.

Scientific and Educational

Saudi Arabia is making remarkable strides in AI and R&D, driven by a \$10.7 billion (SAR 40 billion) investment through the Public Investment Fund. Although GERD remains at 0.5% of GDP, the Kingdom has seen an impressive rise in AI research, with publications more than doubling from 4,100 in 2019 to 10,500 in 2023, and patents increasing five-fold. Anchored by leading institutions like KAUST and KFUPM and supported by centres such as the KAUST-SDAIA CoE, the ecosystem fosters innovation across key sectors, all aligned with Vision 2030. With initiatives like the Saudi Academic Framework for AI Qualifications and Tuwaiq Academy, alongside global partnerships, Saudi Arabia is nurturing AI talent and bridging the gap between research and real-world applications.

Economic Impact

Saudi Arabia's AI ecosystem has attracted significant investments, both from the public and private sectors. The Kingdom's AI-focused companies increased from 250 in 2019 to 317 in 2023, attracting over \$3.9 billion in funding in 2023 alone. The government's commitment is evident with over \$42 billion invested in digital, telecommunications, and AI sectors. Government-backed initiatives, including incubators and accelerator programmes, alongside private investments from major firms like Saudi Aramco, Prosperity7 Ventures, and NEOM have further accelerated the development of AI technologies.

Technical and Infrastructural

Saudi Arabia is rapidly advancing its AI infrastructure with increased data centre capacity (204MW in 2023), cutting-edge supercomputers like Shaheen III, and cloud platforms such as DEEM. However, only 28% of government entities and 22% of private businesses feel their AI infrastructure is adequate. Connectivity is improving but still lags behind GCC peers, with initiatives like SPINE targeting enhancements. Through global partnerships and the adoption of AI standards, Saudi Arabia is strengthening its role as a regional technology leader.

Public and private sector collaborations are key drivers of these efforts, with entities like SDAIA, KAUST, and Saudi Aramco leading the charge. The Kingdom is also making significant investments in GPUs and cloud services, ensuring that both government and commercial sectors are well-equipped to support advanced AI applications.

Developing a National Multi-stakeholder Roadmap

Saudi Arabia's comprehensive stakeholder engagement highlights key areas for policy and regulatory improvement. Insights gathered from consultations with government agencies, private sector leaders, academia, and international experts are critical in identifying challenges and leveraging opportunities in AI development. Key challenges are categorised into six principal areas:

- **Laws and Regulation**

Saudi Arabia's evolving AI regulatory framework requires specialised sandboxes for sector-specific needs. Implementation challenges in the public sector arise from unclear operational impacts. Data and Privacy

Regulatory Sandboxes present opportunities to refine AI applications, offering controlled environments for real-time policy improvements, especially benefiting the private sector.

- **Institutional Frameworks and Governance**

The National Strategy for Data and AI requires updates to reflect the latest stakeholder insights, with previously implemented policies needing efficacy assessments. In this context, the National Data Bank provides a platform to effectively track policy efficiency, ensuring AI governance remains relevant and dynamic.

- **Capacity Building**

Saudi Arabia confronts a significant talent shortage in AI, impacting innovation and technological adoption. Strengthening AI in educational programmes and expanding international collaborations will enhance the talent pool. Evolving training programmes in the public sector will help identify and utilise AI talent more effectively.

- **Responsible Technologies and Innovation**

Despite increased R&D funding, converting research into scalable products remains challenging. Public-private partnerships can catalyse the practical application of AI research. Developing advanced AI infrastructure and pioneering sustainability practices can position KSA as a leader in sustainable AI development.

- **Inclusion and Well-Being**

Saudi Arabia faces challenges in gender diversity within AI and Science, Technology Engineering, Mathematics (STEM) fields. Enhancing inclusion programmes and supporting educational initiatives aimed at young women in STEM can address disparities and empower a more diverse talent pool.

- **Investment Ecosystem**

The pace of growth for AI startups is slow, and the ecosystem lacks sufficient guidance from capital investors. Leveraging Saudi-based VC funds' international activity can help enhance local startup growth and foster a more cohesive AI startup scene in the Kingdom.

Saudi Arabia's AI journey has achieved significant milestones, yet addressing these key challenges is crucial to fully realising the Kingdom's potential in AI. In particular, by fostering a mature AI ecosystem that supports startups and attracts leading companies, and by advancing AI infrastructure underpinned by sustainable practices, Saudi Arabia can strengthen its position as a global leader in AI, driving innovation and contributing to broader social and economic progress.

Towards a National AI Strategy: High Level Recommendations

This section of the report provides targeted recommendations across six key dimensions critical to the success of Saudi Arabia's AI strategy. Each dimension is explored in depth, with specific recommendations designed to address the unique challenges and opportunities within Saudi Arabia's AI ecosystem.

- **Laws and Regulation**

To ensure the secure and ethical deployment of AI technologies, it is recommended to develop and implement comprehensive procurement policies that incorporate AI-specific requirements, ethical standards, and cybersecurity provisions.

- **Institutional Frameworks and Governance**

While it is key to maintain the centralized national governance through SDAIA, it is recommended to establish sectorial collaboration mechanisms that aim to enforce accountability on sector regulators to drive sectoral responsible AI adoption.

- **Capacity Building**

Building and sustaining a skilled AI workforce is a cornerstone of Saudi Arabia's AI strategy. To this end, AI should be embedded across educational curricula at all levels and AI learning opportunities should be expanded beyond traditional classroom settings. In parallel, to ensure that AI is responsibly integrated into the workforce, it is essential to assess its impact on jobs and develop targeted strategies that support workers in transitioning to new, skills-based roles that align with the demands of the evolving economy.

- **Responsible Technologies and Innovation**

To advance its AI infrastructure, it is recommended that the Kingdom focuses on enhancing the availability of high-performance computing resources, making them more accessible to start-ups, research institutions, and other key players in the AI ecosystem.

- **Inclusion and Well-Being**

Promoting diversity and inclusion in the AI and digital sectors is essential to ensuring that AI technologies benefit all segments of Saudi society. To achieve this, Saudi Arabia should develop guidelines that encourage the disclosure of diversity statistics by technology companies, particularly those involved in AI development. Additionally, the Kingdom should address digital gender gaps in STEM and AI by establishing dedicated scholarship funds for women and creating specialised career pathways that guide female students towards STEM programmes.

- **Investment Ecosystem**

To accelerate the growth of Saudi Arabia's AI ecosystem, the Kingdom should focus on strengthening the connections between investors and AI startups and companies. This can be achieved by developing a centralised digital platform that consolidates information on active AI investors, startups, and funding opportunities.

The Kingdom's commitment to ethical AI development, supported by strong governance, robust infrastructure, and strategic investments, will ensure that AI technologies continue to contribute to sustainable and inclusive growth, benefiting all segments of Saudi society.

The UNESCO Readiness Assessment Methodology (RAM) process has provided Saudi Arabia with valuable insights into its current strengths and areas for enhancement within the AI landscape. This report now serves as a strategic roadmap, guiding the Kingdom's continued progress in AI and aligning with the broader objectives of Vision 2030.

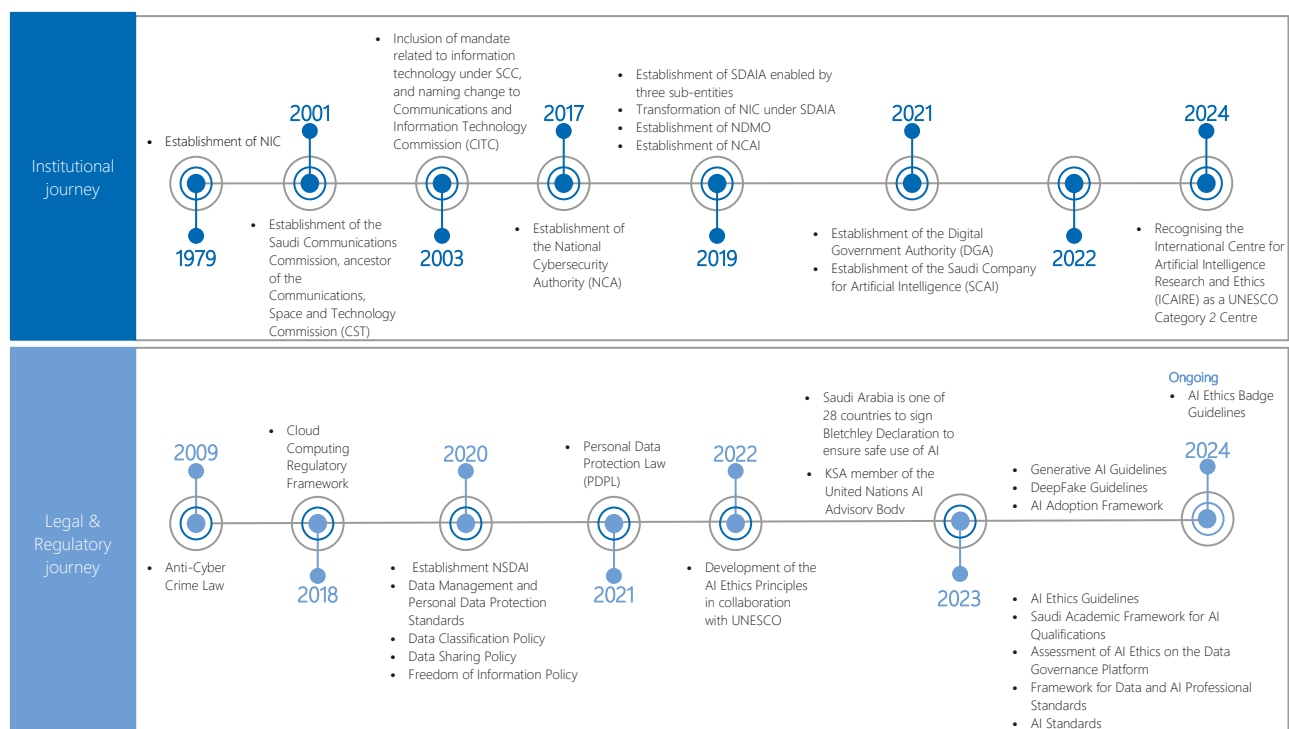
DIAGNOSIS OF THE NATIONAL AI LANDSCAPE

In 2019, the Saudi Data and AI Authority (SDAIA) was established to lead the Kingdom's ambitious national data and AI agenda. Today, Saudi Arabia proudly stands as the top-ranking country in the region and a global leader in AI, securing 14th place globally and 1st place worldwide in "Government Strategy for AI", as recognised by the Global AI Index 2024¹. This achievement underscores the Kingdom's successful efforts to position itself at the forefront of AI innovation. At the core of this success is the National Strategy for Data and AI (NSDAI), launched by SDAIA in 2020, which outlines a transformative roadmap for AI in Saudi Arabia through 2030 and beyond. This progress is driven by a robust governance structure centred on SDAIA and its three sub-entities:

- National Information Center (NIC)
- National Data Management Office (NDMO)
- National Center for Artificial Intelligence (NCAI)

Collaborating with key government organisations like the MCIT, CST DGA, NCA, and PIF. Together, this ecosystem has propelled the Kingdom to regional and global prominence, solidifying its leadership in AI innovation and governance.

Figure 1. KSA's institutional, legal, and regulatory journey in data & AI



¹ Global AI Index, Tortoise 2024: <https://www.tortoisemedia.com/intelligence/global-ai/#rankings>

KSA AI Governance

The Saudi Data and Artificial Intelligence Authority (SDAIA) serves as the primary authority in the Kingdom of Saudi Arabia responsible for overseeing all aspects of data and artificial intelligence. SDAIA functions as the national reference point for the regulation, development, and management of data and AI initiatives. It holds the mandate to lead operations, research, and innovation within these domains. Through its governance framework, SDAIA has established comprehensive strategies for data and AI, fostering foresight and enhancing data-related capabilities. As such, SDAIA led the development of the National Strategy for Data and AI (NSDAI).

SDAIA, is by His Royal Highness Crown Prince Mohammed bin Salman bin Abdulaziz Al Saud, Crown Prince and Prime Minister, has set a pioneering global example by unifying data and AI into a single, cohesive entity. This integration allows SDAIA to streamline data management and AI innovation, enabling the creation of intelligent solutions that address complex challenges with unprecedented efficiency. By bridging the gap between data and AI, SDAIA fosters a holistic ecosystem where insights are transformed into actionable strategies, driving progress across sectors. This unique model not only accelerates Saudi Arabia's digital transformation but also sets a benchmark for nations aiming to harness the combined power of data and AI to shape the future.

Three sub entities report to SDAIA, each tasked with specific mandates:

- **National Information Center (NIC)**

NIC is a critical player in the nation's digital transformation, managing the development, hosting, and operation of the National Data Bank (NDB) and national foresight platforms. It also oversees essential platforms like Tawakkalna, which evolved from a COVID-19 contact tracing tool into a national super app that provides access to health information, permits, educational resources, e-government services, and commercial entry permits. Additionally, the NIC manages government cloud services, the Government Secure Network (GSN), and the Government Service Bus (GSB), offering consistent services such as ticketing, health, and donation options through the Ehsan platform, which facilitates charitable donations with ease and transparency. Other platforms under NIC's purview include (Deem), which provides cloud and infrastructure solutions for government agencies, and (Nafath), a unified national authentication platform enabling secure access to digital services. These platforms are integral to NIC's role in supporting secure and efficient data management for government operations.

- **National Data Management Office (NDMO)**

NDMO is responsible for establishing data policies and standards, as well as developing and enforcing data governance mechanisms and reviewing AI ethics practices in the Kingdom. It plays a crucial role in monitoring compliance with these policies and standards, with the broader objective of enabling national data capabilities. NDMO contributes to the Kingdom's development vision by formulating and proposing data regulations, ensuring excellence in data management, and treating data as a strategic asset to enhance national development. As such, NDMO developed the Personal Data Protection Law (PDPL), the Data Sharing Policy, and the Freedom of Information Policy. Beyond the mandate of NDMO, government agencies are required to have their own Data Management Office (DMO). As of 2024, 245 Data Management Offices have been established.

- **National Center for Artificial Intelligence (NCAI)**

NCAI is tasked with driving AI innovation and R&D. It focuses on unifying national efforts through the execution of strategic research projects, fostering innovation within the AI landscape of the Kingdom, and

developing AI-driven solutions aligned with national priorities across various sectors. Additionally, NCAI is committed to elevating the skills and expertise of national professionals in data science, AI, and related technologies.

In complementarity with the SDAIA-centric ecosystem, 5 government entities play crucial roles in the digital and AI agenda of KSA and hold key mandates:

- **Ministry of Communications and Information Technology (MCIT)**
MCIT is the leading government entity responsible for shaping and implementing national policies in the realms of communications and information technology. It plays a pivotal role in advancing the Kingdom's digital transformation agenda by fostering innovation, enhancing digital infrastructure, and promoting the adoption of emerging technologies across sectors. MCIT is also tasked with creating a regulatory environment that supports the growth of the Information and Communication Technology (ICT) industry and drives national digital economy initiatives. Additionally, MCIT oversees the development of human capital in the ICT field, aligning with the Kingdom's broader vision for a knowledge-based economy. Through strategic partnerships with public and private sectors, MCIT is committed to positioning the Kingdom as a global leader in technology and communications.
- **Communications, Space & Technology Commission (CST)**
The Commission was established to regulate, monitor and empower the communications & IT sector. It does so by overseeing the licensing of telecommunications and IT services, promoting investment, developing relevant policies, and fostering international collaboration. In 2022, regulatory tasks related to the space sector were transferred to the commission from the Saudi Space Commission, achieving holistic coverage of the communications sector.
- **Digital Government Authority (DGA)**
The DGA's primary responsibilities include setting policies, strategies, and standards for digital government services, promoting the use of emerging technologies, and ensuring that government services are user-friendly and accessible. As such, the Authority has launched a series of 10 programmes focusing on deploying new technologies (e.g., Cloud Adoption Acceleration Programme for Government Entities), providing tailored support (e.g., Digital Consulting Programme), and monitoring and evaluating the performance of digital government initiatives (e.g., Digital Government Award).
- **National Cybersecurity Authority (NCA)**
NCA is the central authority responsible for overseeing and enhancing cybersecurity within the Kingdom. It is tasked with developing and implementing national cybersecurity strategies, policies, and frameworks to safeguard the nation's digital infrastructure. The NCA works to protect critical information assets across all sectors, ensuring resilience against cyber threats and attacks. Additionally, it is responsible for establishing and enforcing cybersecurity standards and guidelines, promoting a culture of cybersecurity awareness, and fostering collaboration between government entities, the private sector, and international partners. As such, the NCA has developed the National Cryptographic Standards (NCS), the Cybersecurity Guidelines for Internet of Things (IoT), and the Essential Cybersecurity Controls, among others. The NCA also leads efforts to build and elevate national cybersecurity capabilities, including the development of specialised skills and expertise. By coordinating national cybersecurity initiatives, the NCA plays a vital role in supporting the Kingdom's digital transformation and maintaining its cybersecurity posture on a global scale.

- **Public Investment Fund (PIF)**

Beyond pure government entities, KSA's flagship Public Investment Fund (PIF) is expected to have a significant impact on the future state of AI in KSA. Through new companies like the Saudi Company for Artificial Intelligence (SCAI) launched in 2021 or the advanced manufacturing company Alat launched in 2024, PIF aims to develop impactful AI-enabled solutions unlocking value across a variety of sectors (e.g., smart cities, healthcare, financial services). With the same ambition, PIF forms joint ventures with the private sector and state-owned enterprises:

- **Saudi Company for Artificial Intelligence (SCAI)**

SCAI was established under PIF as a wholly owned subsidiary focusing on developing AI solutions for multiple sectors in Saudi Arabia including smart cities, financial services, healthcare, transportation etc. SCAI focuses on AI solutions for businesses across data, AI applications, platform and infrastructure to advance AI in the Kingdom.

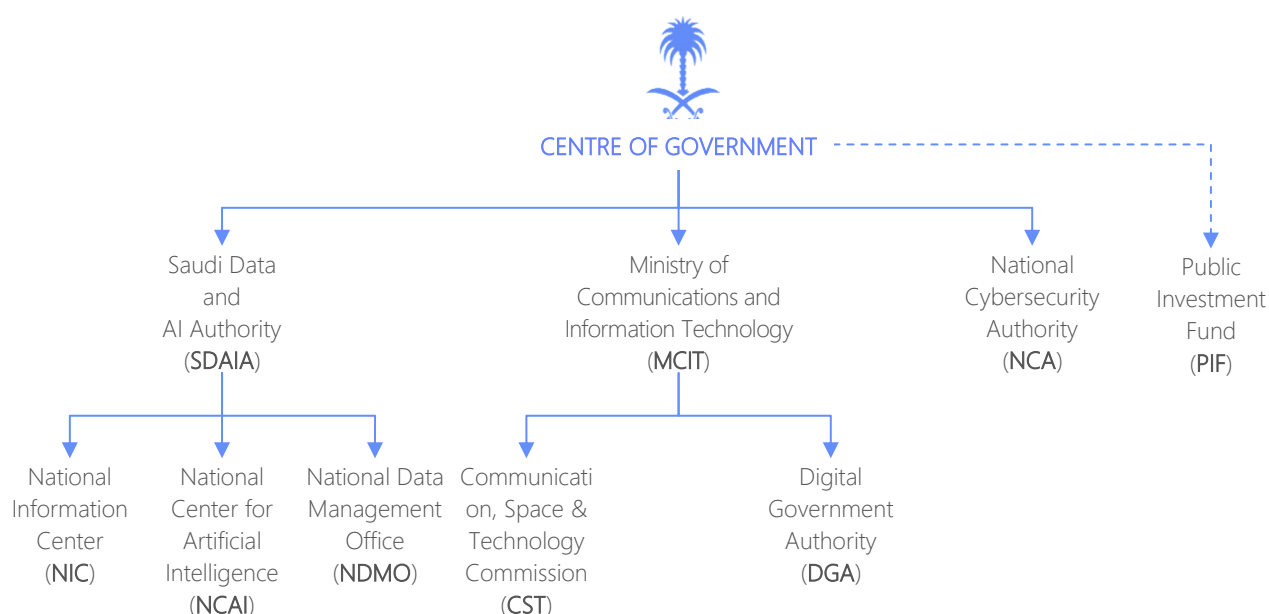
- **Alat**

Alat was established under PIF to enable Saudi Arabia's advanced manufacturing of semiconductors in the country. Specifically, Alat has created a business unit on AI infrastructure technology including network & communication, servers, data centre networking equipment & storage, industrial edge servers, and industry 4.0 computing.

- **Aramco Digital**

Aramco Digital is a pioneering technology firm dedicated to advancing digital innovation within Saudi Arabia and beyond. Leveraging multi-cloud solutions, AI, industrial connectivity, and secure data governance, Aramco Digital empowers industries to optimize operations and drive sustainable growth. With a strong commitment to local talent development and digital transformation aligned with Vision 2030, Aramco Digital partners with global tech leaders to deliver solutions that enhance efficiency, security, and performance across sectors.

Figure 2. KSA's National AI governance



International Presence

Saudi Arabia has become a key leader in global AI discussions by hosting impactful international events that foster collaboration and innovation. These gatherings not only highlight the Kingdom's leadership in AI but also provide critical platforms for stakeholders to discuss pressing issues, share insights, and explore the transformative potential of emerging AI technologies.

- **The International Center for Artificial Intelligence Research and Ethics (ICAIRE), Category 2 Centre C2C under auspices of UNESCO's²:** To be lighthouse for ethical AI by empowering nations to advance ethical AI for the good of humanity. ICAIRE focus on four main pillars; providing AI research & development support, champion AI ethics awareness & outreach, promote & support capacity building, and Develop AI policy recommendations. The centre underscores the Kingdom's commitment to leveraging AI for collective benefit and advancing the UNESCO AI ethics initiatives and United Nations Sustainable Development Goals (SDGs).
- **Global AI Summit³:** Organised by the Saudi Data and Artificial Intelligence Authority (SDAIA), across three editions in 2020, 2022, and 2024, it has established itself as a premier platform for advancing artificial intelligence on a global scale. Each edition has showcased the Kingdom's leadership in AI and its commitment to fostering collaboration, innovation, and ethical development of AI technologies.
 - The first edition in 2020 brought together 20 participating countries, with 61 speakers and an in-person attendance of 200 participants. Despite its relatively smaller scale, this inaugural event laid the groundwork for Saudi Arabia's AI ambitions, facilitating discussions around the future of AI and its potential impact on global challenges.
 - By 2022, the summit had significantly expanded, attracting participants from 100 countries, and featuring 200 speakers. The in-person attendance surged to 20,000 participants. This edition saw the announcement of 10 key initiatives and the signing of 40 agreements, solidifying the summit's role as a catalyst for international cooperation and innovation in AI.
 - The third edition in 2024 further underscored the summit's growth, with representation from 110 countries and an impressive line-up of 456 speakers. Attendance reached a record-breaking 30,000 participants, highlighting the summit's global significance. This edition featured 25 major announcements and the signing of 80 agreements.

The Global AI Summit has become a flagship event for thought leadership in AI, positioning Saudi Arabia as a hub for innovation and collaboration in the field.

- **LEAP Tech Event⁴:** LEAP is one of the world's largest and most influential technology events organized by Ministry of Communications and Information Technology, The Saudi Federation for Cybersecurity, Programming and Drones, and "Tahaluf" Company, held annually in Riyadh. Since its launch in 2022, LEAP has grown into a global hub for innovation, bringing together policymakers, industry leaders, and innovators from over 100 countries to address global challenges and showcase cutting-edge advancements. In 2024, LEAP reached new heights with, 215,000 attendees, 1,800 exhibitors, 1,100 speakers across 10 stages and 19 tracks, investments announced totalling between \$11.9 billion and \$13.4 billion. Also, SDAIA powered DeepFest, an AI-focused conference held alongside LEAP, which included:
 - 150+ sessions on ethical AI governance, innovation, and Arabic-language AI models.
 - Contributions from 50+ global experts and policymakers exploring transformative AI applications.

² The Establishment of ICAIRE: <https://unesdoc.unesco.org/ark:/48223/pf0000387338>

³ Global AI Summit: <https://globalaisummit.org/en/default.aspx>

⁴ Leap: <https://onegiantleap.com/>

- **Global Smart City Forum⁵**: Hosted by SDAIA, the Global Smart City Forum, in its first edition in 2024, served as a premier international platform, bringing together over 120 experts from more than 50 countries, focusing on enhancing living standards and accelerating progress through innovative solutions, dynamic dialogue, and collaborative strategies for smart urban development. Distinguished experts in AI and smart city building discussed key topics shaping the future of cities and their impact on human communities.
- **GAIN Assembly⁶**: held in May 2024 and co-organised by SDAIA and the Islamic World Educational, Scientific, and Cultural Organisation (ICESCO), hosted the largest consultation session for the UN's High-Level Advisory Body on AI report, "Governing AI for Humanity." The event brought together global leaders, policymakers, and AI experts to discuss ethical AI governance and global collaboration.

