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Navigating new frontiers in health:

A strategic guide to GenAI in
the Kingdom of Saudi Arabia

Contents

Foreword

The Kingdom of Saudi Arabia is rapidly advancing in healthcare innovation and the adoption of cutting-edge medical technologies, embracing AI-driven diagnostics, precision medicine, and the use of advanced medical devices. This progressive approach is a cornerstone of Saudi Vision 2030, particularly through the Health Sector Transformation Program, which aims to build a "Vibrant Society" by prioritising the health of every citizen. The Program is dedicated to restructuring the health sector, and emphasises cooperation between public and private health bodies to achieve improved health outcomes.

Its four strategic objectives - facilitating access to health services, improving the quality and efficiency of services, promoting health risk prevention, and enhancing traffic safety - are crucial in driving the Kingdom's health sector forward. Since the launch of Saudi Vision 2030, the Saudi population has experienced significant health improvements, demonstrating the Kingdom's enhanced readiness to face health crises. However, the current healthcare model still leans heavily towards treatment rather than prevention, focusing more on addressing diseases than preventing them.

The integration of GenAI into healthcare has the potential to transform the industry significantly. Adoption of large language models (LLMs) will ensure a significant technological advancement, capable of reducing the time spent on manual tasks, such as searching for and compiling information. However, for this to be realised, leaders must first assess their operations, talent, and technological capabilities. The Kingdom's commitment to investing in healthcare innovation and adopting advanced technologies reflects a forward-thinking vision. As progress continues to accelerate, these efforts will not only elevate the quality of healthcare but also ensure a sustainable and healthy future for all citizens.

Lina Shadid