Saudi Arabia is an active participant in international AI fora, demonstrating its commitment to ethical AI development, technological innovation, and global collaboration.

- **AI Safety Summit⁷**: This commitment was reaffirmed at the AI Safety Summit held at Bletchley Park, where Saudi Arabia, alongside 28 other countries, signed the Bletchley Declaration a unified pledge to prioritize the secure and ethical development and deployment of AI technologies.
- **Seoul AI Summit⁸**: At the Seoul AI Summit, Saudi Arabia joined 26 participating nations to highlight the critical importance of international cooperation in ensuring AI safety and fostering inclusive innovation.

Through these efforts, the Kingdom plays a pivotal role in shaping the global AI landscape and advancing multilateral initiatives that promote AI safety and innovation.

International Awards

In addition to the international presence of KSA within the AI field, several initiatives and programmes have achieved international recognition:

- **The World Summit on the information society (WSIS) Recognised SDAIA for its Leadership in ICT and AI Development⁹**: The Saudi Data & AI Authority (SDAIA) received global recognition at the 2024 WSIS for its contributions to ICT advancement through the National Data Bank (NDB) and the Estishraf project, enhancing data quality and driving a data-based digital economy. Additional honours included excellence certificates for the AI Principles Project, promoting ethical AI, and the Elevate project, empowering over 1,000 women in AI from 28 countries. The SmartTruck project, by STC and Huawei, was also highlighted for bridging the digital divide for seniors¹.
- **The United Nations Public Service Award (UNPSA) Recognises SDAIA's Tawakkalna Platform¹⁰**: The Saudi Data & AI Authority (SDAIA) was awarded the United Nations Public Service Award (UNPSA) in 2022 for its innovative Tawakkalna platform, which revolutionised public service delivery by combining essential services, health management, and government access into a single, user-friendly platform. The award highlights Tawakkalna's significant role in enhancing transparency, accessibility, and resilience, ensuring seamless.

⁵ Global Smart City Forum: <https://globalsmartcityforum.sa/en/default.aspx>

⁶ GAIN Assembly: <https://icesco.org/en/2024/05/15/icesco-sdaia-and-un-organize-global-artificial-intelligence-assembly-in-riyadh/>

⁷ AI Safety Summit: <https://www.gov.uk/government/publications/ai-safety-summit-2023-the-bletchley-declaration/the-bletchley-declaration-by-countries-attending-the-ai-safety-summit-1-2-november-2023>

⁸ Seoul AI Summit: <https://aisummit2023.kr/>

⁹ World Summit on the information society (WSIS): <https://www.itu.int/net4/wsis/stocktaking/Prizes/2024/Winners>

¹⁰ The United Nations Public Service Award (UNPSA): <https://publicadministration.un.org/unpsa/database/Winners/2022-Winners>

International Indices

As a testimony to the country's progress on its ambitious AI journey, KSA has achieved notable scores in international AI rankings:

- 14th globally, 1st in the region in the Global AI Index, 2024¹¹
- 1st place globally in the pillar of 'Government strategy for AI, The Global AI Index, 2024.
- 2nd place globally in Public Awareness about AI, AI Index, 2023¹².
- Saudi Arabia ranks 3rd worldwide in AI policy publications with over 57 policies, OECD AI Policy Observatory
- 5 of Saudi Arabia's cities are among the top 100 smart cities globally, IMD Smart City Index (SCI), 2024 (Riyadh 25th; Makkah 52nd; Jeddah 55th; Medina 74th; Al-Khobar 99th)¹³.
- 1st place globally in the Global Cybersecurity Index (GCI), United Nations International Telecommunication Union (ITU), 2024¹⁴
- Saudi Arabia in the E-Government Development Index (EGDI):¹⁵
 - 6th globally, 1st in the region in the overall EGDI Ranking
 - 1st globally in the Open Government Data Index (OGDI)
 - 4th globally in the Online Service Index (OSI)
 - 7th globally in the E-Participation Index (EPI)

¹¹ The Global AI Index, Tortoise, 2024: <https://www.tortoisemedia.com/intelligence/global-ai/#rankings>

¹² AI Index Report, Stanford University, 2023: https://aiindex.stanford.edu/wp-content/uploads/2023/04/HAI_AI-Index-Report_2023.pdf

¹³ Smart City Index, IMD, 2024: https://www.imd.org/wp-content/uploads/2024/04/20240412-SmartCityIndex-2024-Full-Report_4.pdf

¹⁴ The Global Cybersecurity Index 2024, ITU: https://www.itu.int/en/ITU-D/Cybersecurity/Documents/GCIv5/2401416_1b_Global-Cybersecurity-Index-E.pdf

¹⁵ E-Government Development Index: <https://publicadministration.un.org/egovkb/Data-Center>

LEGAL AND REGULATORY

Saudi Arabia's National Strategy for Data and AI (NSDAI), spearheaded by the Saudi Data and Artificial Intelligence Authority (SDAIA), is the foundation of the Kingdom's ambition to become a global AI leader. This strategy is also complemented by specific guidelines developed by SDAIA, such as the AI Ethics Principles, GenAI guidelines and Deepfakes guidelines. Complementing these AI-specific guidelines is a robust legal framework that includes the Personal Data Protection Law (PDPL), Freedom of Information policy, and Anti-Cyber Crime Law positioning Saudi Arabia as a front-runner in responsible and secure AI adoption.

AI POLICY AND REGULATION

Saudi Arabia's NSDAI combines ethics, innovation, and global leadership into a comprehensive framework that has elevated the Kingdom's AI capabilities. Developed through collaboration with over 100 government entities and incorporating insights from international consultations with stakeholders across academia, industry, and civil society, the NSDAI stands on a well-rounded foundation.

Ethics are woven into the NSDAI as a foundational pillar, upholding Saudi Arabia's vision for responsible and impactful AI development. Initiatives such as the "AI Ethics" and "AI Adoption Framework" guide responsible AI practices, ensuring transparency, fairness, and accountability across sectors. This ethical focus is critical as Saudi Arabia builds an advanced AI ecosystem to benefit citizens, businesses, and government functions alike.

The Saudi Data and AI Authority (SDAIA) leads the implementation of the NSDAI, steering this ethical AI agenda with dedicated government funding to maximise AI's contribution to economic growth and diversification. Through this strategic approach, Saudi Arabia has achieved substantial milestones on the global stage. It climbed from 31st place in 2019 to 14th in 2024 on the Tortoise Intelligence¹⁶ Global AI Index and ranked 1st globally in Government AI Strategy. Additionally, Saudi Arabia is one of the top five countries worldwide in AI policy publications with over 57 policies submitted through the OECD¹⁷ AI Policy Observatory, demonstrating its commitment to AI governance.

In alignment with its ambitious goals, Saudi Arabia has initiated a programme to establish AI offices across government entities, with over 25 such offices now operational. These offices are directly advancing the NSDAI's objectives, embedding AI capabilities into government operations to enhance services and decision-making. The NSDAI's robust implementation plan emphasises continuous monitoring, evaluation, and adaptability, tracking progress with global AI performance indicators such as the Global AI Index, and Government AI Readiness Index¹⁸.

Saudi Arabia's AI strategy is more than a technical roadmap; it is a visionary framework that balances AI's transformative power with ethical stewardship. This balanced approach solidifies Saudi Arabia's global leadership in

¹⁶ The Global AI Index, Tortoise, 2024: <https://www.tortoisemedia.com/intelligence/global-ai/#rankings>

¹⁷ AI Policies in Saudi Arabia: <https://oecd.ai/en/dashboards/countries/SaudiArabia>

¹⁸ Government AI Readiness Index, Oxford Insights, 2023: <https://oxfordinsights.com/wp-content/uploads/2023/12/2023-Government-AI-Readiness-Index-2.pdf>

AI, setting a standard for how AI can drive societal well-being, economic resilience, and secure, responsible technological advancement.

Guidelines

Beyond the NSDAI strategy, several guidelines have been developed and published by SDAIA, guiding behaviours of stakeholders in the KSA AI ecosystem:

- **AI Ethics Principles (2023)¹⁹**

Saudi Arabia actively contributed to the development of global AI ethics by participating in the early scientists' ad hoc group that drafted the AI Ethics Principles in collaboration with UNESCO. The Kingdom was an active member in the deliberations of UNESCO's AI Ethics Recommendations, leveraging these insights to create the KSA AI Ethics Principles document.

The KSA AI ethics framework was developed to ensure ethical AI development in Saudi Arabia, emphasising fairness, privacy, security, and accountability. It outlines seven core principles: eliminating bias, safeguarding data, respecting human rights, promoting social and environmental benefits, ensuring reliability and safety, maintaining transparency, and enforcing accountability.

This framework spans the entire AI development lifecycle, from design to deployment, embedding these principles into every phase of AI projects. SDAIA oversees compliance, providing guidance on how and when to apply each principle during the development process. Notably, the KSA AI Ethics Framework introduces digital badges as indicators of AI ethics compliance for products. This initiative promotes adherence by integrating compliance mechanisms and monitoring systems, aligning AI practices with both national values and international standards.

The development of these principles under SDAIA reflects the Kingdom's commitment to responsible AI practices, firmly rooted in UNESCO's AI Ethics Recommendations.

- **Generative AI guidelines for government (January 2024)²⁰**

Provides comprehensive guidance for government employees in Saudi Arabia on the ethical and effective use of generative AI tools. It outlines key principles such as fairness, reliability, transparency, accountability, privacy, and the need for AI tools to benefit humanity and the environment.

The guidelines emphasise that AI outputs should be reviewed by humans, particularly when used in decision-making processes, to prevent bias and ensure accuracy. It also highlights the roles and responsibilities of various government entities and individuals, ensuring compliance with national regulations, including data protection laws. The document includes practical examples and a checklist for responsible AI usage, aiming to maximise AI benefits while mitigating associated risks.

- **Generative AI guidelines for the public (January 2024)²¹**

The guidelines emphasise the importance of adhering to ethical principles throughout the lifecycle of GenAI systems, focusing on fairness, reliability, transparency, accountability, privacy, and social and environmental benefits. Additionally, the document addresses the risks associated with GenAI, such as deepfakes, misinformation, and data breaches, and suggests mitigation strategies to ensure the safe and ethical deployment of these technologies for the responsible development, deployment, and use of Generative Artificial Intelligence (GenAI).

¹⁹ SDAIA AI Ethics Principles: <https://sdaia.gov.sa/en/SDAIA/about/Documents/ai-principles.pdf>

²⁰ SDAIA GenAI guidelines for government: <https://sdaia.gov.sa/en/SDAIA/about/Files/GenAIGuidelinesForGovernmentENCompressed.pdf>

²¹ SDAIA GenAI guidelines for the public: <https://sdaia.gov.sa/en/SDAIA/about/Files/GenerativeAIPublicEN.pdf>

- **AI Adoption Framework (September 2024)²²**

A comprehensive guide aimed at facilitating AI adoption across all sectors in Saudi Arabia. It emphasises responsible AI use, providing steps for communication and change management, data handling, technology deployment, human resources development, and continuous improvement.

The framework also includes measures for assessing the maturity and readiness of organisations, establishing AI Offices, and setting priorities for AI use cases. It ensures that AI applications align with national goals, focusing on ethical governance, innovation, and enhancing operational efficiency as part of the AI Adoption Framework, Saudi Arabia is pushing government entities to develop a dedicated AI office to assist in the rollout of AI use cases. As of the writing of this report, 20+ entities already created AI offices.

- **Deepfakes Guidelines: (Published for public consultation in September 2024)²³**

This document provides comprehensive guidelines for technology developer, content creators and consumers to address the implications of deepfake and mitigate their associated risks. These guidelines emphasise the importance of ethical principles in developing and using deepfake technologies, including privacy, transparency, accountability, and social benefits.

The recommendations include implementing strong data protection measures, securing consent for using personal data, and maintaining transparency. Developers are also urged to ensure accountability by establishing human oversight and clear responsibilities for AI outcomes. Furthermore, the guidelines highlight the importance of directing deepfake technology towards applications that provide social and environmental benefits. Adhering to these principles not only protects individuals and society from potential harms but also fosters trust and acceptance of AI technologies.

- **AI Ethics Badges (ongoing)**

Comprehensive assessment framework developed by SDAIA and relying on the AI Ethics Principles.

Developed as an assessment sheet, they allow entities in KSA to self-assess their degree of compliance with the AI Ethics Principles.

DATA PROTECTION AND PRIVACY LAWS

Saudi Arabia has attained a distinguished position in Tier 1 of the Global Cybersecurity Index (GCI)²⁴, achieving a commendable score range of 95–100. This index reflects Saudi Arabia's significant commitment to cybersecurity and its role as a global leader. By securing its place in this elite tier, Saudi Arabia underscores its dedication to establishing a robust, secure, and resilient digital landscape, setting a high standard for cybersecurity practices. The Kingdom's proactive and strategic approach to cyber resilience not only reinforces its national security but also showcases its capability as a leader in the international cybersecurity arena.

²² SDAIA AI Adoption Framework: <https://sdaia.gov.sa/en/SDAIA/about/Files/AIAdoptionFramework.pdf>

²³ SDAIA Deepfake Guideline (Published for Public Consultation):
https://istitlaa.ncc.gov.sa/en/transportation/ndmo/deepfakesguidelines/Documents/SDAIA_Deepfakes%20Guidelines.pdf

²⁴ Global Cybersecurity Index, ITU, 2024: [2401416_1b_Global-Cybersecurity-Index-E.pdf](https://www.itu.int/en/ITU-T/Security/Documents/GCI2024-1b-Global-Cybersecurity-Index-E.pdf)

The Personal Data Protection Law (PDPL)²⁵

Saudi Arabia's Personal Data Protection Law (PDPL), issued in September 2021 and amended in March 2023, sets a comprehensive framework of 43 articles for managing personal data collection, processing, and protection across public and private sectors. Enforced from September 2024, the PDPL establishes stringent standards to ensure data protection and individual rights to access, correct, or delete their data, enhancing transparency and security. Its amendments, presented on the public consultation platform Istitlaa, received input from key international and local stakeholders who provided compliance guidance. The PDPL empowers individuals to control their data, allowing requests for data deletion or withdrawal of processing consent. It mandates data controllers to obtain explicit consent, with Articles 5 and 13 highlighting consent for data processing, use restrictions, and disclosure requirements.

Transparency is enforced through Articles 12 and 13, which require data controllers to provide privacy policies detailing data use and rights. The law enforces data minimization (Article 11), limiting data collection to what is necessary and mandating deletion when data is no longer needed. Privacy impact assessments (Article 22) are required for new products or services. Article 23 ensures that sensitive data, such as health or biometric information, is processed only by essential personnel with additional protections. Violations of the PDPL carry severe penalties, including fines up to five million Saudi Riyals and imprisonment, with compensation available to affected individuals.

Public entities have certain exceptions for data processing for security and judicial purposes (Articles 6 and 15), while private entities adhere to stricter consent requirements. Article 1 protects personal and family privacy, and the National Data Management Office, under SDAIA, oversees PDPL compliance, with all government bodies required to establish Data Management Offices, further promoting data governance in line with PDPL standards.

Data Sharing and Accessibility

The Data Sharing Policy²⁶ developed by the NDMO in 2020 sets the framework for securely and ethically sharing data among Saudi government entities, private sector and individuals. It mandates that data sharing be conducted transparently, for legitimate purposes, and with proper authorisation. The policy applies to all types of government-produced data and excludes private or individual data.

Key principles include promoting a culture of data sharing to avoid duplication, ensuring secure access, and holding all relevant parties accountable. A clear, step-by-step process for data sharing is outlined, requiring formal agreements to manage and protect shared data. The policy also includes general rules for secure data transfer, personal data protection, and dispute resolution, emphasising a balance between data sharing and confidentiality.

In line with the principles of the Data Sharing Policy, KSA has launched the National Data Bank (NDB)²⁷ as a constellation of KSA data platforms, including:

- The National Data Lake (85+ TB of data uploaded)
- The Data Marketplace (409+ APIs available for subscription)
- Collaborative Data Labs (50+ reports generated)
- The National Data Catalogue (300+ KPIs defined and 2190+ data standards uploaded)
- The Reference Data Platform (200+ standardised reference tables available)
- The Open Data Platform (9,500+ datasets available).

²⁵ Personal Data Protection Law: <https://sdaia.gov.sa/en/SDAIA/about/Documents/Personal%20Data%20English%20V2-23April2023-%20Reviewed-.pdf>

²⁶ Data Sharing Policy: <https://sdaia.gov.sa/ar/SDAIA/about/Documents/Data%20Sharing%20Policy.pdf>

²⁷ National Data Bank: <https://data.gov.sa/en>

Although Saudi Arabia has not signed the International Open Data Charter, the Kingdom has achieved significant milestones in open data and e-government development. KSA is ranked 6th globally on the UN E-Government Development Index (EGDI) and achieved the first place in the Open Government Data Initiative (OGDI) pillar. As part of its ambition to develop E-Government, the Kingdom has recognised the importance of unlocking the power of Open Data.

Furthermore, KSA ranks 69th on the 2022 Open Data Inventory Ranking (ODIN)²⁸, highlighting significant improvements in the past couple of years. The previous indicators shows that Saudi Arabia has been proactive in advancing its open data agenda, undertaking various initiatives to align with global practices. A key component of this effort is the National Data Index (NDI), which was developed to improve government data management practices. The NDI serves as a crucial framework for standardising data management across different sectors, enabling better decision-making and fostering transparency.

Multiple initiatives and programmes are being launched with the objective of increasing the Kingdom's ranking in key international indexes such as the UN E-Government Index and the Open Data Barometer, the Kingdom provides high-quality open data to drive economic growth and foster innovation.

PROCUREMENT LAWS AND POLICIES

As of today, there is no direct law or policy for the procurement of AI systems, or products and services that include AI components. However, KSA has adopted the AI Ethics Principles, which specify that for an AI system built by a third party, AI system owners should ensure that an AI Ethics due diligence is carried out. This due diligence involves assessing the ethical implications of the AI system, including its design, functionality, and potential impact on users and society.

Key aspects of this process include evaluating the fairness, accountability, and transparency of the AI system, as well as ensuring compliance with data protection and privacy laws. Additionally, all relevant documentation must be accessible and traceable before procurement or sign-off. In this context, there is no list of certified vendors with AI-related provisions, but a voluntary digital badges programme for AI compliance was launched in Global AI Summit in Riyadh 2024.

FREEDOM OF INFORMATION ACTS AND ACCESS TO KNOWLEDGE ACTS

The Freedom of Information Policy²⁹ developed in 2020 by the National Data Management Office (NDMO) establish the legal framework for individuals' rights to access unprotected public sector information and outline the obligations of public entities. This includes requests from any individual to access or obtain unprotected information produced or held by public entities, regardless of its source, form, or nature. It applies to all types of recorded information, such as emails, digital files, handwritten notes, and more.

²⁸ Open Data Inventory Ranking, 2022: <https://odin.opendatawatch.com/Report/rankings>

²⁹ The Freedom of Information Policy: Freedom of Information Policy:
<https://sdaia.gov.sa/en/SDAIA/about/Files/RegulationsAndPolicies06.pdf>

Key principles of the regulations include:

- **Transparency:** ensuring individuals have the right to access public information to enhance accountability; accountability, which requires clear justification for any restrictions on access.
- **Public information disclosure:** affirming the right to access unprotected public information without legal repercussions.
- **Equality:** ensuring non-discriminatory treatment of all information requests.

The regulation also details the obligations of public entities, including the development of policies and procedures for handling information requests, the establishment of data management units, and the implementation of systems for verifying the identity of requesters. Entities must also document all information requests, manage fees for processing these requests, and maintain compliance with national laws. The request process involves submitting a formal application, with entities required to respond within specified timeframes, either by granting access, denying the request with justification, or extending the response time.

DUE PROCESS AND ACCOUNTABILITY

The Basic Law of Governance³⁰ is the main law protecting due process rights in Saudi Arabia. Key provisions include:

- The judiciary is an independent authority and judges' decisions are subject only to Islamic Sharia law.
- All people, citizens or residents, are entitled to file suit on an equal basis.
- Courts are empowered to arbitrate in all disputes and crimes.
- The privacy of communications is inviolate and cannot be confiscated, delayed, surveilled or eavesdropped upon except as provided by law.

While there is currently no specific policy for AI harm monitoring or remedies, such policies are under active consideration. The Personal Data Protection Law (PDPL) includes several articles aimed at monitoring data breaches in general. Additionally, the Personal Data Breach Incidents Procedural Guide was published to outline steps for controllers to follow if they become aware of any personal data breaches. In such cases, they are required to notify SDAIA and inform affected data subjects if the breach could compromise their data or impact their rights or interests. Furthermore, the Law of Civil Procedures provides guidelines for handling civil cases, including requirements for court clerks to attend hearings and maintain accurate records. The overarching Basic Law of Governance establishes the independence of the judiciary and guarantees the right to due process in Saudi Arabia. To strengthen these efforts, SDAIA's AI Ethics Guidelines emphasise ethical considerations in AI development and deployment, supporting a proactive approach to responsible and secure AI use.

³⁰ Basic Law of Governance: <https://laws.boe.gov.sa/Files/Download/?attId=ed4842e1-9543-40b9-973b-ada200d4ed10>

Laws and Regulations

The Anti-Cyber Crime Law³¹ of Saudi Arabia was first developed in 2009 and established a legal framework to combat cybercrimes by defining offences, assigning penalties, and enhancing information security. The law aims to protect public interest, morals, national security, and the economy by regulating the use of computers and information networks. The law outlines specific cybercrimes from minor offences (e.g., unauthorised access, defamation) to grave offences (e.g., unauthorised access to state security data) and provides for corresponding fines and/or prison sentences. The law ensures that cybercrime regulation does not conflict with other laws, such as those protecting intellectual property, and it mandates that the Communications and Information Technology Commission support investigations. The Bureau of Investigation and Public Prosecution is responsible for prosecuting offences under this law. However, the law does not address specific risks related to AI (e.g., misinformation/disinformation).

Beyond the Anti-Cyber Crime Law, NCA has published a series of 17 regulatory documents³² which may be classified into 3 broad categories:

- Policies and controls (e.g., Critical Systems Cybersecurity Controls, Operational Technology Cybersecurity Controls).
- Frameworks and standards (e.g., The Saudi Cybersecurity Workforce Framework, The National Cryptographic Standards).
- Guidelines and support tools (e.g., Cybersecurity Guidelines for e-Commerce, Cybersecurity Toolkits).

KSA Performance in International Ranking

Saudi Arabia has achieved a prominent position in Tier 1 of the Global Cybersecurity Index (GCI), with a remarkable score range of 95–100. This ranking highlights Saudi Arabia's deep commitment to cybersecurity and its role as a global leader in the field. By reaching this top tier, the Kingdom demonstrates its dedication to building a robust, secure, and resilient digital environment, setting an exemplary standard for cybersecurity practices. Saudi Arabia's proactive and strategic approach to cyber resilience not only strengthens its national security but also reinforces its standing as a key player in the international cybersecurity landscape.

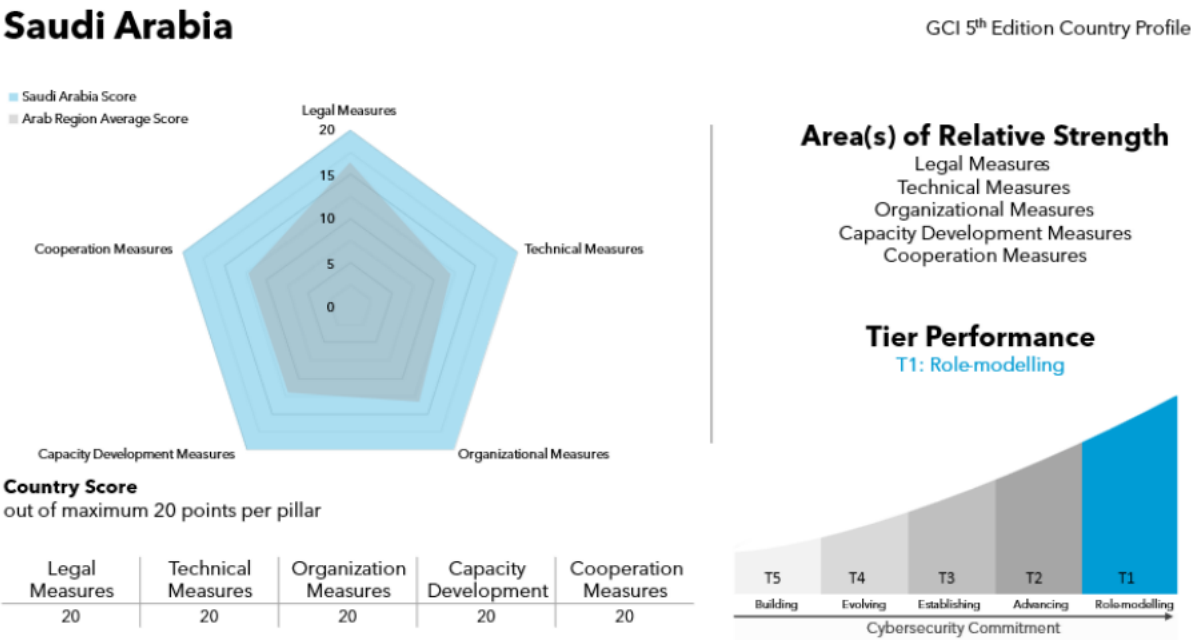
³¹ Anti-Cyber Crime Law: <https://laws.boe.gov.sa/BoeLaws/Laws/LawDetails/25df73d6-0f49-4dc5-b010-a9a700f2ec1d/2>

³² NCA Regulations: <https://nca.gov.sa/en/regulatory-documents/>

Figure 3. Tier Performance: Arab States (Global Cybersecurity Index 2024)³³

T5 <i>Building</i>	T4 <i>Evolving</i>	T3 <i>Establishing</i>	T2 <i>Advancing</i>	T1 <i>Role-modelling</i>
Yemen	Comoros Djibouti Iraq Lebanon Mauritania Somalia State of Palestine Sudan Syrian Arab Republic	Algeria Kuwait Libya Tunisia	(none)	Bahrain Egypt Jordan Morocco Oman Qatar Saudi Arabia United Arab Emirates

Figure 4. Saudi Arabia Overall Score (Global Cybersecurity Index 2024)



³³ Global Cybersecurity Index: https://www.itu.int/dms_pub/itu-d/opb/hdb/d-hdb-gci.01-2024-pdf-e.pdf

Public Sector Upskilling

To elevate public sector capabilities in AI, three strategic initiatives have been introduced under Vision 2030, driving innovation and efficiency. The first initiative established Data Management Offices (DMOs) across all government entities, with 3,838 employees trained through 216 specialised courses to advance AI adoption and research. The second focused on leadership, with the Government Leadership Development Programme providing 80 leaders in 2024 with globally benchmarked training to implement data-driven strategies. The third initiative engaged 770 participants in 569 workshops, fostering awareness and integration of AI across government operations. These efforts, aligned with the National Strategy for Data and Artificial Intelligence (NSDAI), are transforming Saudi Arabia's public sector into a global leader in AI innovation.

Public Sector AI Enablement

In addition to upskilling of the public sector workforce, several initiatives developed within the SDAIA ecosystem act as enablers of public sector capacity in deploying AI:

- **Data Management Offices (DMOs)**

The Kingdom of Saudi Arabia has placed a high priority on data management, recognising it as an asset for investment and a critical driver of development, particularly within the AI sector. This vision was formally established in 2019 through a Royal Decree, which led to the creation of the National Data Management Office (NDMO) and mandated the establishment of data management offices across all government entities.

Today, 245 Data Management Offices (DMOs) have been established, marking significant progress in implementing best practices and fostering enhanced compliance across government entities. These DMOs are empowered to develop strategies tailored to each entity's needs, ensuring alignment with national standards, and advancing the Kingdom's strategic objectives in data management.

- **AI Offices**

Saudi Arabia has launched a national initiative to establish AI Offices in government agencies, aiming to leverage the transformative potential of artificial intelligence across the public sector. These offices are designed to ensure the ethical, safe, and responsible use of AI while raising awareness of its importance and applications, with a focus on adopting best practices and tools.

In addition, they aim to foster collaboration through a unified framework that aligns efforts across entities, enhancing service quality and optimising resource use. Furthermore, the initiative, introduced in 2024, seeks to stimulate the development and adoption of AI-driven solutions to address challenges within government systems, reinforcing AI's role as a catalyst for innovation and progress.

- **Estishraf**

A sector that provides future insights for decision-makers in the kingdom by providing interactive economic and social analytics and indicators in an online platform based on a national multi-disciplinary team by investing in big data, advanced analytical capabilities, and AI; to contribute to supporting the formulation of decisions, policy design, and simulation of the impact of various economic, social and demographic changes to support the future direction of achieving the Saudi vision 2030.

- SPINE**
 initiative Infrastructure initiative leveraging Software-Defined Wide Area Network (SD-WAN) technology to revolutionise government connectivity in KSA. This high-speed, modern network will serve as a backbone for interconnecting various government entities, enhancing their ability to collaborate and share information securely. Insofar as it increases the speed of inter-governmental data sharing, the SPINE initiative will further enable AI-use cases relying on secured and real-time data.
- Deem Cloud initiative**
 Established in 2018 through a Royal Decree, Deem Cloud serves as Saudi Arabia's government cloud computing platform, providing a robust and efficient technological infrastructure for government and semi-government entities. By consolidating 237 data centres and delivering an estimated financial impact of 5.6 billion SAR, the platform has become a cornerstone of the Kingdom's digital transformation efforts. Deem Cloud also significantly advances environmental sustainability by reducing over 608,000 tons of carbon emissions and decreasing energy consumption by more than 64 megawatts. With its commitment to excellence, Deem Cloud has earned top-tier recognition from the Communications, Space, and Technology Commission (CST) and achieved globally respected certifications like ISO 27001 for Information Security and ISO 9001 for Quality Management, solidifying its role as a key enabler of the Saudi Vision 2030.
- Nafath**
 A national platform enabling unified and secure digital access to services across public and private sectors. By integrating advanced biometric authentication, it eliminates the need for multiple passwords and simplifies access for users. With over 17.2 million downloads and 380 million verification requests processed, Nafath plays a vital role in Saudi Arabia's digital transformation and aligns with Vision 2030's goals of a secure and efficient digital ecosystem.
- National Data Bank (NDB)**
 The NDB is a comprehensive ecosystem of interconnected platforms designed to accelerate data sharing, enhance data quality, and position data as a cornerstone of Saudi Arabia's digital economy. It integrates disparate national data assets into a unified repository through the National Data Lake, consolidating over 85 TB of data from 60+ entities and 300+ systems. The Data Marketplace fosters transparency and innovation, offering 400+ APIs and enabling data exchange among 100+ entities. Collaborative efforts are supported through Data Labs, which have generated 50+ analytical reports and hosted exploration sessions for multiple entities. The National Data Catalogue enhances data democratization, cataloguing metadata for 250+ systems and defining 300+ KPIs. Additionally, the Reference Data Platform ensures consistency across 200+ reference tables, while the Open Data Platform promotes transparency, hosting 7,900+ datasets accessed by over 1.2 million visitors.
- Deploy GenAI in Arabic Language Technologies**
 SDAIA has launched two transformative initiatives that set a new benchmark for Arabic AI innovation. ALLaM, an advanced Arabic Large Language Model, has achieved 2nd place globally in generative AI performance, showcasing its leadership in the field. Developed using 500 billion tokens and enriched by 300,000 Arabic books, including encyclopaedias, scientific research, and historical texts, ALLaM reflects the linguistic and cultural richness of Arabic. Integrated into platforms like IBM WatsonX and Microsoft Azure, it delivers secure, accurate, and high-performance AI solutions, serving diverse sectors from government to private enterprises. Complementing ALLaM is SauTech, a state-of-the-art speech-to-text platform created by SDAIA. Designed to transcribe Arabic speech across dialects with precision, SauTech enhances efficiency and transparency in key areas like the judiciary by streamlining workflows, accelerating case resolution, and minimizing errors.

SOCIAL AND CULTURAL

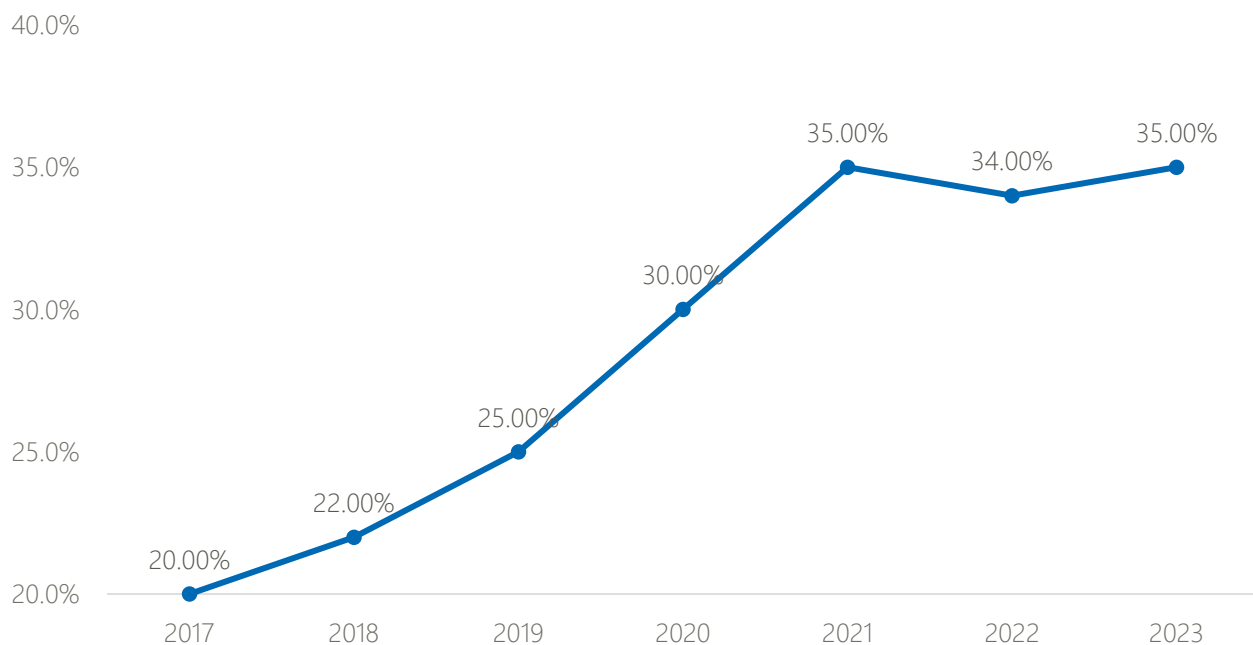
DIVERSITY, INCLUSION AND EQUALITY

While KSA has improved in including women in the workforce, significant digital gender gaps remain, although dedicated programs and affirmative action is being developed. Beyond the gender gap, KSA is committed to improving connectivity, with dedicated programs aiming at reducing the rural/urban connectivity gap.

The Gender Gap in KSA Is Improving in The Workforce, But Lags Digitally

The Kingdom of Saudi Arabia has made significant progress in promoting diversity, particularly in the workforce. The labour force participation rate of Saudi women saw a remarkable increase from 20% in 2017 to 34% in 2022, representing a 71% improvement over five years. The Vision 2030 target, which aimed for a 30% female participation rate in the workforce by 2030, was therefore surpassed ahead of schedule.

Figure 5. KSA female labour force participation rate (in %)³⁴



³⁴ World Bank, 2024: <https://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS?locations=SA>

Saudi Arabia has shown remarkable progress in fostering digital talent and promoting artificial intelligence innovation. One key achievement is the active empowerment of women within the technology and AI sectors, where their participation has now reached 35%. This milestone is part of a broader national effort to enhance digital inclusivity, equipping women with essential skills and creating opportunities for impactful contributions in high-tech fields. The focus on women's empowerment aligns with the Kingdom's Vision 2030 goals, aiming for a diversified and inclusive digital economy. For instance, The Digital Gender Gaps ranking developed by the University of Oxford³⁵ reports as:

- Internet gender gap.
 - Combined both Online and Offline 0.763
 - ITU: 0.673
- Mobile gender gap
 - Combined: 0.905 both online and offline.
 - GSMA: 0.965

The gap between KSA and peers in ITU Internet Gender Gap suggests there is further room for improvement in female digital adoption. This gender gap is also visible in tertiary education within STEM programs, where 63.18% of graduates are male and only 36.82% are female³⁶. Furthermore, there is a gender gap in career aspirations, with 30% of top-performing male students in science or mathematics expecting to work as STEM professionals by the age of 30, compared to only 11.7% of female students. Affirmative action is well developed in KSA, and addresses equal opportunities for women through programmes such as:

- **Transport Support (Wusool)**³⁷: A national initiative by the Human Resources Development Fund (HRDF) aimed at empowering women in the private sector by addressing transportation challenges and enhancing career stability for female employees.
- **Support for Children's Hospitality (Qurrah)**³⁸: An HRDF programme designed to empower working women by providing access to childcare support services, fostering greater workforce participation and promoting a more inclusive labour market.

Affirmative Action in The Data and AI Space

Saudi Arabia has launched several targeted initiatives to enhance the participation and qualifications of women and other vulnerable groups in the digital and AI sectors. These efforts are part of the Kingdom's broader commitment to inclusivity and empowerment:

- **Women Empowerment in Technology**³⁹:
 - The Ministry of Communication and Information Technology (MCIT) launched the Women Empowerment Programme in Technology⁴⁰ in 2018 to enhance women's digital skills and create opportunities in the ICT sector. The female representation in the industry jumped to 35% in 2024, up from 7% in 2018.

³⁵ Digital Gender Gaps, University of Oxford: <https://www.digitalgendergaps.org/>

³⁶ Global Gender Gap Report, World Economic Forum, 2023: https://www3.weforum.org/docs/WEF_GGGR_2023.pdf

³⁷ Human Resources Development Fund: <https://www.hrdf.org.sa/en/programs/individuals/enable/wusool/>

³⁸ Human Resources Development Fund: <https://www.hrdf.org.sa/en/programs/individuals/enable/childcare-support-for-working-women/>

³⁹ Empowerment of Women and Youths: <https://www.spa.gov.sa/en/N2175361>

⁴⁰ Women Empowerment in Technology: <https://sa.zain.com/en/all-news/partnership-mcit%E2%80%A6zain-ksa-launches-wit-4>

- This initiative received global recognition, winning a world award from ITU (WSIS) in 2020 for its impact in empowering women in Communications and Information Technology⁴¹.
- **AI Training and Capacity Building:**
 - In 2023, SDAIA introduced the Elevate Program⁴², aiming to train 25,000 women in Saudi Arabia and globally in advanced AI-related technical fields.
 - Additional initiatives such as the Saudi Digital Academy, the Future Skills Programme, the SDAIA Academy, and the Tuwaiq Academy extend support to women and other underserved populations⁴³, equipping them with essential skills in digital and AI fields.
- **Accessibility for People of Determination:** Saudi Arabia mandates all government agencies and service providers to comply with the Web Content Accessibility Guidelines (WCAG) 2.0 AAA standards. These standards ensure that online content is accessible and user-friendly for People with Disabilities:
 - Features include variable font sizes for the visually impaired, contrast colours for colour blindness, alternative text for images, and compatibility with assistive devices like screen readers and braille translators.
 - This accessibility commitment ensures equal opportunities for People with Disabilities to engage with government services and digital content⁴⁴.

While these initiatives are expected to have a significant impact on the Saudi workforce, managing their performance is made difficult by the lack of diversity statistics reporting in the data and AI space. For instance, there is no legal requirement for tech companies to publish diversity statistics, and there is no provision for employment of women or other vulnerable populations in the field of data and AI within the KSA labour laws, as mentioned in the previous section.

Beyond the Gender Gap

While efforts are well underway to tackle gender equality, the Kingdom has made strides in bridging the rural-urban connectivity divide, with 99% of its population now covered by 4G wireless broadband⁴⁵. For instance, The Schools Connectivity project is a part of a large nationwide connectivity project for the Ministry of Education. The aim is to connect more than 3,000 remote schools with no Internet service, use satellite VSAT, and enhance and upgrade the available connectivity in more than 19,000 schools. This project is strategic and extremely important in ensuring that all schools in Saudi Arabia are linked to the ministry via the Internet, thereby enabling them to access and use the services provided by the ministry's major centralised systems FARIS, NOOR and EduMap Award.⁴⁶ In addition, KSA's official language is only Arabic but there are many Arabic dialects, therefore online content and data are available from different resources to train AI model in Arabic language to be more inclusive. For example, SDAIA published 3,000 hours of voice from different Arabic dialects with annotated data for AI training. Arabic language still underrepresented in many large training datasets due to the lack of available public datasets.

⁴¹ Saudi Press Agency: <https://www.spa.gov.sa/2154426?lang=en&newsid=2154426>

⁴² Saudi Press Agency: <https://www.spa.gov.sa/en/11dfb64817e>

⁴³ KSA National Portal: <https://www.my.gov.sa/wps/portal/snp/careaboutyou/digitalinclusion/>

⁴⁴ KSA National Portal: <https://www.my.gov.sa/wps/portal/snp/careaboutyou/digitalinclusion/>

⁴⁵ National Transformation Program: <https://www.vision2030.gov.sa/media/xqjbmpwg/english-ntp-annual-report-2023.pdf>

⁴⁶ KSA National Portal: <https://www.my.gov.sa/wps/portal/snp/careaboutyou/digitalinclusion/>

PUBLIC ENGAGEMENT AND TRUST

Latest indexes show that KSA is performing above most GCC peers for provision of online services, paired with a strong e-participation, fuelled by high trust metrics:

- **2024 United National Online service index⁴⁷:** KSA is currently scoring 0.9602 in the 2024 Online Service Index (UN E-government database), which translates to a rank 4th out of 193.
- **2024 United Nations E-participation index⁴⁸:** KSA is currently scoring 0.09589 in the 2024 E-participation Index (UN E-government database), which translates to a rank 7th out of 193.
- **2022 The Economist Inclusive Internet Index⁴⁹:**
 - Availability of e-Government services in the local language: Ranked 1st.
 - Privacy Regulation: Ranked 1st.
 - Trust in Government websites and apps: Ranked 25th.

In general, the trust of Saudis in Innovation, Technology, and AI is high, as suggested by the 2024 Edelman Trust Barometer⁵⁰:

- 86% trust in technology businesses.
- 69% trust in AI.

ENVIRONMENTAL AND SUSTAINABILITY POLICIES

The Saudi Green Initiative (SGI)⁵¹, launched in 2021 as part of Vision 2030, aims to address climate change, promote sustainability, and enhance environmental protection across Saudi Arabia. Key initiatives under SGI include:

- **Carbon Reduction and Renewable Energy:** SGI targets a reduction of 278 million tons of carbon emissions annually by 2030, alongside renewable energy projects such as the Sudair Solar PV Project⁵², to lead in green hydrogen and carbon capture technologies.
- **Afforestation and Land Rehabilitation⁵³:** With plans to plant 10 billion trees and rehabilitate degraded lands, SGI supports one of the world's largest afforestation projects, aiming to restore ecosystems and expand green spaces across the Kingdom.
- **AI-Driven Environmental Monitoring⁵⁴:** Aligned with AI Ethics Principles, SDAIA and the Ministry of Environment, Water, and Agriculture established the Artificial Intelligence Centre of Excellence, along with

⁴⁷ Online service Index, United Nations, 2024: <https://publicadministration.un.org/egovkb/Data-Center>

⁴⁸ E-participation Index, United Nations, 2024: <https://publicadministration.un.org/egovkb/Data-Center>

⁴⁹ Inclusive Internet Index, The Economist, 2022: <https://impact.economist.com/projects/inclusive-internet-index/>

⁵⁰ Edelman Trust Barometer, Edelman, 2024: <https://www.edelman.com/trust/2024/trust-barometer>

⁵¹ The Saudi Green Initiative: <https://www.vision2030.gov.sa/en/explore/projects/saudi-green-initiative>

⁵² Sudair Solar PV project: <https://www.nsenergybusiness.com/projects/sudair-solar-power-plant/>

⁵³ The Saudi Green Initiative: <https://www.greeninitiatives.gov.sa/>

⁵⁴ SDAIA and Ministry of Environment, Water, and Agriculture: <https://www.spa.gov.sa/en/N2093291>

the Artificial Intelligence Centre for Energy, to monitor carbon emissions, enhance sustainability, and leverage AI for environmental resource protection.

- Smart Planet Program⁵⁵: SDAIA in collaboration with the Ministry of Energy and IBM utilises advanced AI to track environmental data, monitor carbon footprints, and support sustainable development projects, reinforcing Saudi Arabia's commitment to responsible environmental stewardship and innovative climate solutions.

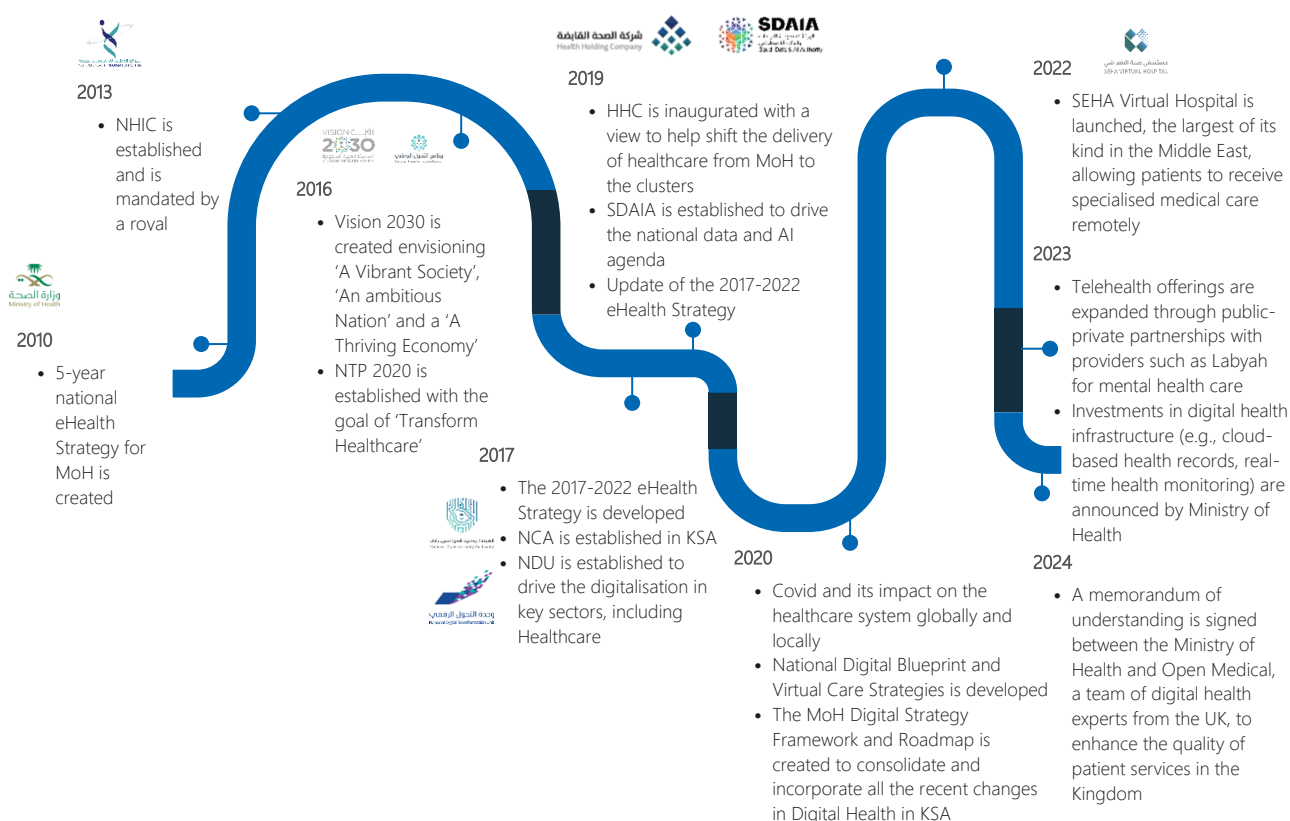
HEALTH AND SOCIAL WELLBEING

AI in Health-Related Policies

Leveraging digital capabilities in the health space has been a priority for the Kingdom over the last two decades. Through the 5-year national eHealth strategy of the Ministry of Health, digitally enabled healthcare was first formalized in 2010, making KSA a pioneer in implementing digital health. This initiative marked a turning point, driving significant advancements in the healthcare sector and setting the stage for the integration of emerging technologies. Over the years, these efforts have expanded beyond foundational implementations, incorporating cutting-edge innovations such as AI and big data analytics to enhance efficiency and patient outcomes. However, the topic has since matured, with the Kingdom's focus shifting towards achieving a more holistic digital transformation. Today, the Kingdom's digital health journey is therefore integrated with the previously discussed data and AI journey of KSA, creating a unified framework that drives both technological innovation and sustainable healthcare improvements.

⁵⁵ SDAIA, Ministry of Energy and IBM: <https://newsroom.ibm.com/2022-09-27-Saudi-Data,-AI-Authority-SDAIA-and-Ministry-of-Energy-Partner-with-IBM-to-Accelerate-Sustainability-Initiatives-in-Saudi-Arabia-Using-AI>

Figure 6. KSA digital health journey⁵⁶



As AI-enabled technologies evolved, along with the disruptive impact of the COVID pandemic, the development of policies accounting specifically for AI became a necessity. As of today, the use of AI in the health sector is reflected through two main strategies and frameworks:

1. **The Digital Strategy Framework and Roadmap (2020)⁵⁷:** This framework provides for the definition of an AI in healthcare strategy and framework, in alignment with SDAIA. This strategy will focus on the key areas where AI can add value in healthcare, whether in healthcare delivery or through predictive capabilities, among others. This programme would cover existing AI projects at a conceptual or advanced stage, including integrating AI in the SEHA platform, and leveraging AI in diagnostic/care support, pharmaceuticals, retinopathy, etc.

⁵⁶ Ministry of Health Digital Strategy Framework and Roadmap: <https://www.moh.gov.sa/Ministry/vro/eHealth/Documents/MoH-Digital-Health-Strategy-Update.pdf>

⁵⁷ Ministry of Health Digital Strategy Framework and Roadmap: <https://www.moh.gov.sa/Ministry/vro/eHealth/Documents/MoH-Digital-Health-Strategy-Update.pdf>

2. [National Strategy for Data and AI \(2020\)](#)⁵⁸: Healthcare is clearly defined as a sector and sub-programme of the NSDAI, where the use of AI for the health sector is structured around 9 use-cases covering 5 strategic objectives:
- Enhance sectoral sustainability through cost and revenue optimisation opportunities and operational excellence enabled through AI.
 - Support early, efficient, and accurate medical diagnostics to deliver better patient experiences enabled through AI.
 - Improve clinical outcomes and enhance patient-centricity with personalised AI solutions.
 - Reduce the prevalence of life-threatening diseases and promote healthy behaviour with the support of AI.
 - Mitigate public health risks and contain infectious diseases through AI-driven surveillance capabilities.

⁵⁸ National Strategy for Data and AI: <https://ai.sa/>

KSA's Ministry of Culture (MoC) currently supervises 11 cultural commissions, each of which focuses on a different discipline. In this context, applications of new technologies and AI are a transversal concern, in light of recent advancements in GenAI.

- **AI in Filmmaking and Archaeology⁵⁹**

The Film Commission has initiated exploratory discussions on incorporating AI into filmmaking processes; this extends beyond enhancing marketing and distribution strategies to influencing the very core of movie production through AI-generated storylines and visual content, which holds the potential to make filmmaking more accessible and cost-efficient, ultimately unlocking new talent and fostering a more competitive industry.

- **Al-Yamama archaeological project⁶⁰**

In archaeology, the Saudi Heritage Commission is deploying AI within the Al-Yamama archaeological project, launched in September 2024 in Riyadh, to generate detailed geographic and topographic maps; this initiative complements advanced technological tools like ground-penetrating radar and magnetic surveying, illustrating the Kingdom's commitment to modernizing its cultural heritage preservation practices.

- **Dive into Heritage⁶¹**

Beyond nascent and pure AI applications across different disciplines related to culture, the Ministry of Culture in KSA is collaborating with UNESCO on flagship projects aiming at leveraging digital capabilities for heritage preservation. As part of this effort, the "Dive into Heritage" initiative uses digital technology for the promotion, safeguarding and transmission of World Heritage to future generations. By gathering data on cultural and natural heritage of the world, a wide range of supporting files are developed (e.g., 3D models, interactive models) and made available to researchers, and to the public. Through digital capabilities, the initiative therefore aims to make heritage accessible to everyone.

- **Artathon⁶²**

an esteemed initiative by the Saudi Data and Artificial Intelligence Authority (SDAIA), convenes 300 distinguished artists and AI specialists from over 20 nations to pioneer the fusion of artistic expression with artificial intelligence. Integral to the Global AI Summit, this competition fosters profound collaboration between creative and technical visionaries, advancing the boundaries of AI's transformative role in the cultural and artistic domains. Selected from a competitive field, 20 exceptional projects receive developmental support, underscoring Saudi Arabia's commitment to elevating AI-driven creativity on the global stage and solidifying its role as a forerunner in the cultural innovation of artificial intelligence.

In brief, KSA is at the forefront of the use of digital technologies in culture and is therefore well-positioned to embrace the still nascent applications of AI in culture in the years to come. KSA's effort on culture preservation using emerging technologies like AI is expanding to a global role by sponsoring international initiative like UNESCO's 'Dive into Heritage' among other programmes.

⁵⁹ Fast Company Middle East: <https://fastcompanyme.com/news/saudi-film-commission-to-explore-ai-in-movie-production-and-marketing/>

⁶⁰ The launch of Al-Yamama Archaeological Project in Riyadh: <https://www.spa.gov.sa/en/N2164221>

⁶¹ Heritage Commission: <https://www.arabnews.com/node/2569778/saudi-arabia>

⁶² SDAIA & Ministry of Culture esteemed Artathon: <https://www.spa.gov.sa/2014070>

SCIENTIFIC AND EDUCATIONAL

RESEARCH AND INNOVATION

Saudi Arabia is advancing its position in the global research and development (R&D) and artificial intelligence (AI) sectors.

- Gross Expenditure on Research and Development (GERD) remains close to 0.5% of GDP, which is below GCC and G20 peers.
- On AI, however, a significant investment of ~\$10.7 billion (SAR 40 billion), dedicated to R&D among other areas, has been committed through the Public Investment Fund (PIF).

The Kingdom's AI research ecosystem is robust, with numerous academic institutions, research centres, and strategic partnerships driving innovation. This ecosystem emphasises ethical AI development, with key players like the International Centre for Artificial Intelligence Research and Ethics (ICAIRE) and the National Committee of Bioethics (NCBE).

Saudi Arabia has also seen a surge in AI-related research output, including a substantial increase in publications and patents, underscoring its commitment to improving its standing in AI and technology research.

R&D Investments

While R&D figures for AI specifically are not readily available, Gross Expenditure on Research and Development (GERD) represented 0.45% of KSA GDP⁶³ in 2021, placing KSA behind most GCC and G20 peers. However, while a limited improvement of GERD as % of GDP of 0.02% is observed between 2021 and 2022, an increase in R&D investment of ~1.15 billion (SAR 4.3 billion)^{64,65} was registered over the period, mitigated by similar GDP growth⁶⁶.

The KSA AI Research Ecosystem

Saudi Arabia is cultivating a thriving research ecosystem that includes academic institutions, research centres, and private sector companies.

Key Contributions:

- Many universities, both public and private, have launched centres specializing in AI to support academic and student research.
- The Research, Development, and Innovation Authority (RDIA) introduced the Open Access Portal in 2021, which facilitates access to 10+ AI-focused research labs across universities and research centres.

⁶³ World Bank: <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?locations=SA>

⁶⁴ R&D, GASTAT, 2021:

https://www.stats.gov.sa/sites/default/files/Research%20and%20Development%20Statistics%20survey%202021EN_0.pdf

⁶⁵ R&D, GASTAT, 2022: https://www.stats.gov.sa/sites/default/files/Research_and_Development_Statistics_Survey_2022_EN_0.pdf

⁶⁶ KSA GDP, General Authority for Statistics (GASTAT): <https://www.stats.gov.sa/en/823>

Dynamic Partnerships:

- Collaborations between academia and industry giants are enhancing the practical application of AI research across fields.
- These synergies have contributed to increases in AI-related scholarly publications and patent filings, strengthening Saudi Arabia's global stature in AI.

Within this ecosystem developing both fundamental and applied research in AI, a particular emphasis is also placed on research at the intersection of advanced technology, AI, and ethics, with two research centres fully dedicated to the topic:

- **King Abdullah University of Science and Technology (KAUST)⁶⁷**
Located in Thuwal, Saudi Arabia, it is a top-ranked institution excelling in science and technology, ranking first in the 2023 Times Higher Education Arab University Rankings and 100th globally in U.S. News & World Report. Recently, KAUST established a new Generative AI Centre of Excellence, advancing research in AI-powered innovation across various sectors. Alongside this, KAUST Academy offers an Artificial Intelligence Specialization programme to equip Saudi students and recent graduates with essential AI skills. The university also offers a Statistics (STAT) program, which provides M.S. and Ph.D. degrees, focusing on complex real-world data science applications. With these initiatives, KAUST supports Saudi Arabia's Vision 2030, positioning itself as a key contributor to national and global advancements in AI and technology.
- **KAUST – SDAIA CoE⁶⁸**
The SDAIA-KAUST Centre of Excellence in Data Science and Artificial Intelligence (CoE), launched in 2023 as part of Saudi Vision 2030, was created through a strategic partnership between SDAIA and King Abdullah University of Science and Technology (KAUST). Its mission is to enhance Saudi Arabia's global standing in data science and AI by fostering collaboration among leading scientists and delivering applied solutions in critical sectors, including healthcare, environment, water, food, and energy. The Centre is recognised for its cutting-edge research, such as AI-based early pneumonia detection and predictive environmental models, and it has been published in top AI journals and conferences, such as Nature Machine Intelligence and CVPR⁶⁹. In addition to research, the CoE emphasises training programs to equip the next generation of Saudi AI professionals, thereby strengthening the Kingdom's AI ecosystem and accelerating national AI adoption.
- **King Fahd University of Petroleum and Minerals (KFUPM)⁷⁰**
Located in Dhahran, Saudi Arabia, it is a leading institution specializing in engineering, science, and technology education. Globally recognised, KFUPM ranks 101st overall and 58th in Data Science and AI according to QS rankings. The university has secured over 1,500 U.S. patents, underscoring its commitment to innovation. With a selective 4% acceptance rate, KFUPM fosters a competitive academic environment. Through initiatives like Dhahran Techno Valley and the Entrepreneurship Institute, KFUPM actively contributes to research and development, particularly in artificial intelligence, aligning with Saudi Arabia's Vision 2030 objectives.

⁶⁷ King Abdullah University of Science and Technology: <https://www.kaust.edu.sa/en/>

⁶⁸ SDAIA – KAUST Centre of Excellence: <https://sdaia-kaust-ai.kaust.edu.sa/>

⁶⁹ CVPR: https://openaccess.thecvf.com/content/ICCV2023/papers/Xie_BoxDiff_Text-to-Image_Synthesis_with_Training-Free_Box-Constrained_Diffusion_ICCV_2023_paper.pdf

⁷⁰ King Fahad University of Petroleum and Minerals: <https://www.kfupm.edu.sa/>

- KFUPM–SDAIA Joint Research Center for Artificial Intelligence (JRC-AI)⁷¹**
 Established in January 2022 through a strategic partnership between King Fahd University of Petroleum and Minerals (KFUPM) and the Saudi Data and Artificial Intelligence Authority (SDAIA), the JRC-AI aims to position Saudi Arabia as a global leader in data-driven economies. The centre focuses on conducting and supporting research and innovation in artificial intelligence (AI), developing use cases and solutions aligned with the Saudi National Strategy for Data and AI to achieve Vision 2030 objectives. The JRC-AI emphasises interdisciplinary collaboration, bringing together educators and researchers to address complex cognitive tasks and solve real-world problems.
- King Abdulaziz City for Science and Technology (KACST)⁷²**
 Plays a critical role in advancing Saudi Arabia's research and innovation, completing 35 research projects in 2023 across sectors like health, sustainability, energy, and future economies. KACST provided 664 technological services, including laboratory support, consultations, and training for public and private entities. Key achievements include the AI-powered Dengue Fever Management Project in Jeddah, reducing mosquito rates by over 70%, and the Saudi Genome Project, creating a genetic database to identify mutations unique to the Saudi population. Through initiatives like "The Garage" incubator and "Academy 32," KACST supports over 240 startups and strengthens national research capabilities.
- Research Development Innovation Authority (RDIA)⁷³**
 The RDIA has driven significant growth in Saudi Arabia's research sector, with a 146% rise in publications, totalling 59,016 in 2022. Focusing on national priorities like Health, Environment, Energy, and Future Economies, RDIA supports impactful projects in renewable energy, healthcare, and digital innovation, fostering collaboration across academia, industry, and government to boost economic growth and elevate Saudi Arabia's global research standing.
- KSU Thakaa⁷⁴**
 The AI Centre for Advanced Studies (Thakaa) at King Saud University is a leading research hub focused on advancing AI and data science in Saudi Arabia. The centre drives innovation through a range of initiatives, including Thakaa Tech, which provides specialised workshops, consultations, and challenges to foster AI expertise. Thakaa collaborates with industry and academic partners to promote applied research and upskilling, supporting Saudi Arabia's Vision 2030 goals of building a knowledge-based economy. Through its programs, the centre empowers both students and professionals, contributing significantly to national advancements in artificial intelligence.
- National Committee of Bioethics (NCBE)⁷⁵**
 Focuses on ethical issues related to biological and medical research, including human and environmental health, genetics, and biotechnology. Given the prominent role of AI in these fields, the NCBE adds sectorial depth to ICAIRE's overarching work on AI Ethics.

⁷¹ KFUPM–SDAIA Joint Research Centre for Artificial Intelligence: <https://ri.kfupm.edu.sa/jrcai>

⁷² King Abdulaziz City for Science and Technology: <https://www.kacst.gov.sa/>

⁷³ Research Development Innovation Authority: <https://rdia.gov.sa/index.en.html>

⁷⁴ KSU Thakaa: <https://thakaa.ksu.edu.sa/en>

⁷⁵ NCBE: <https://ncbe.kacst.edu.sa/en/>

In addition, 15+ research centres or departments cover AI Ethics as part of their activities (e.g., Alfaisal Center of Excellence for GenAI, King Salman Arabic Language AI Center, Saudi Electronic University AI Center).

Research Output

Saudi Arabia has witnessed a remarkable surge in AI-related research over the past five years, driven by:

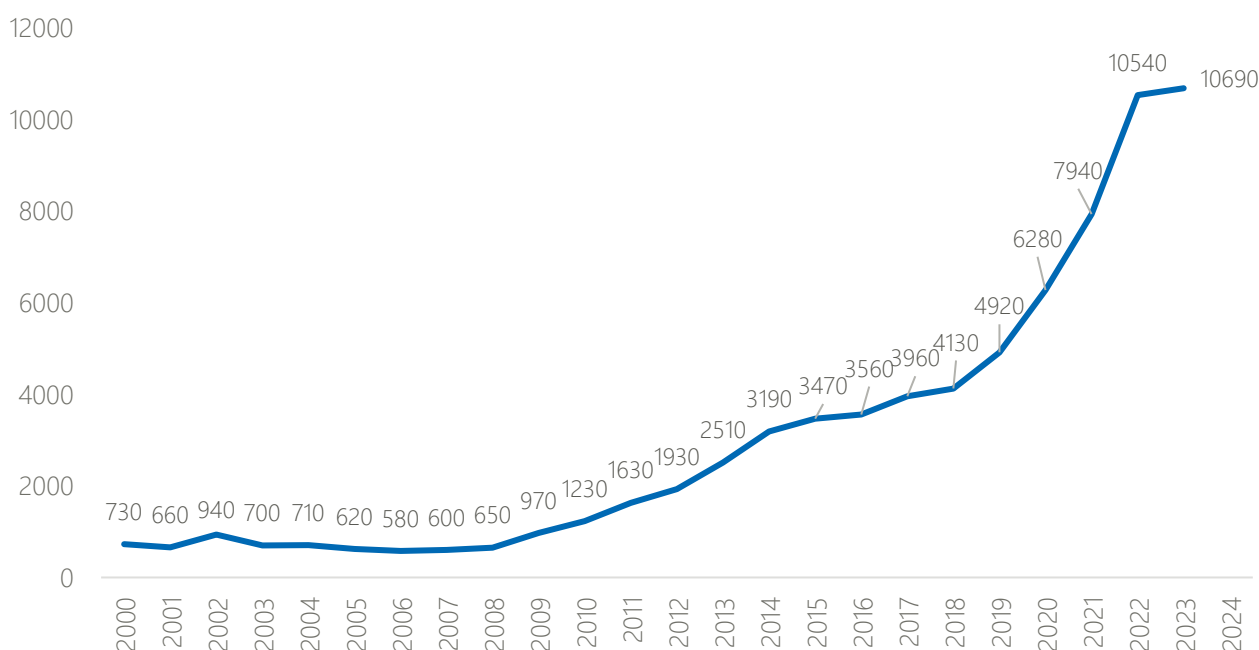
- Subsequent investments in AI R&D
- The progressive setup of a fully-fledged AI research ecosystem.

Scientific Publications

- AI publications have more than doubled, increasing from 4.1K in 2019 to 10.5K in 2023.
- This represents a Compound Average Growth Rate (CAGR) of 26%, showcasing the Kingdom's rapidly expanding research output in AI

In the same fashion as AI publications, granted patents related to AI have grown significantly from 39 in 2019 to 195 in 2023. This five-fold increase in AI patents over the last five years highlights the rapid pace of innovation in the Kingdom's AI sector beyond more fundamental research⁷⁶.

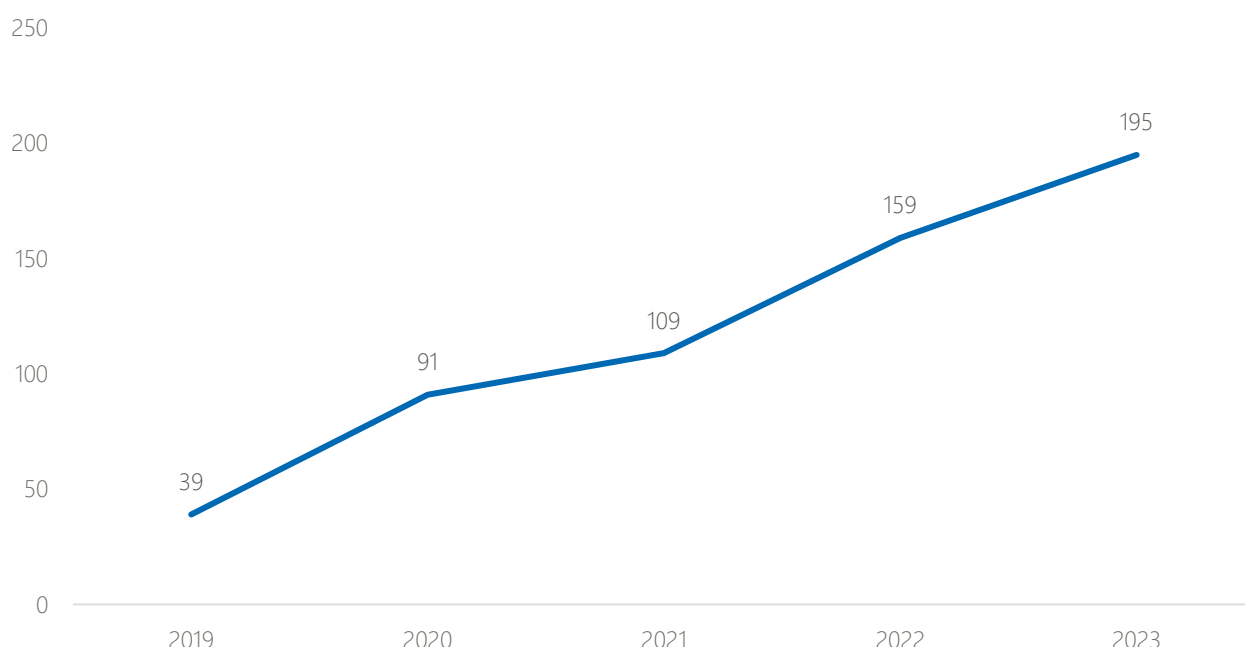
Figure 7. Yearly AI-related publications in KSA⁷⁷



⁷⁶ State of AI in Saudi Arabia: <https://globalaisummit.org/Documents/StateofAIinSaudiArabia.pdf>

⁷⁷ OECD.AI Policy Observatory as of September 2024: <https://oecd.ai/en/data?selectedArea=ai-research&selectedVisualization=ai-publications-time-series-by-country>

Figure 8. Yearly number of patents granted in KSA from 2019 to 2023⁷⁸



While the observed evolution in research and innovation is promising, it will rely on fuelling the KSA ecosystem with high quality talent in data and AI.

EDUCATION

Saudi Arabia is advancing AI integration in education through the Saudi Academic Framework for AI Qualifications⁷⁹. This framework guides the development of AI-focused higher education programmes. Initiatives like the Artificial Intelligence Hour⁸⁰ engage students early, and 42% of universities now offer AI degrees⁸¹, contributing to over 38,000 AI-related graduates between 2019 and 2023⁸². However, it is critical to monitor the quality of the skills achieved by KSA graduates, as data may suggest lower skills than regional and international peers. For the KSA population at large, programs like the Digital Skills Framework and Saudi Digital Academy enhance digital literacy and technical skills, ensuring a strong pipeline of AI talent for the future. KSA has launched a comprehensive AI framework in digital learning, establishing guidelines, policies, and tools to support AI across K-12, higher education, and lifelong learning, driving innovation and advancing digital literacy. As part of this initiative, 42,567 educators received training in AI.

The Ministry of Education (MoE) has introduced a robust AI curriculum for secondary education, complemented by university programmes covering both technical and ethical aspects of AI. Additionally, the MoE offers K-12 courses focused on digital resilience, citizenship, programming, and digital skills. In collaboration with the Ministry of Communications and Information Technology (MCIT), the National eLearning Centre (NelC)⁸³ provides AI courses

⁷⁸ Saudi Authority for Intellectual Property as per 'State of AI in Saudi Arabia's report:

<https://globalaisummit.org/Documents/StateofAIinSaudiArabia.pdf>

⁷⁹ Saudi Academic Framework for AI Qualifications: <https://sdaia.gov.sa/en/Research/Documents/SaudiAcademicFramework.pdf>

⁸⁰ Saudi Press Agency: <https://www.spa.gov.sa/en/N1977783>

⁸¹ State of AI in Saudi Arabia: <https://globalaisummit.org/Documents/StateofAIinSaudiArabia.pdf>

⁸² State of AI in Saudi Arabia: <https://globalaisummit.org/Documents/StateofAIinSaudiArabia.pdf>

⁸³ National Framework for Artificial Intelligence in Digital Learning: <https://nelc.gov.sa/en/node/2929>

aimed at fostering lifelong learning and equipping learners with essential skills for the modern workforce. These courses address a range of AI topics, including ethics, applications, and generative AI, and are tailored to support professionals and students seeking advanced knowledge in AI.

- **National Olympiad (Athka)⁸⁴**

The road to Athka was a qualifying national training programme that trained over 260,000 middle and high school students from across the kingdom on math, computer science, machine learning, and artificial intelligence-related topics. It started with an event in a stadium with 10,000 students attended, and 70 students were crowned winners. KSA launched this inspiring national Olympiad called (ATHKA).

- **The first International Artificial Intelligence Olympiad (IAIO)⁸⁵**

Hosted by International Centre for AI Research and Ethics (ICAIRE) and International Research Centre on Artificial Intelligence in Slovenia (IRCAI) under UNESCO's auspices, marked a significant advancement in global AI innovation and ethical education. Bringing together over 90 participants from 25 countries, the event offered a unique platform to compete in advanced AI fields. Designed to enhance international cooperation and awareness of AI's transformative impact, the IAIO highlighted the need for forward-thinking AI solutions that consider societal values alongside technical prowess. The Olympiad ran alongside the Global AI Summit organised by SDAIA, emphasising Saudi Arabia's strategic role in global AI leadership and its commitment to fostering ethical AI practices across international borders.

- **KAUST Academy⁸⁶**

Played a key role in upskilling Saudi talent, running an AI Specialisation programme for 200 students in 2024, delivering advanced training for MOI's AI Master's programme (67 students), and leading AI for Leaders programs with NEOM, Thiqah, and SDAIA. In total, KAUST trained hundreds in innovative AI fields, where students tackled 20 real-world projects involving computer vision, NLP, and reinforcement learning, positioning Saudi youth to support Vision 2030's goal of global AI leadership.

- **Tuwaiq Academy⁸⁷**

Stands as a pillar of progress in the Kingdom, driving forward Saudi Arabia's vision for a globally competitive and innovative society. Since its establishment, Tuwaiq has empowered over a million Saudis, equipping them with innovative skills across vital fields such as cybersecurity, artificial intelligence, cloud computing, and digital manufacturing. Designed to meet the demands of an evolving market, Tuwaiq's programmes cater to a wide range of participants, from university students and recent graduates to seasoned professionals. With a foundation built on strategic partnerships with top global technology firms and leading Saudi institutions, Tuwaiq has consistently delivered exceptional results, including record-breaking employment rates for graduates and recognition in international competitions. This Academy not only strengthens the Kingdom's technological capabilities but also cements Saudi Arabia's role as a leader in the global digital economy, continuously pushing the boundaries of innovation and skill development.

⁸⁴ National AI Olympiad (Athka): <https://aiolympics.mawhiba.org/>

⁸⁵ IAIO: <https://www.iaio-official.org/>

⁸⁶ KAUST Academy: <https://academy.kaust.edu.sa/>

⁸⁷ Tuwaiq Academy: <https://tuwaiq.edu.sa/>

Integrating AI into the Education System

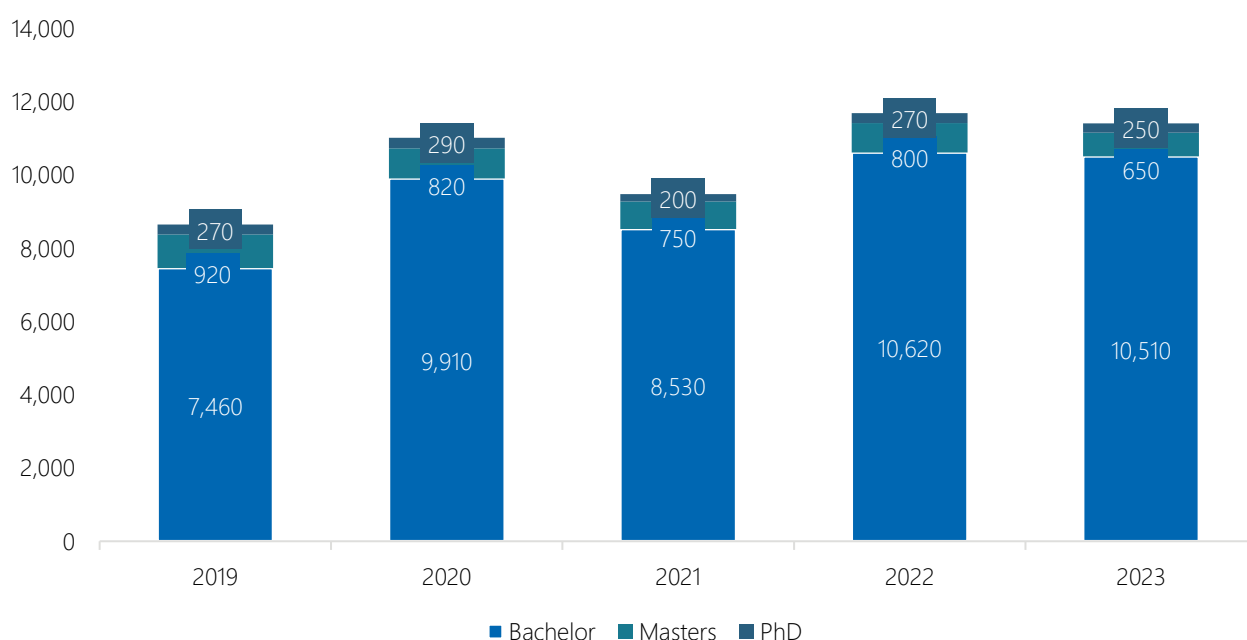
The Saudi Academic Framework for AI Qualifications by the Saudi Data & AI Authority (SDAIA) acts as the main guide for the development, evaluation, and accreditation of higher education programmes in AI, serving as a reliable, primary reference recognised in the Kingdom of Saudi Arabia. It also contributes to establish minimum curricular requirements for education programmes in the field of AI. The framework is designed for flexibility, allowing it to keep pace with the rapidly evolving AI field, thereby empowering educational and training institutions to develop fit for purpose curricula.

In addition to pro-forma curriculum design, KSA is spearheading AI integration in education through programmes such as the 'Artificial Intelligence Hour', reaching 1,300 public and private schools to raise awareness and cultivate interest in AI technology, thereby laying the foundation for future talent and skill development. To further support responsible AI integration in education, the Generative AI Guidelines for K-12 higher Education target parents, teachers, and students, promoting ethical and safe engagement with generative AI. The guidelines raise awareness of the risks and opportunities of AI use and provide practical advice on key areas.

Fuelling the Pipeline of AI Graduates: Supply of AI Talent

Saudi Arabia has made significant progress in expanding and providing many specialised AI education opportunities across both academic and non-academic grounds. In the realm of academic education, 42% of Saudi universities are offering AI-specific degree programmes at undergraduate and about 44% at graduate levels. The number of bachelor graduates in Saudi Arabia reached 38K+ graduates with degrees directly related to AI from 2019 to 2023, with 6.5K+ of them being abroad graduates⁸⁸. These degrees include specialisations in computer science with an AI focus, data science, and machine learning.

Figure 9. Yearly number of graduates in AI-related fields in KSA⁸⁹



⁸⁸ State of AI in Saudi Arabia: <https://globalaisummit.org/Documents/StateofAIinSaudiArabia.pdf>

⁸⁹ Ministry of Education through Estishraf platform, 2023, as per 'State of AI in Saudi Arabia's report: <https://globalaisummit.org/Documents/StateofAIinSaudiArabia.pdf>

Overall, these graduates will contribute to educating and establishing a reservoir of highly qualified AI scientists. For this purpose, it is also critical to measure the skills of the graduates in AI-related fields. In light of this, a point of attention should be the results of the Coursera Global Skills Report 2024, following a hybrid methodology combining information from Coursera's platform with external data. While KSA is ranked 15th globally in business, it lags behind peers in both tech (67th globally with a 39% score), and data science (79th with a 29% score).

Public Access to Education

While producing a highly skilled workforce in Data and AI remains a priority to cater to the needs of the labour market, continuous education and lifelong learning are crucial to ensure a solid baseline of digital skills across the Saudi population. In this respect, a series of programmes and frameworks have been developed to favour the upskilling of the Saudi population on digital topics:

- **Digital Skills Framework (DSF)⁹⁰**
The Ministry of Communications and Information Technology (MCIT) developed a Digital Skill Framework (DSF) to define ICT skills built based on the SFIA Skills Framework for the Information Age and define ICT skills worldwide. The framework identified 102 skills and seven different possible levels of responsibility.
- **Saudi Digital Academy⁹¹**
The Saudi Digital Academy (SDA) is a key national initiative by the Ministry of Communications and Information Technology (MCIT) of Saudi Arabia, which aims to develop human capital and the tech capabilities of Saudi youth.
- **Future Skills Programme⁹²**
The Ministry of Communications and Information Technology (MCIT) launched the Future Skills Programme to provide intensive training in digital areas, including communications and technology projects management, information security, data science, web development, blockchain, artificial intelligence, and information technology engineering.
- **SDAIA Academy⁹³**
One of the Authority's initiatives to enhance the level of national competencies in the fields of data and AI and create qualified and professional human resources capable of leading the labour market through several promising programmes and activities that are carried out in cooperation with a group of leading local, regional and global agencies in the fields of data and AI (46,000 Saudis trained throughout 2023).
- **Tuwaiq Academy⁹⁴**
Founded in 2019 by the Saudi Federation for Cybersecurity, Programming, and Drones (SAFCSP), it is the first academy in the Kingdom of Saudi Arabia to offer educational programmes in advanced technologies, with a wide range of courses for different age groups and technical fields (1,200+ bootcamps and courses, 1,4M+ registered students, 23k+ graduates).

⁹⁰ Digital Skills Framework, MCIT: <https://futureskills.mcit.gov.sa/en/skills-framework>

⁹¹ Saudi Digital Academy: <https://sda.edu.sa/ar>

⁹² Future Skills Program, MCIT: <https://futureskills.mcit.gov.sa/en>

⁹³ SDAIA Academy: <https://sdaia.gov.sa/en/Sectors/BuildingCapacity/academy/Pages/default.aspx>

⁹⁴ Tuwaiq Academy: <https://tuwaiq.edu.sa/>

- **One Million Saudi in AI (SAMAI)⁹⁵**

A national initiative, launched in collaboration with the Ministry of Human Resources and the Ministry of Education during the Global AI Summit, seeks to equip one million Saudis with skills in artificial intelligence and data technologies, emphasizing applications, ethics, and integration into everyday life and work.

- **National AI Scholarship Programme⁹⁶**

A joint programme by SDAIA and the Ministry of Education aims to develop national talent in AI by sponsoring top students to study at leading global universities. The programme seeks to bridge the talent gap, support Saudi Arabia's technological advancement, and contribute to Vision 2030 by fostering an innovation-driven, knowledge-based society.

Global Joint Academies

- **NVIDIA Academy⁹⁷**

One of the Authority's initiatives in collaboration with NVIDIA, the NVIDIA Academy focuses on empowering national talents in the rapidly growing field of generative AI. It aims to build a highly skilled workforce by offering intensive training programs that cover foundational and advanced topics in generative AI, large language models (LLMs), and multimodal AI. The academy provides participants with hands-on experience using NVIDIA's cutting-edge tools and platforms, enabling them to design and deploy AI solutions effectively.

- **Microsoft Academy⁹⁸**

SDAIA and Microsoft have signed an MoU to advance generative AI innovation in Saudi Arabia. Announced at the Global AI Summit in Riyadh, the partnership includes launching the Microsoft AI Academy in collaboration with SDAIA Academy to develop national AI capabilities through initiatives like the Microsoft Azure Professional Certificate Program.

⁹⁵ SAMAI: <https://www.spa.gov.sa/en/N2170857>

⁹⁶ Education Ministry, SDAIA Launch AI Scholarship Program: <https://www.spa.gov.sa/en/N2170656>

⁹⁷ SDAIA Opens Registration for NVIDIA Program: <https://www.spa.gov.sa/en/N2130159>

⁹⁸ SDAIA & MICROSOFT: <https://www.spa.gov.sa/en/N2170062>

ECONOMIC

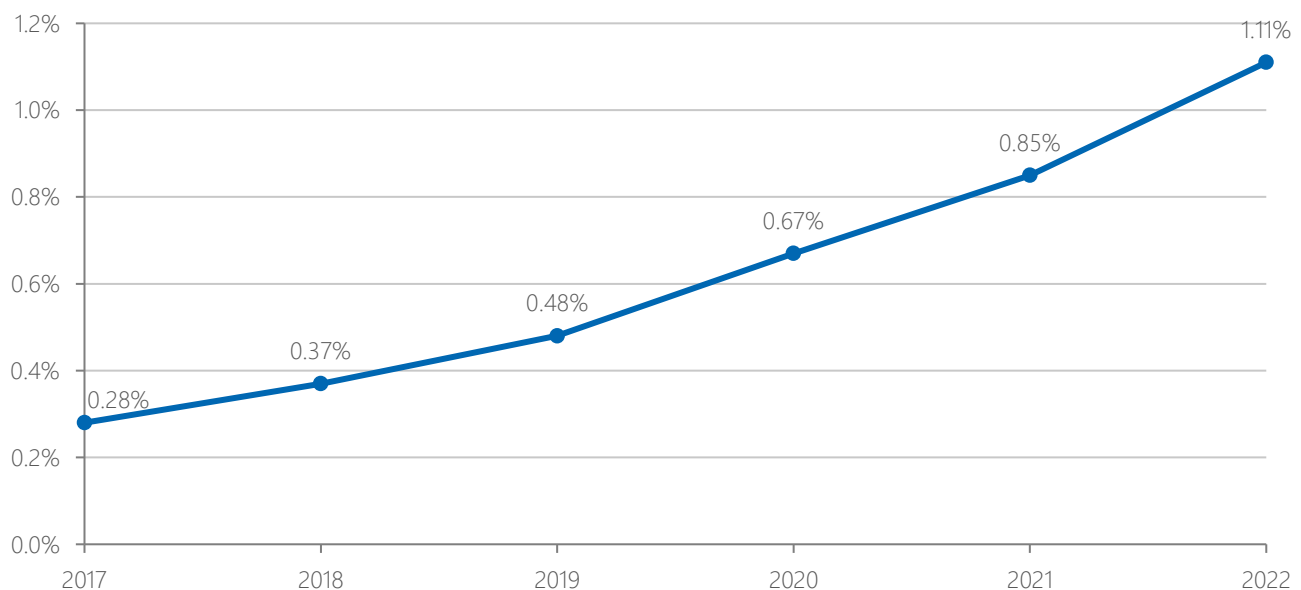
LABOUR MARKETS

Increased Demand for AI Talent

Over recent years, Saudi Arabia AI workforce has expanded rapidly, reflecting the rising demand for AI skills across various sectors. As of 2022, the number of AI specialists in Saudi Arabia has reached 1.4K+ based on their job title, with a broader pool of 165K+ workers having at least two related AI skills⁹⁹. While these numbers are based on LinkedIn data and are therefore subject to the signalling effect of employers and potential employees alike, they nevertheless reflect a fundamental increase in the need for AI talent in the Kingdom.

The acknowledgement of the positive response of KSA's education system to the labour market's increased demand for AI talent is also reinforced through the metric for the concentration of AI talent in KSA. As evidenced by numbers from the OECD AI policy observatory based on a LinkedIn analysis (percentage of LinkedIn members with AI skills or who perform an AI occupation (e.g., machine learning engineer)), there is an ongoing structural shift within the KSA workforce, adapting to the requirement of skills in AI.

Figure 10. Yearly AI talent concentration in KSA (in %)¹⁰⁰



⁹⁹ LinkedIn analysis as per 'State of AI in Saudi Arabia's report: <https://globalaisummit.org/Documents/StateofAIinSaudiArabia.pdf>

¹⁰⁰ AI Talent Concentration: <https://oecd.ai/en/data?selectedArea=ai-jobs-and-skills&selectedVisualization=ai-talent-concentration-by-country>

While the improvement of yearly AI talent concentration by a Compound Average Growth Rate (CAGR) of 32% should be viewed positively, KSA is still lagging two thirds of its G20 peers, highlighting the need for continued efforts in educating AI talent.

INTERMEDIATE CONSUMPTION

No intermediate consumption metric related to AI is currently tracked in KSA.

INVESTMENTS AND OUTPUT

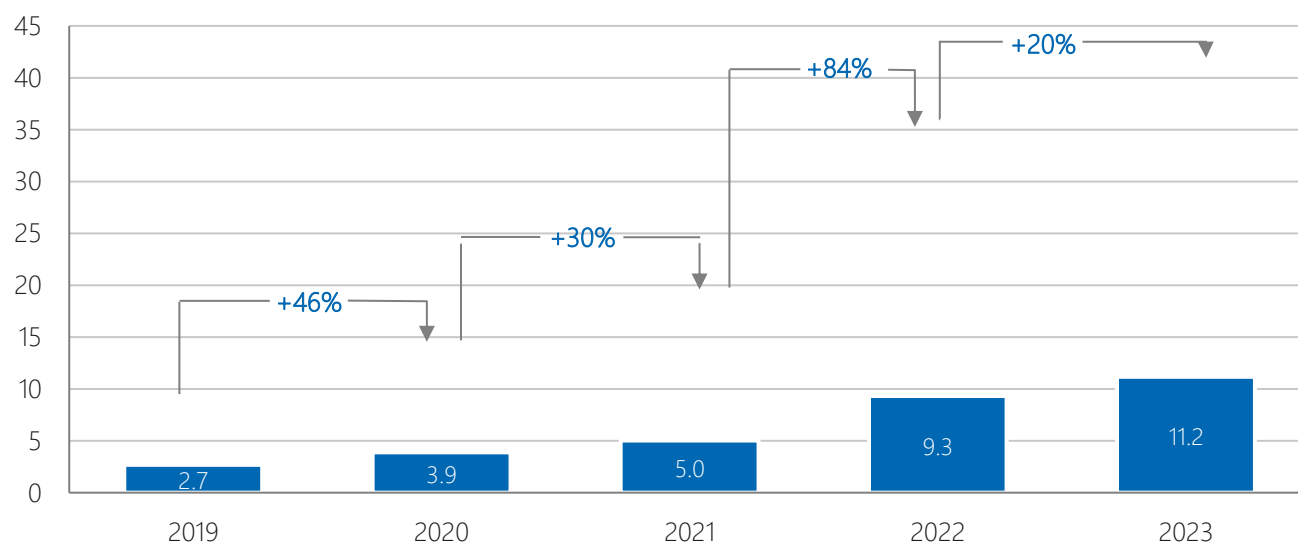
The global race for AI supremacy is accelerating, with many countries striving to meet ambitious goals. While some may lag, focused investments in AI in areas like research and innovation, talent development, and infrastructure can transition nearly any country to the forefront. Saudi Arabia exemplifies this potential transformation. With \$42+ billion (approximately SAR 157.67 billion) in active investments—in digital, telecommunications, and information technology sectors—the country continues to lead as the largest digital market in the MENA region. This commitment was further showcased at LEAP 2023, where Saudi Arabia's tech sector attracted an additional \$9.5 billion (approximately SAR 35.66 billion), marking a significant milestone for the industry. While these figures account for sharp increases in government investments over the period, private investment in the KSA AI sector has also increased significantly.¹⁰¹

Government Investment

Government AI spending is crucial to driving innovation, economic growth, and improving public services. It also leads to building essential infrastructure, supporting education and research, and encouraging private sector involvement, ultimately positioning the nation for success in the global tech landscape. In KSA, the government has significantly increased its technology investments in recent years. While AI spending figures are not reported separately, they are included within the Information and Communication Technology (ICT) spending, which grew 43% yearly on average between 2019 and 2023.

¹⁰¹ Leap Forward Issue #1, as highlighted in 'State of AI in Saudi Arabia's report: <https://shorturl.at/zjpF9>

Figure 11. Yearly government ICT spend (in \$B)¹⁰²



In 2021, Saudi Arabia committed to building a robust AI ecosystem through a multifaceted investment strategy. The Kingdom allocated \$4 billion (approximately SAR 15 billion) to enhance digital infrastructure, focusing on sectors such as the industrial Internet of Things (IoT), AI, cloud computing, and data centres. This investment was later expanded significantly to \$18 billion (approximately SAR 67.54 billion) to further advance digital infrastructure and support the development of mega data centres. Additionally, Saudi Arabia's acquisition 5000 NVIDIA GPUs¹⁰³ underscores its dedication to reinforcing its AI computing capabilities.

When looking at investments into less mature projects along the innovation cycle, a commitment of \$6.4+ billion (approximately SAR 24 billion) was announced at the Leap 2024 summit¹⁰⁴, to boost next-generation technologies and entrepreneurship. To facilitate the growth of AI startups, the government has established several incubators and accelerator programs. These incubators/accelerators include King Abdulaziz City for Science and Technology's (KACST) The Garage incubator¹⁰⁵, King Abdullah University of Science and Technology's (KAUST) Taqadam accelerator¹⁰⁶, SDAIA's Rowad Package¹⁰⁷, and the GAIA accelerator

- **GAIA¹⁰⁸**: The world's first generative AI early-stage accelerator and has committed 600+ million to transform innovative ideas in AI into successful businesses, while 50 startups including 19 Saudi companies, and 31 foreign companies were funded
- **Rowad¹⁰⁹**: A startup empowerment programme in collaboration with Monsha'at and Elm Company, supports startups by offering discounted digital verification services. Benefiting over 264 companies with more than 22 million transactions, the programme has provided direct support exceeding SAR 60 million.

¹⁰² Government ICT Spending Report in Saudi Arabia 2023, Digital Government Authority (DGA), as highlighted in 'State of AI in Saudi Arabia's report: <https://shorturl.at/5Hn4E>

¹⁰³ SDAIA Partners with NVIDIA to Enhance Kingdom's AI Capabilities: <https://www.spa.gov.sa/en/N2169413>

¹⁰⁴ Leap Forward Issue #1, as highlighted in 'State of AI in Saudi Arabia's report: <https://shorturl.at/zjpF9>

¹⁰⁵ The Garage Incubator: <https://thegarage.sa/>

¹⁰⁶ Taqadam Accelerator: <https://taqadam.kaust.edu.sa/>

¹⁰⁷ SDAIA Rowad package announcement: <https://elm.sa/ar/our-business/digital-products/Documents/En/Rowad%20Package%20Initiative%20EN1.pdf>

¹⁰⁸ GAIA: <https://sdaia.gov.sa/en/MediaCenter/News/Pages/NewsDetails.aspx?NewsID=164>

¹⁰⁹ SDAIA Rowad package announcement: <https://elm.sa/ar/our-business/digital-products/Documents/En/Rowad%20Package%20Initiative%20EN1.pdf>

In Addition, the Kingdom has launched several initiatives and programs to promote and accelerate the AI technology landscape through effective collaboration between several government entities. For instance, Artificial Intelligence Mission (AI.M) and National Technology Development Programme (NTDP) are the main engines that steer the ai startup ecosystem.

- **AI.M¹¹⁰**: Founded to foster a robust AI ecosystem by supporting research, innovation, and the growth of 100 quality AI companies. With a budget of SAR 1 billion, it offers specialised services to ensure success, while also building AI capabilities for 1,000 engineers and developing 50 AI modules aligned with national priorities.
- **NTDP¹¹¹**: A national programme that contributes to developing the technology ecosystem in the Kingdom and increasing its effectiveness by driving sustainable growth using different interventions and support mechanisms complementing efforts made by other stakeholders. The programme also plays an essential role in enhancing all enablers that influence the technology market growth, aiming to make the Kingdom an attractive regional centre for innovation and investment in the sector.

From an ecosystem-enablement point of view, the government's investment strategy also encompasses specialised research and skills development programmes by institutions such as MiSK, KAUST, or the SDAIA Academy. For this purpose, KSA also builds strategic partnerships with private key players in the industry include Accenture, Amazon AWS, Apple, Cisco, Dell Technologies, Google, IBM, Meta, Microsoft, Naver, NVIDIA, and Oracle.

These Centres of Excellence also serve the purpose of attracting private investments in KSA, which have increased drastically over the last 5 years.

Private Investment

The private sector is crucial in advancing AI technology and driving innovation. By injecting capital into the AI ecosystem, it enables the growth of startups and accelerates product development. To take a forward-looking stance, KSA expects AI to grow significantly until 2030, with the AI market expected to grow at a 29% CAGR, reaching a contribution to Saudi Arabia's GDP of 12% by 2030. Recognising the transformative potential of AI across industries, Saudi Arabia's Venture Capital (VC) firms and corporations at large have significantly increased their investments in recent years to support the development of AI solutions. For instance, key investors such as Saudi Aramco Entrepreneurship Venture (Wa'ed), Prosperity7 Ventures (part of Aramco Ventures), Raed Ventures, Shorooq Partners, Saudi Technology Ventures (STV), and NEOM have made several investments in AI-focused companies both globally and locally in recent years:

- **Prosperity7 Ventures participation in \$400 million investment in Zhipu AI (2024)¹¹²**: large AI model platform designed to provide API services to various types of customers.
- **NEOM \$100 million investment in pony.ai (2023)¹¹³**: global autonomous vehicle technology company.
- **Prosperity7 Ventures participation in \$20 million investment in Artera (2023)¹¹⁴**: AI-enabled predictive and prognostic cancer tests intended to identify patients who will benefit from therapy intensification.

¹¹⁰ AI.M: <https://www.spa.gov.sa/en/N2170535>

¹¹¹ NTDP: <https://ntdp.gov.sa/en>

¹¹² Prosperity7 invest in Zhipu AI: <https://equalocean.com/news/2024060420962>

¹¹³ NEOM invest in Pony.ai: <https://www.neom.com/en-us/newsroom/neom-investment-fund-invests-in-pony-ai>

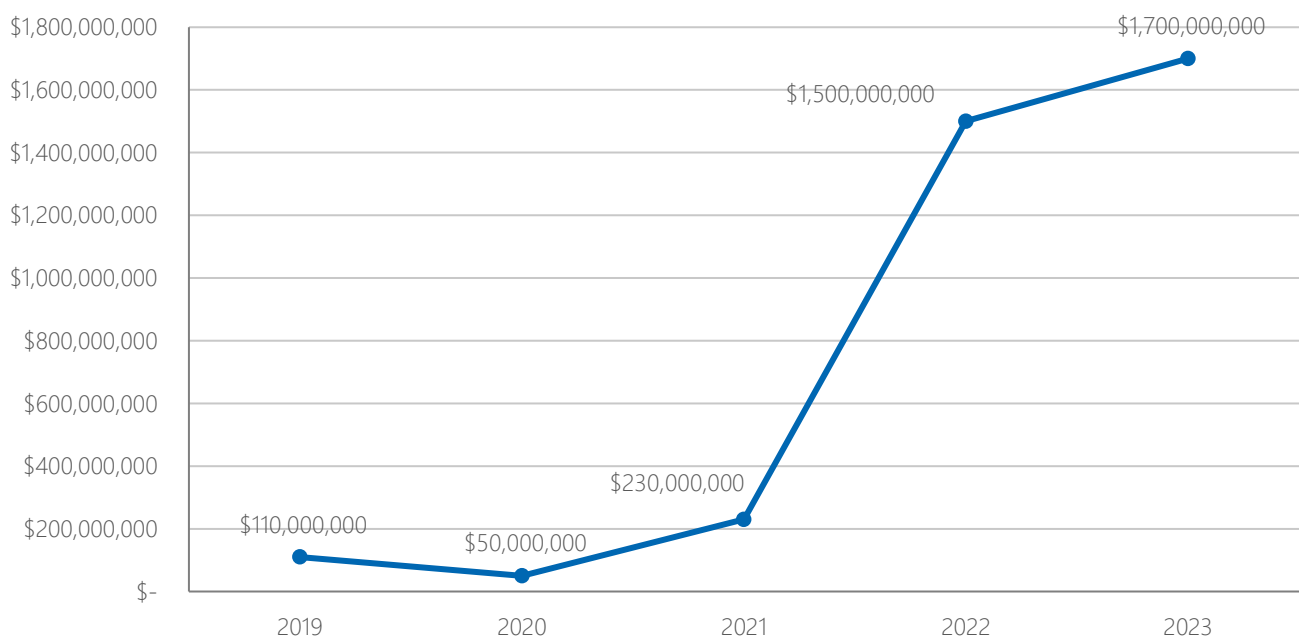
¹¹⁴ Prosperity7 invest in Artera: <https://silverwoodpartners.com/healthcare-private-placement-and-ma-transactions-review-week-ending-feb-4-2024/#:~:text=Artera%3A%20The%20company%20raised%20%2420,also%20participated%20in%20the%20round>

- **Wa'ed \$9 million investment in SpiderSilk (2023)¹¹⁵:** cybersecurity threat detection and management platform utilising AI based in Dubai.
- **NEOM \$175 million investment in Volocopter (2022)¹¹⁶:** design of electric multirotor helicopters in the form of personal air vehicles, designed for air taxi use.
- **Saudi Telecom Company (STC) \$21 million investment in Unifonic (2020)¹¹⁷:** conversational AI technology to streamline omnichannel communication for businesses.

The ecosystem of AI companies in KSA has also shown remarkable growth in recent years, with an increase in the number of AI-focused companies from 177 in 2019 to 242 in 2023. In 2023 alone, these companies attracted \$1.7+ billion (approximately SAR 6.3 billion) in funding.

This represents a ~160% increase compared to 2022, highlighting the growing confidence among investors in Saudi Arabia's AI ecosystem.

Figure 12. Yearly funding of AI-related companies in KSA (in \$)



¹¹⁵ Wa'ed invest in Spidersilk: <https://www.wamda.com/2023/11/spidersilk-raises-9-million-led-waed-ventures>

¹¹⁶ NEOM invest in Volocopter: <https://www.neom.com/en-us/newsroom/neom-invests-in-volocopter>

¹¹⁷ STC investment in Unifonic: <https://www.stc.com.sa/content/dam/corporatesite/ar/generic/pdf/investor/stc+presentation+-+Q3+2020.pdf>

TECHNICAL AND INFRASTRUCTURAL

INFRASTRUCTURE AND CONNECTIVITY

Infrastructure

Saudi Arabia recognises that robust infrastructure is crucial for the development, implementation, and deployment of AI. To build such infrastructure, the country focuses on three key pillars:

- Data centre capacity
- Advanced supercomputing capabilities
- Scalable cloud computing services.

These elements work in concert to create an ecosystem capable of supporting complex AI applications, from smart city initiatives to groundbreaking research in fields like healthcare and energy. Various entities are driving efforts to develop robust infrastructure by collaborating with global tech providers such as NVIDIA and IBM

Entities like SDAIA and KAUST are leading these infrastructure efforts in the public sector. In the private sector, companies such as STC and Saudi Aramco are making significant strides by heavily investing in AI infrastructure. For instance, in 2022, From a pure infrastructure perspective, STC has also deployed an AI-powered operations system on its network using Nokia's MantaRay¹¹⁸ Self-Organising Network (SON). This AI-powered system automates network optimisation, resulting in an increased utilisation rate of approximately 30% on loaded cells and a 10% average improvement in user throughput. Similarly, through its subsidiary Aramco Digital, Aramco formed a strategic partnership with Worldwide Technology (WWT) in July 2024 to advance AI infrastructure in Saudi Arabia¹¹⁹.

Despite these ongoing efforts, a SDAIA survey shows that only 28% of government entities believe they have adequate AI infrastructure in place. Likewise, Cisco's AI Readiness Index indicates that just 22% of private sector businesses in Saudi Arabia possess highly scalable infrastructure for the development of AI use cases. This highlights that the full impact of these initiatives has yet to materialise.

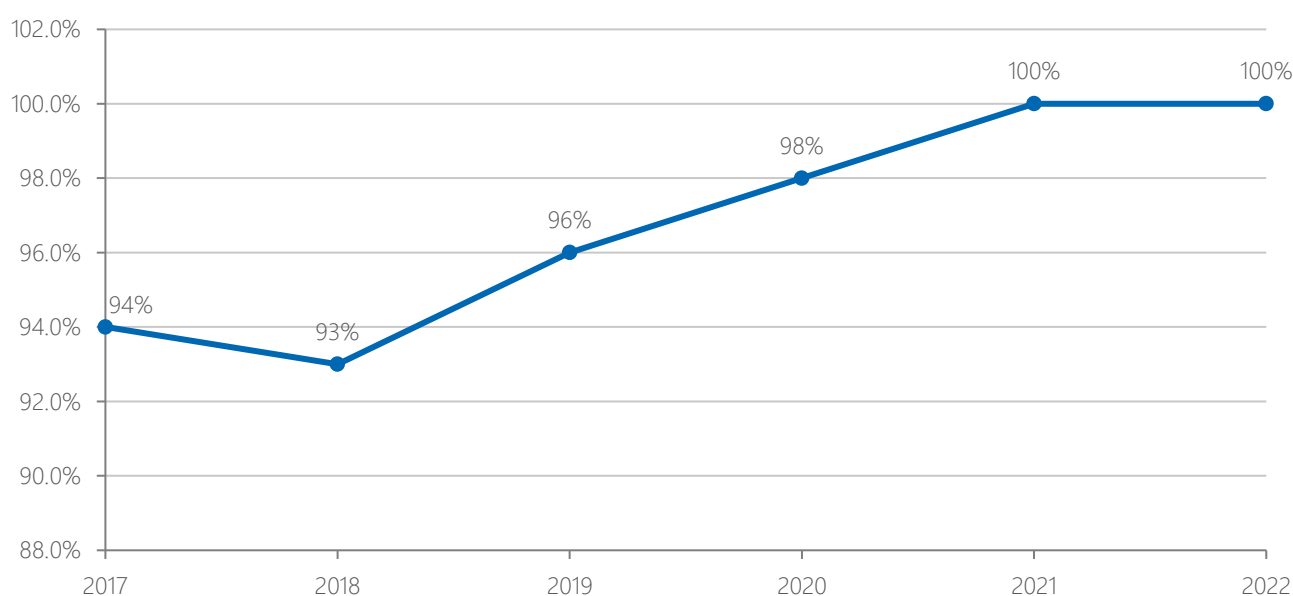
¹¹⁸Nokia and STC Group optimise network with AI-powered: <https://www.nokia.com/about-us/news/releases/2024/07/02/nokia-and-stc-group-optimize-network-with-ai-powered-mantaray-cognitive-son-solution-in-saudi-arabia/>

¹¹⁹ Saudi Aramco and WWT partnership announcement, Middle East AI News: <https://www.middleeastainews.com/p/aramco-digital-wwt-ai-infrastructure-deal>

Connectivity

KSA's connectivity metrics are broadly aligned with G20 averages yet lag with respect to the GCC. In particular, mobile and fixed broadband download speeds may be further improved. While connectivity metrics specific to the public sector are not readily available, the SPINE¹²⁰ initiative under development by the NIC leverages Software-Defined Wide Area Network (SD-WAN) technology to significantly improve government connectivity. In general, the infrastructure investments discussed in earlier sections are expected to significantly contribute to the improvement of KSA's connectivity metrics.

Figure 13. Internet Usage in Saudi Arabia¹²¹

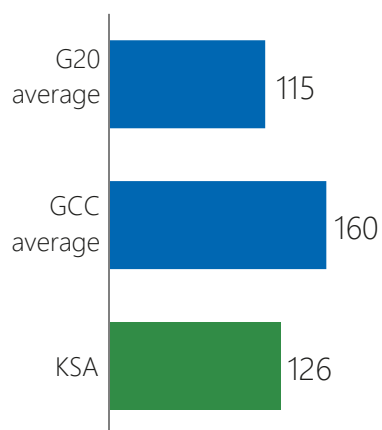


¹²⁰ SDAIA Unveils SPINE Network Initiative to Connect over 300 Government Entities: <https://www.spa.gov.sa/en/N2170812>

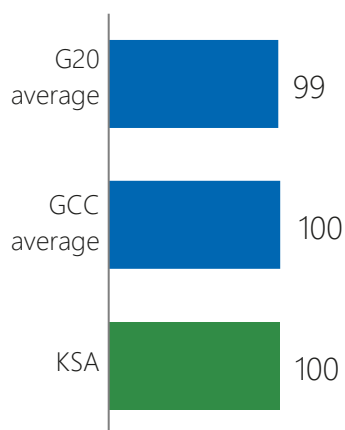
¹²¹ Active mobile broadband subscription, per 100 people, World Bank: <https://prosperitydata360.worldbank.org/en/indicator/ITU+DDD+1>

Figure 14. KSA's main connectivity metrics¹²²

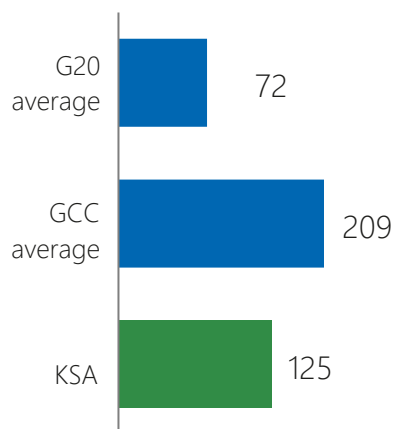
Active mobile broadband subscription,
per 100 people (World Bank, 2022)



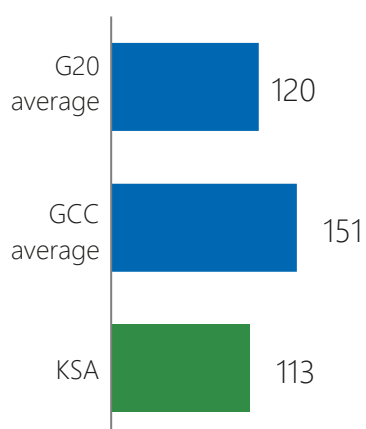
Share of population covered by
at least a 3G mobile network, %
(World Bank, 2022)



Median mobile broadband download
speed, Mbps (Speedtest Global Index, July
2024)



Median fixed broadband
download speed, Mbps
(Speedtest Global Index, July
2024)



¹²² Share of population covered by at least a 3G network, World Bank: <https://prosperitydata360.worldbank.org/en/indicator/ITU+DDD+31>
Media Mobile Broadband Download Speeds, Speedtest Global Index, <https://www.speedtest.net/global-index>

APPLIED STANDARDS

Saudi Arabia is actively involved in the standardisation of AI and digital technologies. The Saudi Data and AI Authority (SDAIA) collaborates with the Saudi Standards, Metrology and Quality Organisation (SASO), among others, to engage with international organisations like ISO, IEC, ITU, and IEEE. SDAIA lead AI and emerging technologies specification team in SASO to approve and localise international standards in the kingdom. The kingdom already approved tens of standards to help safe and responsible adoption of AI.

This collaboration focuses on both technical and ethical standards.

- **Technical standards¹²³**
 - ISO 14001 - Environmental Management System
 - ISO 9001 - Quality Management
 - ISO 45001 - Occupational Health and Safety Management
 - ISO 27001 - Information security, cybersecurity and privacy protection
- **Ethical standards¹²⁴**
 - IEEE 7000.

¹²³ Technical Standards: <https://spa.gov.sa/en/N2092587>

¹²⁴ Ethical Standards: <https://sdaia.gov.sa/en/MediaCenter/KnowledgeCenter/ResearchLibrary/SDAIAPublications12.pdf>

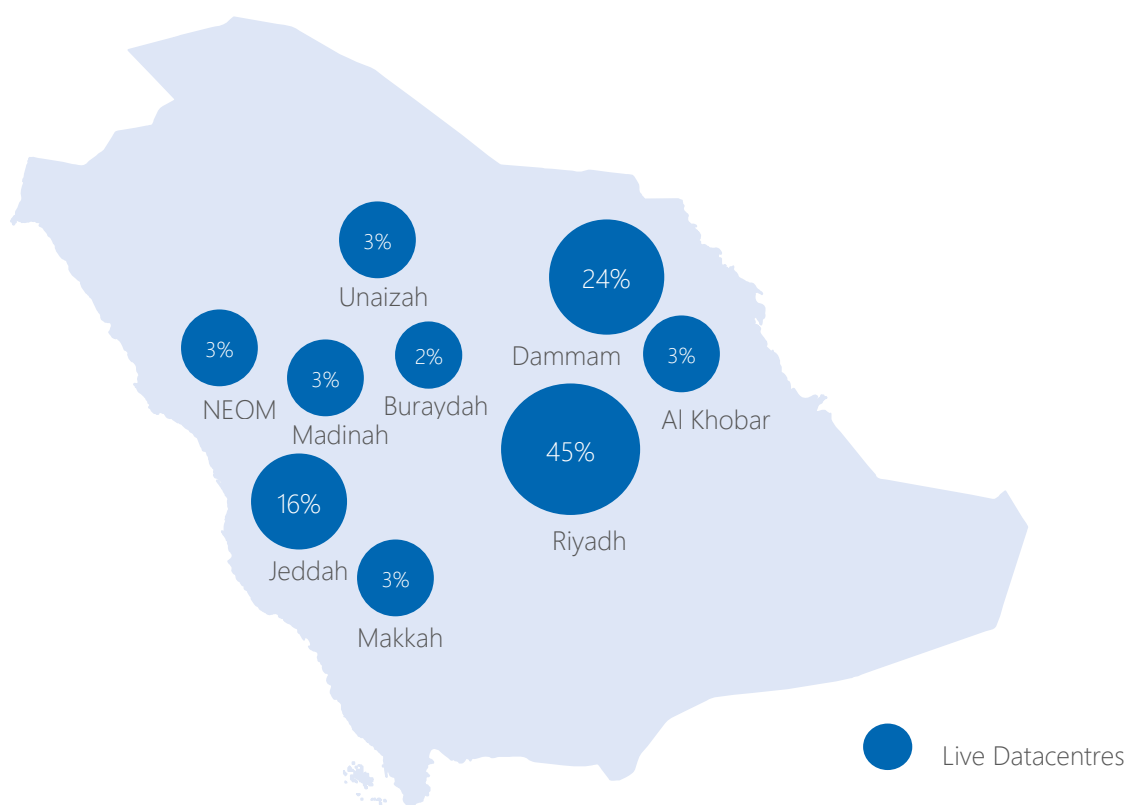
Data Centres

Saudi Arabia has significantly expanded its data centre capabilities, recognising the critical importance of data for AI development. In particular, the Ministry of Communications and Information Technology (MCIT) has introduced various initiatives that directly or indirectly impact the Saudi data centre market. These initiatives focus on diverse activities, such as increasing connectivity bandwidth and providing support for digital entrepreneurship.

Additionally, since 2017, multiple authorities, including the Communications, Space & Technology Commission (CST), the Saudi Central Bank (SAMA), Ministry of Communications and Information Technology (MCIT), the National Cybersecurity Authority (NCA), and Saudi Data & AI Authority (SDAIA), have announced data centre-related regulatory policies. As a result, Saudi Arabia currently hosts 22 active data centres, with the capacity of these centres increasing to 204MW in 2023 from 122.4MW in 2022, with 45% of this capacity located in Riyadh.

The growth in capacity has been driven by collaboration between government entities such as SDAIA, CST, the State Properties General Authority (SPGA), the Ministry of Education (MOE), the Digital Government Authority (DGA), and Princess Nourah bint Abdulrahman University (PNU), alongside data centre investors such as STC and Tamasuk. According to IDC, 15% of the live data centres in the Kingdom are classified as hyperscale data centres, while 58% are considered large.

Figure 15. Datacentres capacity distribution in KSA¹²⁵



¹²⁵ Datacentres capacity distribution in KSA: <https://globalaisummit.org/Documents/StateofAIinSaudiArabia.pdf>

This computing power is expected to increase in the years to come, with major expansions underway. For instance, STC's Center3 is expanding its capacities by 9.6MW, while DAMAC data centre plans to deliver a capacity of 55MW by 2025, ensuring robust storage and processing capabilities for advanced AI applications. In addition, the KSA government, led by MCIT, launched a plan in 2021 to attract \$18 billion worth of investment by 2030 to transform the Kingdom of Saudi Arabia into the main data centre hub for the region¹²⁶.

Supercomputers

Saudi Arabia is rapidly expanding its supercomputing infrastructure, which is crucial for AI development and scientific research. The Kingdom has developed 10 supercomputers around the country, eight of which are ranked among the top 500 globally¹²⁷. For example, Shaheen III, operated at KAUST, is ranked 23rd among the worldwide supercomputers in 2024, making it the most powerful supercomputer in the Middle East. Indeed, Shaheen III has an upgraded performance 6x faster than KAUST's existing Shaheen II. On the other hand, Aramco is leading private sector expansion of super computers by acquiring six different supercomputers, with Dammam-7 as the second most powerful supercomputer in Saudi Arabia¹²⁸.

Figure 16. Top 5 supercomputers in Saudi Arabia

Owner	Name	Rank (HPL)	Performance
KAUST	Shaheen III-CPU	23	35.66 PetaFlops
Saudi Aramco and STC	Dammam-7	37	22.4 PetaFlops
Saudi Aramco	Ghawar-1	53	19.26 PetaFlops
	Tuwaiq-1	111	8.49 PetaFlops
KAUST	Shaheen II	161	5.54 PetaFlops

Additionally, the Kingdom is investing heavily in GPUs, with SDAIA ordering 3K+ Nvidia GPUs in 2023 and 500+ Nvidia GPUs to bolster computing power for AI¹²⁹. All these supercomputing resources aims to support in driving research, innovation, and industrial applications, aligning with Vision 2030's goals for technological advancement¹³⁰.

new horizons for digital innovation and infrastructure, driving advancements in research, innovation, and industrial applications, while aligning with Vision 2030's goals for technological progress

¹²⁶ State of AI in Saudi Arabia: <https://globalaisummit.org/Documents/StateofAlinSaudiArabia.pdf>

¹²⁷ Top 500, as per the 'State of AI in Saudi Arabia' report: <https://top500.org/lists/top500/2024/06/>

¹²⁸ State of AI in Saudi Arabia: <https://globalaisummit.org/Documents/StateofAlinSaudiArabia.pdf>

¹²⁹ SDAIA Partners with NVIDIA to Enhance Kingdom's AI Capabilities: <https://www.spa.gov.sa/en/N2169413>

¹³⁰ State of AI in Saudi Arabia: <https://globalaisummit.org/Documents/StateofAlinSaudiArabia.pdf>

Cloud Computing

After launching the Cloud Computing Regulatory Framework¹³¹ (CCRF) in 2018 to encourage cloud investment while protecting consumers, the Saudi government, led by the Ministry of Communications and Information Technology (MCIT), unveiled a plan in 2021 to attract \$18 billion worth of investment by 2030¹³². These efforts aim to lay the foundation for accelerated cloud adoption, attract international investments, and foster the development of local talent and innovation within the cloud sector.

As of 2023, the Kingdom has successfully increased the number of Cloud Service Providers (CSPs) registered with the Communications, Space & Technology Commission (CST) to 29. Global tech giants such as Oracle, Google Cloud, Alibaba Cloud, and SAP are establishing cloud regions in the country through strategic joint ventures with local telecommunication companies, resellers, and other relevant partners. Simultaneously, local providers such as STC, SITE, and Cloud4C are playing a key role in strengthening the domestic cloud ecosystem

In a similar vein, SDAIA launched DEEM, a government cloud platform, in 2018. It offers secure, reliable, and scalable cloud services for government and semi-government entities. Notable achievements include the consolidation of over 248 data centres, the provision of services to 185 government entities, the delivery of 51 different cloud services, and generating a financial impact of approximately \$1.5 billion (SAR 5.6 billion) through hosted services.

During the 8th Future Investment Initiative (FII) held in Riyadh, the Public Investment Fund (PIF) announced a strategic partnership with Google Cloud to establish an advanced AI and Cloud Computing Hub in Saudi Arabia. This initiative underscores the Kingdom's commitment to advancing its technological infrastructure.¹³³

Figure 17. Key Saudi Arabia CSPs

Global	Regional	Local
• Alibaba Cloud	• Kalaam-Telecom	• Cloud4C
• Google Cloud	• Raya IT	• DEEM Cloud
• Huawei Cloud	• ZAIN	• Mobily
• Oracle	• ZainTech	• NourNet
• SAP		• STC

¹³¹ Cloud Computing Regulatory Framework: https://www.cst.gov.sa/en/RulesandSystems/RegulatoryDocuments/Documents/CCRF_En.pdf

¹³² State of AI in Saudi Arabia: <https://globalaisummit.org/Documents/StateofAIinSaudiArabia.pdf>

¹³³ PIF & Google Cloud to create advanced AI Hub (FII): <https://www.pif.gov.sa/en/news-and-insights/press-releases/2024/pif-and-google-cloud-to-create-advanced-ai-hub-in-saudi-arabia/>

The conjunction of these efforts has already led to significant developments. For instance, the Ministry of Health (MOH) leveraged cloud platforms to develop a chatbot hosted on Oracle Cloud Infrastructure during the COVID-19 pandemic, and the King Abdullah International Medical Research Center (KAIMRC) uses cloud-based high-performance computing to power research into treatments for infectious diseases¹³⁴.

STATISTICAL PERFORMANCE

On the World Bank's statistical performance indicator, KSA has achieved an overall score of 81.5, based on the aggregation of 5 sub-scores measuring a country's ability to generate and leverage complex data.

Figure 18. KSA's score in the World Bank's Statistical Performance Indicators¹³⁵

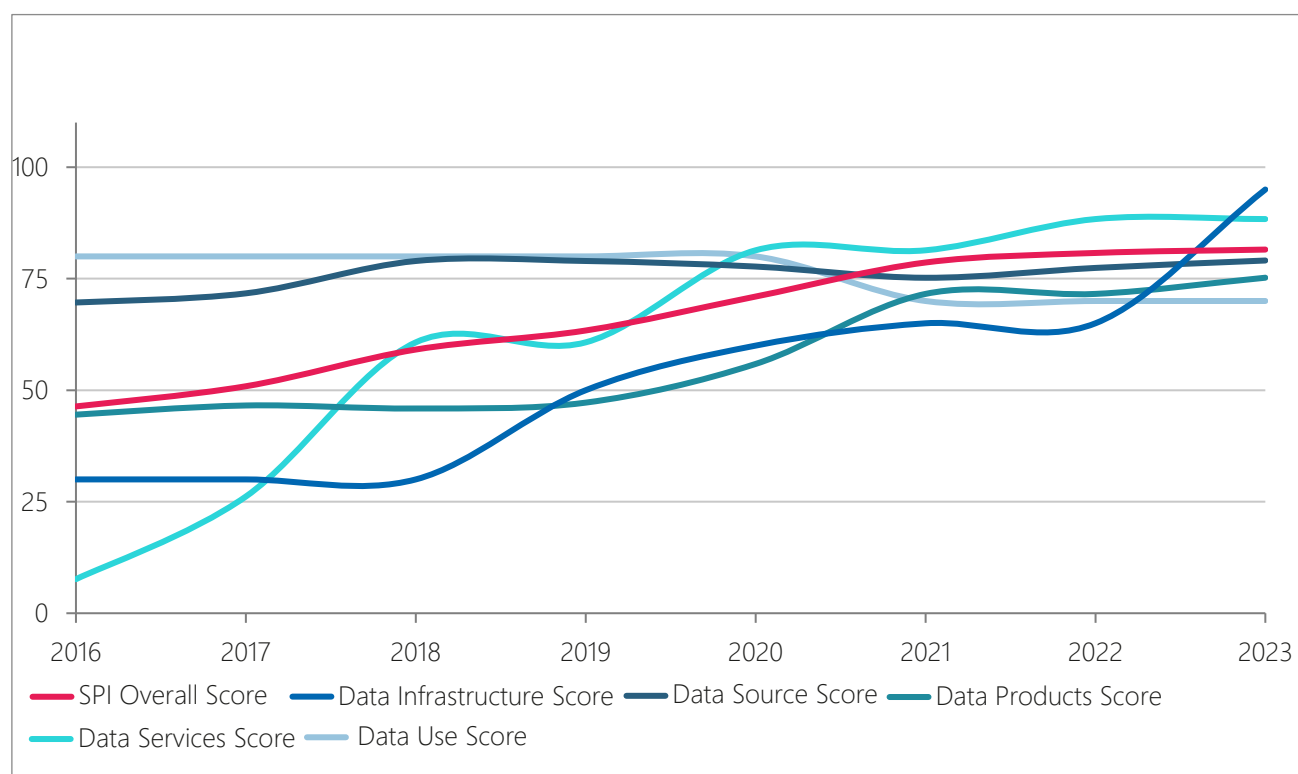
Metric	Description	Score
Data use	Captures whether data that is used widely and frequently	70
Data services	Captures breadth of services connecting data producers to consumers of data	88.37
Data products	Captures accuracy, timeliness, frequency, comparability, and levels of disaggregation of statistical products	75.22
Data sources	Captures whether data collection goes beyond typical censuses and surveys, including administrative and geospatial data, as well as data generated by private firms and citizens	79.08
Data infrastructure	Captures development of governance, legislation, and standards, in addition to the skills, partnerships, and necessary funding capabilities to deliver useful and widely used data products and services	95

KSA's significant improvement on the World Bank's statistical performance indicator should be viewed in light of the comprehensive laws, regulations, and guidelines addressing data management in KSA developed by the National Data Management Office (NDMO). Beyond the regulatory context, actual access to a wealth of data through the National Data Bank operated by NIC should be highlighted as a main driver of the score improvement over the last years. Finally, the role of programmes such as the National Data Index initiative in monitoring the performance of government data management should be highlighted.

¹³⁴ CST. Cloud Computing: Technology Overview and Market Outlook, as per the 'State of AI in Saudi Arabia' report: https://www.cst.gov.sa/ar/mediacenter/researchsandstudies/Documents/Cloud_Computing_Technology_Overview_and_Market_Outlook.pdf

¹³⁵ Statistical Performance Indicators, World Bank, 2022: <https://www.worldbank.org/en/programs/statistical-performance-indicators/explore-data>

Figure 19. Yearly World Bank Statistical Performance Indicators (SPI) of KSA¹³⁶



This strong momentum positions KSA as a leader in the GCC and Arab World, yet with further improvements possible to reach a world-leading status from a data generation and utilisation standpoint.

¹³⁶ Statistical Performance Indicators, World Bank, 2023: <https://www.worldbank.org/en/programs/statistical-performance-indicators/explore-data>

DEVELOPING A NATIONAL AI MULTI-STAKEHOLDER ROADMAP

OVERVIEW OF STAKEHOLDER ENGAGEMENT PROCESS

SDAIA has engaged heavily with stakeholders in the data and AI landscape, both in KSA and globally, to inform its policy development and activities. This multi-stakeholder engagement covers the government and public sector, academic and research institutions, the private sector, relevant NGOs and intergovernmental organisations, and civil society. These interactions are particularly frequent in the context of punctual policy development, as shown by the engagement process rolled-out for the development of the National Strategy of Data & AI (NSDAI) in 2020 (e.g., alignments with 25+ key government entities, workshops with 100+ entities from various sectors).

However, this stakeholder engagement takes place on a continuous basis and through a variety of formats, all of which form a core part of SDAIA's activities:

- Regular workshops (e.g., Regional AI Governance Workshop).
- Public consultations and surveys (e.g., public sector AI-adoption survey).
- Partnerships with industry and academia (e.g., partnerships with IBM, KAUST).
- Advisory committees and working groups (e.g., United Nations AI Advisory Board).
- Conferences and relevant forums (e.g., GAIN summit).

For instance, following the development of NSDAI in 2020, a wealth of interactions with the local and global data and AI ecosystem have taken place:

- Experts from 10+ countries engaged.
- 80+ government entities surveyed.
- 30+ direct meetings with government entities held.
- 50+ Chief Data Officers surveyed.
- 1,000+ digital engagements held.
- 7+ conferences and summits held.

In addition, throughout 2024, entities from the full spectrum of stakeholders have been involved in consultation efforts through multiple workshops and assemblies. SDAIA seized the opportunity of 10 of these gatherings to finetune strategic directions for AI in the Kingdom, and to investigate possible supporting initiatives:

- **The establishment of the International Center for Artificial Intelligence Research and Ethics (ICAIRE), recognised as a Category 2 Centre (C2C) under UNESCO's auspices¹³⁷**
Underscores the Kingdom's commitment to leveraging AI for collective benefit and advancing the United Nations Sustainable Development Goals (SDGs). ICAIRE also plays a leading role in championing the RAM (Responsible AI Management) framework, promoting ethical AI governance and sustainable practices globally.
- **ITU's AI Readiness Framework¹³⁸**
Saudi Arabia's contributions also extend to developing frameworks for assessing AI readiness. SDAIA's introduction of the ITU's AI Readiness Framework, a globally recognised tool, marks a significant step in supporting nations to evaluate their AI capabilities and foster international collaboration. This initiative aligns with broader efforts to standardise global practices and promote sustainable growth.
- **OECD AI Incident Observatory¹³⁹**
Saudi Arabia's adherence to G20 AI principles and its leadership in launching the OECD AI Incident Observatory in Arabic for the Middle East region highlight its dedication to advancing AI governance and policy.
- **World Bank's Digital Development Partnership (DDP)¹⁴⁰**
The Kingdom's commitment to contributing to the global discourse on AI ethics, safety, and equitable development was further solidified by its membership in the World Bank's Digital Development Partnership (DDP).
- **League of Arab States, Artificial Intelligence for Sustainability (January 2024)¹⁴¹**
Brought together 73 experts and representatives from 18 Arab countries to discuss AI's role in sustainable development. Emphasising ethical frameworks, the event focused on fostering regional cooperation to ensure AI applications support environmental sustainability.
- **GCC Workshop, AI Ethics Toolkits (January 2024)¹⁴²**
Workshop with 31 experts across the GCC to develop an AI Ethics Toolkit that aims to standardise ethical AI practices within the GCC, focusing on responsible AI use that aligns with social and economic sustainability goals in the region.
- **GAIN Assembly: Collaborating for Global AI Governance¹⁴³ (May 2024)**
Organised by SDAIA, ICESCO, and the UN Advisory Board on AI, the assembly focused on AI governance, featuring discussions on the future of AI in the Islamic world and global perspectives on AI ethics and policy.

¹³⁷ The Establishment of ICAIRE: <https://unesdoc.unesco.org/ark:/48223/pf0000387338>

¹³⁸ ITU AI Readiness Framework: <https://aiforgood.itu.int/are-you-ai-ready-a-new-ai-standards-framework-has-just-launched/>

¹³⁹ OECD AI Incident Observatory: <https://www.prnewswire.com/news-releases/sdaia-and-oecd-sign-mou-to-enhance-ai-incident-monitoring-in-the-middle-east-302244005.html>

¹⁴⁰ SDAIA Joins World Bank's Digital Development Partnership: <https://www.spa.gov.sa/2383981>

¹⁴¹ Kingdom Participates in Arab League: <https://www.spa.gov.sa/en/N2013086>

¹⁴² SDAIA Conducts Workshops on AI Ethics in Collaboration with AL, GCC and ICAIRE: <https://www.spa.gov.sa/en/N2039312>

¹⁴³ GAIN Assembly: <https://icesco.org/en/2024/05/15/icesco-sdaia-and-un-organize-global-artificial-intelligence-assembly-in-riyadh/>

- **Regional AI Governance Workshop: targeting the KSA public sector (May 2024)**
77 participants from 38 government entities convened in Riyadh to discuss the governance of AI within Saudi Arabia. The workshop covered crucial topics such as data governance, AI ethics, and generative AI, focusing on regulatory tools and ethical principles essential for the country's AI strategy.
- **Stakeholder Workshop targeting the KSA private sector and relevant public sector entities (September 2024)**
100 participants from 49 private and public sector entities convened in Riyadh to identify pain points to AI development and deployment within the KSA ecosystem.
- **GAIN Summit: targeting the whole AI ecosystem in KSA and abroad (September 2024)¹⁴⁴**
300+ speakers and 15k+ participants convened in Riyadh to participate in 120+ sessions on the state and future of AI in KSA and globally.

MAIN CHALLENGES IDENTIFIED THROUGH PREVIOUS CONSULTATIONS

Through the consultations held with ecosystem players in the Kingdom and globally, several challenges and opportunities have been identified across the KSA data and AI ecosystem:

- **Laws and regulation:**

Challenges: While the Kingdom's regulatory framework for AI is still evolving, it may be enhanced to foster a supportive environment for testing and deploying AI technologies which account for sector specificities:

- Implementation and compliance of existing regulations are still perceived as a challenge by the public sector, in particular due to the lack of clarity on how they impact actual operations.
- From a private sector point of view, regulation might hinder innovation and could be an obstacle to the successful scaling of AI systems.

Opportunities: The enhancement of the Data and Privacy Regulatory Sandbox represents a strategic opportunity to refine AI applications within a controlled environment:

- From a public sector standpoint, real-time policy iterations and improvements are facilitated based on empirical data, leading to fit-for-purpose policies which also account for sector specificities.
- In addition, key learnings from sandbox experimentation may be synthesised and serve as a guidebook for the whole data and AI ecosystem, providing guidance and support to public sector entities in the implementation and compliance with emerging regulation.
- Finally, while benefiting from a loosened regulatory context in which to investigate scaling of systems more rapidly, the private sector would also be more involved in setting the KSA AI agenda, mitigating existing perceptions of being kept out of the loop.

¹⁴⁴ GAIN Summit: <https://globalaisummit.org/en/default.aspx>

- **Capacity building:**

Challenges: There is a broad consensus across both the public and private sector today that Saudi Arabia faces a critical scarcity of high-quality and internationally competitive AI talent. This talent gap risks slowing the pace of AI innovation and broader technological adoption across industries:

- While the talent gap is generalised and applies to the private sector at large, hiring talent is particularly difficult for SMEs and startups as larger corporations remain more attractive to data & AI talents. The talent gap suffered by the private sector should be largely targeted by improvements to the KSA education system at large, and through increased attractiveness for foreign talent.
- In the public sector, implementation of AI-tools and use-cases are still lagging yet are expected to rely more heavily on appropriate continuous learning opportunities as a key factor of success. The challenges faces are therefore more related to general AI-upskilling of the public-sector workforce, which could be further improved from its current state.

Opportunities:

- To fuel the private sector with AI talent, inclusion of data science and AI in school programmes and universities is well underway and may be further strengthened. Increasing the attractiveness of KSA universities for foreign talent is also expected to play a role in the nurturing of a Saudi-based talent pool (e.g., through international collaborations and exchange programmes).
- Beyond the growth of talent locally to fuel the private sector, increasing the attractiveness of KSA at large to existing AI-talent is also perceived as critical to bridge the talent gap, with the added benefit of bringing international perspectives and expertise to the Kingdom. Levers for increased attractiveness should be viewed beyond the pure AI-lens and fit into a broader logic of attraction of foreign talent, across different sectors and fields of expertise.
- From a public sector point of view, the willingness and ability of employees to embrace data and AI use cases could also be improved through adapted and evolving training programmes. When deployed through the right providers, these training programmes are also expected to increase ties and foster cross-pollination of ideas with leading private sector organisations. More anecdotally, these enhanced continuous learning opportunities would also serve the purpose of identifying AI talent and enthusiasts within public sector organisations, to whom more advanced and costly training opportunities may be considered.

- **Responsible technologies and innovation:**

Challenges: The KSA AI ecosystem today lacks maturity and is characterised by a limited number of AI startups and established AI companies. In this context, limited government enablement is viewed as the main challenge:

- From the research ecosystem's point of view, existing support mechanisms are viewed as not focusing sufficiently on generating impact, leading to limited innovation in spite of funds and lack of translation of fundamental research into concrete applications.

- For startups and SMEs, beyond the possibility of government funding, the absence of a strong government impetus to create a cohesive ecosystem is highlighted as a main challenge (e.g., opportunities for data monetisation, networking opportunities, sponsored attendance to events, competitions).
- Thirdly, and from an infrastructure angle covering both the private and public sector, computing and cloud capabilities could be further enhanced, to foster further development and deployment of advanced AI applications.
- Finally, the environmental impact of the growth of the KSA AI ecosystem is not sufficiently accounted for, be it in theory or in practice. For instance, sustainability practices in AI infrastructure development in Saudi Arabia are not developed, despite being included in SDAIA's AI Ethics Principles.

Opportunities:

- Firstly, enhancing and promoting public-private partnerships aimed at addressing real-world industrial challenges could catalyse the practical application of AI research. This could in turn drive both technological and economic progress, while transforming the ecosystem into a more innovative and cohesive universe.
- Secondly, from an infrastructure standpoint, Saudi Arabia is currently lagging in terms of computing capabilities, there is strong momentum in the development of next-generation AI infrastructure (i.e., advanced data centres and enhanced cloud computing capabilities). These efforts provide existing momentum to be further leveraged.
- Finally, sustainability practices are at a nascent stage on the global stage, providing the Kingdom with the opportunity to position itself as a pioneer. This positioning should be viewed in the context of a substantial renewable energy infrastructure roll-out across the Kingdom.
- **Institutional frameworks and governance:**

Challenges: There is currently a limited view within the public sector of the efficiency of previously implemented policies, limiting the possibility of agile amendments. More generally, the National Strategy for Data and AI (NSDAI) was developed in 2020 and should be updated to incorporate latest thinking and outcomes of stakeholder engagement in the rapidly moving AI field.

Opportunities:

- Stakeholder engagement has been conducted on a regular basis since the development of the NSDAI, and input from the ecosystem is regularly consolidated through exercises like the RAM report. This means the data exists but needs to be analysed on a more continuous basis through an adapted data backbone.
- It is therefore notable that from a policy monitoring point of view, the National Data Bank (NDB) offers an existing platform which may host relevant KPIs, tracking policy efficiency across the Kingdom.

- **Inclusion and well-being:**

Challenges: A significant gender gap exists within the KSA data and AI ecosystem today, particularly visible through the quasi-absence of female role models in the field. It is critical to ensure this gap is closed in the broader context of the AI-talent gap in KSA. In the current state, several more detailed observations can be made:

- Firstly, aspirations of female students in KSA are not geared towards STEM at large.
- In addition, while several digital programmes targeting women are deployed, their efficiency is not sufficiently tracked and verified.

Opportunities: Programmes for female empowerment in the digital sphere exist, and may be enhanced to improve the outcomes of young women in STEM fields:

- Existing programmes for the creation of early AI-aspirations across girls may be further enhanced, and further programs should be developed.
- Across the board, if properly managed for outcomes, these programmes can help solve the AI gender gap, and in turn the KSA AI-talent gap.

- **Investment ecosystem:**

Challenges: The AI startup scene in Saudi Arabia is growing slowly, with a limited number of local AI startups emerging. Startups often face difficulties in receiving the necessary guidance and support from capital investors, which hampers their ability to scale and grow. This indicates a lack of cohesion and maturity in the KSA AI investment ecosystem, particularly when it comes to fostering early-stage AI companies, echoing the lack of effective government enablement in technology development and innovation.

Opportunities: There is potential to leverage the existing deployment of government and Saudi Venture Capital (VC) funds to better support the growth and development of local AI startups. Saudi-based VC funds have been actively investing internationally, which presents an opportunity to leverage their global expertise and experiences to strengthen the domestic AI ecosystem:

- The Kingdom could therefore accelerate the growth of its AI startup landscape by multiplying touchpoints between investors with international experience and startups, at all stages of development.
- As the KSA AI ecosystem matures, deploying the necessary incentives to attract additional foreign VC firms into the Kingdom will further ensure international best practice gets a stronger foothold.

CONCLUSION

In light of the challenges and opportunities identified across the 6 dimensions, 10 key conclusions may be drawn. Summarising the input of all engaged stakeholders, these conclusions represent key foundations to be accounted for in the development of high-level recommendations on the path towards a new national strategy for data and AI:

1. Saudi Arabia's has a unique data and AI authority that led the kingdom data & AI strategy, policymaking, regulation, and enablement. However, governance framework is still under development, which presents unique opportunities for shaping a robust regulatory environment. As governance structures evolve, there is potential to establish Saudi Arabia as a leader in AI ethics and compliance, drawing on global best practices to ensure that AI development benefits all segments of society.
2. The establishment of AI-specific regulatory sandboxes could accelerate innovation while managing risks. Such environments allow for the testing and refinement of AI technologies under regulatory supervision, providing valuable insights into effective governance mechanisms tailored to relevant sectors.
3. There is a critical need to address the talent gap in the AI sector to sustain growth and innovation. While Saudi Arabia is making strides in educational reform to boost AI and data science skills, more targeted initiatives are required to attract and retain high-quality, internationally competitive talent. In addition, upskilling of the public sector through adequate training is critical.
4. Educational systems must continue to adapt to prepare future generations for a world increasingly driven by AI. This involves not only integrating AI into curricula but also ensuring that ethical considerations and human-centric design principles are emphasised to students, while monitoring the quality of students' hard skills.
5. Addressing the talent gap relies on empowering women to pursue careers in STEM fields, through early nurturing and appropriate inclusion programmes further down the road.
6. The maturity of the AI ecosystem in Saudi Arabia is a pivotal factor in its ability to compete on a global scale. Strengthening the ecosystem with a focus on nurturing local startups while attracting established AI companies will be crucial to driving innovation and maintaining technological leadership. This may be done by ensuring ecosystem-wide learning effects from KSA investments in startups abroad.
7. While improvements have been made to AI infrastructure, it is critical that momentum is kept ensuring unhindered development of the KSA AI ecosystem.
8. Sustainability must be a cornerstone of AI infrastructure development to ensure long-term viability. Developing guidelines and practices for sustainable AI can help mitigate environmental impacts and align with global efforts to promote responsible technology use while putting KSA on the map as a thought leader in sustainable AI.
9. The strategic deployment of government support and funding can catalyse the growth of the AI sector locally. Initiatives should be tailored to enhance the resources available to AI startups and research institutions, fostering a vibrant technological environment attracting leaders in the field, and aiming at tightly knit and cohesive ecosystem.
10. As a general principle, cross-pollination of ideas between the private and the public sector, and between international and local players should be sought as a critical objective on all fronts.

TOWARDS A NATIONAL AI STRATEGY: HIGH LEVEL RECOMMENDATIONS

Saudi Arabia's National Strategy for Data and AI (NSDAI), launched in 2020, outlines the Kingdom's ambition to become a global leader in AI by 2030 and beyond. As part of this journey, Saudi Arabia has engaged extensively with stakeholders through workshops, public consultations, strategic partnerships, and advisory committees. The application of the Readiness Assessment Methodology (RAM) has further informed Saudi Arabia's AI strategy by providing valuable insights into current strengths and areas for improvement.

This section provides targeted recommendations for Saudi Arabia across six key dimensions: laws and regulation, institutional frameworks and governance, capacity building, responsible technologies and innovation, inclusion and well-being, and investment ecosystem. These recommendations are designed to ensure that Saudi Arabia's AI ecosystem remains robust, forward-looking, and aligned with the Kingdom's values, including a shared commitment to ethical and sustainable AI development as reflected in UNESCO's principles.

LAWS AND REGULATION

The laws and regulation dimension provides key recommendations designed to address the specific regulatory needs of Saudi Arabia's rapidly evolving AI ecosystem. As the Kingdom advances in AI, it is crucial to develop clear, sector-specific legislation, establish regulatory sandboxes, and enhance data access policies to ensure that AI technologies are deployed securely, ethically, and in alignment with both national and global standards.

DEVELOP AND IMPLEMENT AI STANDARDS FOR PRIORITY SECTORS

As AI continues to shape various industries, the need for tailored legislation has become increasingly important to address specific requirements and challenges. While Saudi Arabia's AI Ethics Principles provide a strong foundation for responsible AI adoption, developing AI-specific legislation and sector-oriented standards would further support safe and effective implementation in key fields such as healthcare, finance, and transportation.

Introducing comprehensive AI-specific legislation, alongside sector-specific standards, would help provide clarity and guidance for stakeholders, ensuring ethical and accountable AI practices. This approach would also promote innovation and align the Kingdom with global best practices, reinforcing its leadership in the responsible use of AI technologies.

Timeline: 2025-2030

Priority: High

IMPLEMENT SPECIALIZED AI REGULATORY SANDBOXES AND PILOT ZONES

As AI technologies advance, a dynamic and adaptable regulatory environment is essential to foster innovation while maintaining safety and ethical standards. Regulatory sandboxes and pilot zones provide controlled environments where AI solutions can be tested, refined, and prepared for market deployment.

Saudi Arabia has already seen success with initiatives launched by the Communications, Space & Technology Commission (CST) and the National Data Management Office (NDMO). Building on these achievements, it is proposed that specialised AI sandboxes be developed for priority sectors. These sandboxes would help balance technological advancement with safeguards for responsible AI development.

Key actions include identifying priority sectors, setting clear objectives and participation criteria, and establishing comprehensive operating models with strong oversight. Additionally, leveraging existing pilot zones as testbeds for AI solutions would enhance practical experimentation and refinement in real-world environments, further supporting the Kingdom's leadership in responsible AI innovation.

Timeline: 2025-2026

Priority: High

INTRODUCE AI-SPECIFIC TERMS AND CONDITIONS IN PUBLIC PROCUREMENT

Given the potential risks of biased algorithms and security vulnerabilities, governments must establish clear policies to regulate the procurement of AI systems and AI-integrated products and services. At present, Saudi Arabia lacks specific laws or policies governing AI-related procurement. However, they have adopted AI Ethics Principles that require AI system owners to ensure that AI Ethics due diligence is carried out for third-party AI systems. A formal list of certified vendors with AI-related provisions has yet to be established, although a voluntary digital badges programme for AI compliance is currently under development.

To align with international best practices and enhance the robustness of AI system procurement, it is recommended that Saudi Arabia develops comprehensive procurement policies that incorporate AI-specific requirements, ethical standards, and cybersecurity provisions.

Timeline: 2025-2030

Priority: High

EXPAND THE SCOPE OF AI ETHICS ASSESSMENT ACROSS PUBLIC AND PRIVATE SECTORS

The Kingdom of Saudi Arabia has demonstrated commendable progress by publishing comprehensive AI Ethics Principles, providing a robust framework to guide the ethical development and deployment of AI systems. However, ensuring systematic compliance with these principles across public and private sectors remains a critical area for development. While many entities have begun aligning their operations with these guidelines, the absence of standardised compliance mechanisms and monitoring frameworks poses challenges to consistent implementation.

To address this, it is recommended that Saudi Arabia strengthens efforts to institutionalize adherence to its AI Ethics Principles. This can be achieved through the establishment of sector-specific compliance frameworks, the introduction of regular auditing and monitoring processes, and the development of capacity-building programs to ensure stakeholders are well-equipped to meet ethical standards. Such measures will enhance the Kingdom's AI readiness and position it as a global leader in fostering ethical AI practices.

Timeline: 2025-2030

Priority: Medium

ENHANCE REGULATIONS AROUND SYNTHETIC CONTENT GENERATION

Saudi Arabia has made notable strides in addressing the complexities of synthetic content generation, such as deepfakes and AI-created media. However, the absence of a formalized mechanism for the regular oversight and refinement of policies and guidelines presents a critical challenge. As AI technologies in this domain continue to evolve rapidly, this gap could hinder the Kingdom's ability to effectively address emerging risks, including misuse, misinformation, and ethical concerns.

To ensure the robustness and adaptability of its regulatory framework, it is recommended that Saudi Arabia establishes a structured mechanism for the ongoing review and enhancement of synthetic content policies. This mechanism should incorporate continuous monitoring of technological advancements, active stakeholder engagement, and alignment with international best practices. By adopting this approach, the Kingdom can safeguard against potential risks while fostering innovation in synthetic content generation in a responsible and ethical manner.

Timeline: 2025-2028

Priority: High

INSTITUTIONAL FRAMEWORKS AND GOVERNANCE

The institutional frameworks and governance dimension provide key recommendations to ensure the effective implementation and oversight of AI initiatives in Saudi Arabia. By establishing mechanisms to monitor AI programmes, regularly reviewing the National Strategy for Data and AI, and improving data sharing practices, the Kingdom can ensure that its AI initiatives are aligned with national goals, responsive to new challenges, and governed ethically.

REFRESH THE NATIONAL AI STRATEGY TO MEET EVOLVING PRIORITIES

Saudi Arabia's national AI strategy has provided a strong foundation for fostering innovation and advancing AI adoption across key sectors. However, with rapid technological advancements and shifting national priorities, it is crucial to ensure the strategy evolves to remain relevant and forward-looking.

It is recommended that Saudi Arabia refines and elevates its national AI strategy to address these changing priorities. This should involve reviewing current objectives, integrating emerging technologies, and aligning with international best practices. By doing so, the Kingdom can maintain its leadership in AI, drive sustainable development, and meet the evolving needs of its economy and society.

Timeline: 2025-2026

Priority: High

BROADEN THE ESTABLISHMENT OF AI OFFICES WITHIN THE PUBLIC SECTOR

Saudi Arabia has demonstrated its commitment to harnessing the transformative potential of artificial intelligence by integrating AI initiatives across various sectors. However, the presence of dedicated AI offices within government entities remains limited, creating challenges in ensuring cohesive governance, effective implementation, and the scalability of AI-driven strategies. Establishing a broader network of such offices is vital to aligning government operations with the national AI vision.

It is recommended that Saudi Arabia expands the establishment of AI offices across all government entities. These offices should be equipped to coordinate AI initiatives, oversee policy implementation, and foster alignment with the

national AI strategy. This expansion will strengthen the Kingdom's capacity to leverage AI for enhancing public services, driving innovation, and sustaining its leadership in the global AI ecosystem.

Timeline: 2025-2028

Priority: Medium

DEVELOP A NATIONAL FRAMEWORK TO MONITOR ECONOMIC IMPACT OF AI

The rapid integration of AI is reshaping economies and transforming workforce dynamics. While Saudi Arabia has made significant strides in AI adoption, there is currently no structured mechanism to evaluate its impact on economic growth and labour markets. Such a framework is essential to identify opportunities, address challenges, and ensure equitable benefits from AI advancements.

It is recommended that Saudi Arabia develops a comprehensive national framework to assess the impact of AI on the economy and workforce. This framework should include metrics for evaluating economic contributions, tracking workforce changes, and identifying skills gaps. By establishing this framework, the Kingdom can make informed decisions, shape policies effectively, and support sustainable economic and workforce development in the AI era.

Timeline: 2025-2028

Priority: Medium

ENHANCE DATA COLLECTION AND DATA SHARING CAPABILITIES

High-quality data is vital for training AI algorithms, and Saudi Arabia has made significant progress through initiatives like the National Data Bank (NDB) and the National Data Catalogue. However, further enhancements to data collection and governance are needed to maximise AI's potential across sectors.

To foster a collaborative data-sharing culture, incentives should be introduced for local, regional, and global data sharing. These could include data-sharing agreements, access to advanced analytics tools, and research funding for contributors. Developing sector-specific databases and cross-sectorial databanks will also provide AI researchers and developers with comprehensive datasets, which can be integrated into national platforms for broader accessibility.

Additionally, the National Data Index (NDI) should be utilised to assess and improve data management practices across government entities, ensuring efficient and ethical use of the national data infrastructure. These measures will strengthen Saudi Arabia's data ecosystem, supporting innovation and responsible AI development.

Timeline: 2025-2026

Priority: Medium

CAPACITY BUILDING

As Saudi Arabia continues to advance its AI capabilities, building and sustaining a skilled workforce is crucial to drive innovation and implementation. The capacity building dimension provides recommendations that focus on integrating AI into educational curricula at all levels and expanding AI training opportunities. Additionally, these recommendations emphasise the importance of monitoring and assessing the impact of AI on the workforce.

EMBED AI ACROSS GENERAL AND HIGHER EDUCATION CURRICULA

Artificial intelligence is driving profound changes across industries and society, making AI education essential for preparing a future-ready workforce. While Saudi Arabia has made strides in introducing AI into its education system, a more comprehensive and structured approach is required to ensure the nation remains at the forefront of innovation and technological leadership.

To achieve this, Saudi Arabia should prioritize the comprehensive integration of AI into national educational and training programs. This involves embedding AI concepts into school curricula, enhancing higher education with specialised AI programs, and offering upskilling opportunities for the current workforce. Such an approach will enable the Kingdom to cultivate a robust talent pipeline aligned with its vision for global leadership in AI and innovation.

Timeline: 2025-2030

Priority: High

REGULARLY EVALUATE THE IMPACT OF AI AND AUTOMATION ON THE WORKFORCE

As AI and automation advance, Saudi Arabia's workforce faces significant structural changes, particularly in industries dependent on manual or routine tasks. To responsibly integrate AI into the workforce, it is crucial to assess its impact on jobs and implement strategies that enable workers to transition into skill-based roles aligned with the evolving economy.

A multi-stakeholder task force should be established, including representatives from government, industry, academia, and civil society. This group would identify sectors at risk of job displacement, analyse future skill requirements, and propose policies to support affected workers.

Additionally, workforce resilience reforms should be introduced, such as updated labour laws to protect workers, government-funded reskilling and upskilling programs, and sector-specific transformation initiatives. These measures will help prepare the workforce for AI-enhanced roles and ensure a smooth transition to a more dynamic and skills-oriented economy.

Timeline: 2025-2026

Priority: Medium

INTRODUCE GLOBAL AI TALENT ATTRACTION PROGRAMS

To position Saudi Arabia as a global leader in artificial intelligence, attracting top-tier AI talent from around the world is essential. While the Kingdom has made significant investments in building a robust AI ecosystem, there is a need to enhance efforts in bringing skilled professionals to further accelerate innovation and strengthen the AI sector.

A global AI talent attraction programme would enable Saudi Arabia to draw expertise in AI research, development, and application across diverse industries. This programme could include competitive incentives such as research grants, streamlined immigration processes, and collaborative opportunities with leading academic institutions and industry leaders. Establishing innovation hubs and centers of excellence dedicated to AI would also create a compelling environment for attracting international talent.

Timeline: 2025-2028

Priority: High

DEPLOY COMPREHENSIVE, NATIONWIDE AI UPSKILLING PROGRAMS

The rapid adoption of artificial intelligence across industries has created an urgent need to equip the workforce with AI-related skills to remain competitive in the global economy. While Saudi Arabia has made progress in promoting AI awareness, a large-scale, structured approach to upskilling is essential to meet the growing demand for AI expertise across sectors.

To address this, Saudi Arabia should focus on deploying comprehensive AI upskilling programs nationwide. These programs should target various skill levels, from foundational AI literacy to advanced technical expertise, ensuring inclusivity and accessibility. By prioritizing this initiative, the Kingdom can strengthen its workforce, drive innovation, and reinforce its position as a leader in the global AI landscape.

Timeline: 2025-2026

Priority: Medium

RESPONSIBLE TECHNOLOGIES AND INNOVATION

The responsible technologies and innovation dimension outlines recommendations for driving innovation through enhanced AI infrastructure, data management, and a robust research ecosystem. The focus is on expanding technological capabilities while ensuring sustainability and ethical considerations guide the development and deployment of AI.

ENSURE SUSTAINABILITY AND ACCESSIBILITY OF HIGH-PERFORMANCE AI INFRASTRUCTURE

AI systems rely on high-performance infrastructure, requiring substantial investments in data centres and GPUs. As Saudi Arabia continues to position itself at the forefront of AI innovation, the development of a world-class digital infrastructure has become a central focus. The Kingdom has taken significant steps toward this goal, integrating cutting-edge computing power into its data centres, acquiring several hundred NVIDIA GPUs, and expanding its supercomputing capabilities—six of which are ranked among the Top 500 globally.

While these initiatives have significantly improved access to advanced computing resources for startups, research institutes, and AI developers, there remains an opportunity to further optimise and expand this accessibility to ensure that these resources are sustainable and fully utilised across the Kingdom's AI ecosystem.

Timeline: 2025-2030

Priority: High

ESTABLISH AI CENTERS OF EXCELLENCE IN NATIONAL PRIORITY AREAS

To advance its position as a leader in artificial intelligence, Saudi Arabia must focus on targeted investments that align with its national priorities. Establishing AI centers of excellence dedicated to strategic sectors will enable the Kingdom to drive innovation, support economic diversification, and address critical challenges in areas such as healthcare, energy, education, and smart cities.

These centres would serve as hubs for cutting-edge AI research, development, and application, fostering collaboration among academia, industry, and government. They could also facilitate talent development by offering specialised training programs and resources to equip the workforce with advanced AI skills. Additionally, partnerships with international organisations and global AI leaders would ensure knowledge exchange and access to best practices.

Timeline: 2025-2027

Priority: Medium

STRENGTHEN NATIONAL AI RESEARCH AND INNOVATION ECOSYSTEM

Due to the rapid advancements in AI, research and innovation are crucial for countries aiming to stay at the forefront of technological progress in AI. Saudi Arabia is making significant progress in AI research and innovation, driven by the efforts of the Research, Development, and Innovation Authority (RDIA), strategic partnerships, Centres of Excellence (CoEs), and a growing network of academic institutions and research centres. To accelerate its journey toward becoming a global hub for AI, there is potential for KSA to further strengthen collaboration with leading AI research centres and enhance the commercialisation of AI innovations.

Timeline: 2025-2030

Priority: High

INCLUSION AND WELL-BEING

The inclusion and well-being dimension provides recommendations aimed at promoting diversity, preserving cultural heritage, bridging digital gender gaps, and ensuring that AI technologies are developed with a deep commitment to ethical standards and sustainability. By incorporating Responsible AI principles into its AI initiatives, Saudi Arabia can advance innovation while ensuring positive outcomes for its communities.

CATALYSE THE DEVELOPMENT OF ARABIC LANGUAGE TECHNOLOGIES

AI language technologies globally are dominated by English, creating disparities for speakers of other languages. Saudi Arabia has made significant advancements in Arabic language technologies, notably with the development of the SauTech model and active research initiatives in leading universities. These achievements have established the Kingdom as a leader in the field. However, to fully harness the potential of these technologies and ensure they meet the diverse needs of Arabic-speaking communities, there is a need to expand the resources, platforms, and high-quality dialectal data needed to accelerate and scale Arabic LT solutions.

Strengthening the ecosystem through global partnerships and increased commercialisation efforts will be key to accelerating the development and widespread adoption of Arabic language technologies.

Timeline: 2025-2030

Priority: High

PROMOTE DIVERSITY AND INCLUSION IN AI AND DIGITAL SECTORS

Encouraging the publication of diversity statistics can drive organisations to improve diversity within their workplaces. While Saudi Arabia has no legal requirements for technology companies to disclose diversity data, initiatives like the *Women Empowerment Programme in Technology* and the *Elevate Programme* have made significant progress in promoting diversity, particularly for women in the ICT and AI sectors.

To build on these efforts, it is recommended to establish guidelines that encourage or require technology companies and AI organisations to disclose diversity metrics, such as gender and ethnicity, through existing reporting frameworks. Additionally, a dedicated working group should be formed to develop regulatory recommendations and best practices, addressing diversity and inclusion in both public and private AI sectors. These actions will promote transparency, accountability, and greater inclusion in the Kingdom's AI and digital ecosystems.

Timeline: 2025-2030

Priority: High

ADDRESS DIGITAL GENDER GAPS IN STEM AND AI

Despite progress in gender equality, women remain underrepresented in STEM and AI fields in Saudi Arabia, limiting the potential of the workforce and technological innovation. To bridge this gap, Saudi Arabia should implement initiatives that promote women's participation in AI and STEM, such as scholarships, mentorship programs, and targeted training opportunities.

Additionally, fostering partnerships with global organisations and creating career pathways for women in AI, along with leadership development and networking opportunities, will help create a more inclusive and innovative environment. Addressing the gender gap will unlock the full potential of Saudi Arabia's diverse talent pool and strengthen its position in the global digital economy.

Timeline: 2025-2026

Priority: High

ASSESS THE IMPACT OF AI ON CULTURE

AI has shown strong potential to impact industries such as the creative and cultural sectors, though many of its effects remain unknown. This requires a systematic study of these potential impacts as AI is increasingly integrated in cultural projects. Saudi Arabia is witnessing an increasing integration of AI technologies in cultural projects, such as the development of smart museums and AI-driven initiatives in AIUla. However, the impact and potential of AI in the cultural and creative industries have not been systematically measured or fully explored.

Timeline: 2025-2026

Priority: Low

ESTABLISH GUIDELINES FOR ENVIRONMENTAL IMPACT MONITORING

AI infrastructure is a significant energy consumer, highlighting the need for sustainable practices to manage its growing demands. While Saudi Arabia's AI Ethics Principles emphasise the social and environmental impacts of AI, there is currently no specific policy focused on sustainability in this area.

It is recommended that guidelines be developed to assess and report the environmental impact of AI systems throughout their lifecycle. These guidelines should include key metrics like energy consumption, carbon footprint, and resource usage. Additionally, promoting sustainable AI practices, such as the use of renewable energy and energy-efficient cooling systems, should be encouraged. Offering incentives like grants or tax breaks to organisations committed to minimizing their AI systems' environmental impact would further support these efforts.

Timeline: 2025-2028

Priority: Medium

INVESTMENT ECOSYSTEM

The investment ecosystem dimension outlines recommendations to support AI startups and strengthen the investment landscape. It focuses on building stronger connections between investors and AI companies, ensuring targeted AI funding to accelerate growth.

ADVANCE AI INVESTMENT AND STARTUP ECOSYSTEM

AI has attracted billions of dollars in global investments, driving substantial capital into the startup ecosystem. Arabia's growing ecosystem of AI-focused startups and companies, increasing venture capital investments, and strong public sector involvement is positioning the Kingdom as a global leader in AI innovation. To further build on this momentum, enhancing collaboration between investors, businesses, and the public sector, while driving the commercialisation of AI technologies can further strengthen Saudi Arabia's position in the global AI market. By embedding principles of responsible AI into these efforts, Saudi Arabia can ensure that its AI growth is ethical and sustainable.

Timeline: 2024-2030

Priority: High

Figure 20. List of recommendations

DIMENSION	NO.	RECOMMENDATION	TIMELINE	PRIORITY
Laws and regulation	1.1	Develop and implement AI standards for priority sectors	2025-2030	High
	1.2	Implement specialised AI regulatory sandboxes and pilot zones	2025-2026	High
	1.3	Introduce AI-specific terms and conditions in public procurement	2025-2030	High
	1.4	Expand the scope of AI ethics assessment across public and private sectors	2025-2030	Medium
	1.5	Enhance regulations around synthetic content generation	2025-2028	High
Institutional frameworks and governance	2.1	Refresh the National AI Strategy to meet evolving priorities	2025-2026	High
	2.2	Broaden the establishment of AI offices within the public sector	2025-2028	Medium
	2.3	Develop a national framework to monitor economic impact of AI	2025-2028	Medium
	2.4	Enhance data collection and data sharing capabilities	2025-2026	Medium
Capacity building	3.1	Embed AI across general and higher education curricula	2025-2030	High
	3.2	Regularly evaluate the impact of AI and automation on the workforce	2025-2026	Medium
	3.3	Introduce global AI talent attraction programs	2025-2028	High
	3.4	Deploy comprehensive, nationwide AI upskilling programs	2025-2026	Medium
Responsible technologies and innovation	4.1	Ensure sustainability and accessibility of high-performance AI infrastructure	2025-2030	High
	4.2	Establish AI centres of excellence in national priority areas	2025-2027	Medium
	4.3	Strengthen National AI research and innovation ecosystem	2025-2030	High
Inclusion and well-being	5.1	Catalyse the development of Arabic language technologies	2025-2030	High
	5.2	Promote diversity and inclusion in AI and digital sectors	2025-2030	High
	5.3	Address digital gender gaps in STEM and AI	2025-2026	High
	5.4	Assess the impact of AI on culture	2025-2026	Low
	5.5	Establish guidelines for environmental impact monitoring	2025-2028	Medium
Investment ecosystem	6.1	Advance AI investment and startup ecosystem	2024-2030	High

References

Active mobile broadband subscription, per 100 people, World Bank:

<https://prosperitydata360.worldbank.org/en/indicator/ITU+DDD+1>

AI in Government act. <https://www.congress.gov/bill/116th-congress/house-bill/2575>

AI Index Report, Stanford University, 2023: https://aiindex.stanford.edu/wp-content/uploads/2023/04/HAI_AI-Index-Report_2023.pdf

Anti-Cyber Crime Law: <https://laws.boe.gov.sa/BoeLaws/Laws/LawDetails/25df73d6-0f49-4dc5-b010-a9a700f2ec1d/2>

Arab News: <https://www.arabnews.com/node/2569778/saudi-arabia>

Basic Law of Governance: <https://laws.boe.gov.sa/Files/Download/?attId=ed4842e1-9543-40b9-973b-ada200d4ed10>

Cloud Computing Regulatory Framework:

https://www.cst.gov.sa/en/RulesandSystems/RegulatoryDocuments/Documents/CCRF_En.pdf

Comparitech Cybersecurity Ranking, 2024: <https://www.comparitech.com/blog/vpn-privacy/cybersecurity-by-country/>

Crunchbase analysis, as per 'State of AI in Saudi Arabia' report:

<https://globalaisummit.org/Documents/StateofAlinSaudiArabia.pdf>

CST News: <https://www.cst.gov.sa/en/mediacenter/pressreleases/Pages/2024052801.aspx>

CST. Cloud Computing: Technology Overview and Market Outlook, as per the 'State of AI in Saudi Arabia' report:

https://www.cst.gov.sa/ar/mediacenter/researchsandstudies/Documents/Cloud_Computing_Technology_Overview_and_Market_Outlook.pdf

Data Sharing Policy: <https://sdaia.gov.sa/ar/SDAIA/about/Documents/Data%20Sharing%20Policy.pdf>

DataRobot partnership announcement, Saudi Press Agency: <https://www.spa.gov.sa/2370302>

Digital Gender Gaps, University of Oxford: <https://www.digitalgendergaps.org/>

Digital Skills Framework, MCIT: <https://futureskills.mcit.gov.sa/en/skills-framework>

Directive on Automated Decision Making. <https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=32592>

Edelman Trust Barometer, Edelman, 2024: <https://www.edelman.com/trust/2024/trust-barometer>

E-participation Index, United Nations, 2022: <https://publicadministration.un.org/egovkb/Data-Center>

European Commission. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/european-datastrategy_en#a-single-market-for-data

Executive Order on Safe, Secure, and Trustworthy AI. <https://www.whitehouse.gov/briefing-room/presidentialactions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence/>

Fast Company Middle East: <https://fastcompanyme.com/news/saudi-film-commission-to-explore-ai-in-movie-production-and-marketing/>

Freedom of Information Interim Regulations: <https://sdaia.gov.sa/ndmo/Files/PoliciesEn.pdf>

Future Skills Program, MCIT: <https://futureskills.mcit.gov.sa/en>

Germany's AI Strategy: https://ai-watch.ec.europa.eu/countries/germany/germany-ai-strategy-report_en

Global Cybersecurity Index, ITU, 2020: https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf

Global Gender Gap Report, World Economic Forum, 2023: https://www3.weforum.org/docs/WEF_GGGR_2023.pdf

Global Skills Report, Coursera, 2024: <https://www.coursera.org/skills-reports/global/>

Government AI Readiness Index, Oxford Insights, 2023: <https://oxfordinsights.com/wp-content/uploads/2023/12/2023-Government-AI-ReadinessIndex-2.pdf>

Government ICT Spending Report in Saudi Arabia 2023, DGA, as highlighted in 'State of AI in Saudi Arabia' report: <https://shorturl.at/5Hn4E>

Human Resources Development Fund: <https://www.hrdf.org.sa/en/programs/individuals/enable/wusool/>

IAIO: <https://www.iaio-official.org/>

ICAIRE: <https://icaire.sa/en/default.aspx>

Inclusive Internet Index, The Economist, 2022: <https://impact.economist.com/projects/inclusive-internet-index/>

Insuretek Golden Shield Excellence Awards, https://x.com/Insuretek_ME/status/1800136227297067249

KSA GDP, General Authority for Statistics (GASTAT): <https://www.stats.gov.sa/en/823>

KSA National Portal : https://www.my.gov.sa/wps/portal/snp/content/news/newsDetails/CONT-news100420231/!ut/p/z0/04_Sj9CPyKssy0xPLMnMz0vMAfjjo8zivQIsTAwdDQz9LQwCXQ0CnV0MfYyNQgwM_M30g1Pz9L30o_ArAppiVOTr7JuuH_1WQWJKhM5mXlq8f4ezvF6Kbl1perGtoYGBiZGBkbKhfkO0eDgArNGZ7/

KSA National Portal: <https://www.my.gov.sa/wps/portal/snp/careaboutyou/digitalinclusion/>

Labour Laws: <https://www.hrsd.gov.sa/sites/default/files/2017-05/LABOR%20LAW.pdf>

Law of Civil Procedures: <https://www.moj.gov.sa/Documents/Regulations/pdf/En/50.pdf>

Leap Forward Issue #1, as highlighted in 'State of AI in Saudi Arabia' report: <https://shorturl.at/zjpF9>

Linkedin analysis as per 'State of AI in Saudi Arabia' report: <https://globalaisummit.org/Documents/StateofAIinSaudiArabia.pdf>

MCIT: <https://shorturl.at/l2NR3>

MCIT: <https://shorturl.at/zo22H>

Media Fixed Broadband Download Speeds, Speedtest Global Index, <https://www.speedtest.net/global-index>

Media Mobile Broadband Download Speeds, Speedtest Global Index, <https://www.speedtest.net/global-index>

Ministry of Health Digital Strategy Framework and Roadmap: <https://www.moh.gov.sa/Ministry/vro/eHealth/Documents/MoH-Digital-HealthStrategy-Update.pdf>

National AI Initiative Act: <https://www.congress.gov/bill/116th-congress/house-bill/6216/text>

National Cyber Security Index, 2024: <https://ncsi.ega.ee/ncsi-index/>

National Data Bank: <https://data.gov.sa/en>

National Strategy for Data and AI: <https://ai.sa/>

National Transformation Program: <https://www.vision2030.gov.sa/media/xqjbmpwg/english-ntp-anuual-report-2023.pdf>

NCA Regulations: <https://nca.gov.sa/en/regulatory-documents/>

NCBE: <https://ncbe.kacst.edu.sa/en/>

OECD.AI Policy Observatory: <https://oecd.ai/en/data?selectedArea=ai-research&selectedVisualization=ai-publications-time-series-bycountry>

Online service Index, United Nations, 2022: <https://publicadministration.un.org/egovkb/Data-Center>

Open Access Portal, RDIA: <https://openaccess.rdia.gov.sa/>

Open Data Inventory Ranking, 2022: <https://odin.opendatawatch.com/Report/rankings>

Open Data UK. <https://www.data.gov.uk/>

Personal Data Protection Commission Singapore. <https://www.pdpc.gov.sg/help-and-resources/2020/01/model-ai-governanceframework>

Personal Data Protection Law:

[https://sdaia.gov.sa/en/SDAIA/about/Documents/Personal%20Data%20English%20V2-23April2023- %20Reviewed-.pdf](https://sdaia.gov.sa/en/SDAIA/about/Documents/Personal%20Data%20English%20V2-23April2023-%20Reviewed-.pdf)

PIF & Google:

<https://www.pif.gov.sa/en/news-and-insights/press-releases/2024/pif-and-google-cloud-to-create-advanced-ai-hub-in-saudi-arabia/>

R&D, GASTAT, 2021:

https://www.stats.gov.sa/sites/default/files/Research%20and%20Development%20Statistics%20survey%202021EN_0.pdf

R&D, GASTAT, 2022:

<https://www.stats.gov.sa/sites/default/files/Research and Development Statistics Survey 2022 EN 0.pdf>

Saudi Academic Framework for AI Qualifications:

<https://sdaia.gov.sa/en/Research/Documents/SaudiAcademicFramework.pdf>

Saudi Arabia plans \$40B push into AI: <https://www.reuters.com/world/middle-east/saudi-arabia-plans-40-bln-push-into-artificial-intelligence-nytreports-2024-03-19/>

Saudi Aramco and WWT partnership announcement, Middle East AI News:

<https://www.middleeastainews.com/p/aramco-digital-wwtai-infrastructure-deal>

Saudi Digital Academy: <http://sda.edu.sa/ar>

Saudi Press Agency: <https://www.spa.gov.sa/2154426?lang=en&newsid=2154426>

Saudi Press Agency: <https://www.spa.gov.sa/en/11dfb64817e>

Saudi Press Agency: <https://www.spa.gov.sa/en/e9f368f1bfm>

Saudi Press Agency: <https://www.spa.gov.sa/en/N1977783>

SDAIA Academy, SDAIA: <https://sdaia.gov.sa/en/Sectors/academy/Pages/default.aspx>

SDAIA AI Ethics Principles: <https://sdaia.gov.sa/en/SDAIA/about/Documents/ai-principles.pdf>

SDAIA Electronic Service Statistics: <https://sdaia.gov.sa/en/Services/Pages/eServices-Statistics.aspx>

SDAIA GenAI guidelines for government:

<https://sdaia.gov.sa/en/SDAIA/about/Files/GenAIGuidelinesForGovernmentENCompressed.pdf>

SDAIA GenAI guidelines for the public: <https://sdaia.gov.sa/en/SDAIA/about/Files/GenerativeAIPublicEN.pdf>

SDAIA ISO 42001 announcement, Saudi Press Agency: <https://www.spa.gov.sa/en/N2137042>

SDAIA Rowad package announcement:

<https://sdaia.gov.sa/en/MediaCenter/News/Pages/NewsDetails.aspx?NewsID=217>

Share of population covered by at least a 3G network, World Bank:

<https://prosperitydata360.worldbank.org/en/indicator/ITU+DDD+31>

Singapore Model AI Governance Framework: <https://www.pdpc.gov.sg/-/media/Files/PDPC/PDF-Files/Resource-forOrganisation/AI/SGModelAIGovFramework2.pdf>

Smart City Index, IMD, 2024: https://www.imd.org/wp-content/uploads/2024/04/20240412-SmartCityIndex-2024-Full-Report_4.pdf

State of AI in Saudi Arabia: <https://globalaisummit.org/Documents/StateofAIinSaudiArabia.pdf>

STC and Nokia partnership announcement, Zawya: <https://www.zawya.com/en/press-release/companies-news/stc-group-and-nokiasuccessfully-implement-ai-solution-to-optimize-live-network-performance-y7uusuli>

Taqadam Accelerator: <https://taqadam.kaust.edu.sa/>

The Garage Incubator: <https://thegarage.sa/>

The Global AI Index, Tortoise, 2024: <https://www.tortoisemedia.com/intelligence/global-ai/#rankings>

The White House. <https://www.whitehouse.gov/ostp/ai-bill-of-rights/>

Top 500, as per the 'State of AI in Saudi Arabia' report: <https://top500.org/lists/top500/2024/06/>

Tuwaiq Academy: <https://tuwaiq.edu.sa/>

UK Data Ethics Framework: <https://www.gov.uk/government/publications/data-ethics-framework>

Women Empowerment in Technology: <https://sa.zain.com/en/all-news/partnership-mcit%E2%80%A6zain-ksa-launches-wit-4>

World Bank, 2024: <https://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS?locations=SA>

World Bank: <https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?locations=SA>



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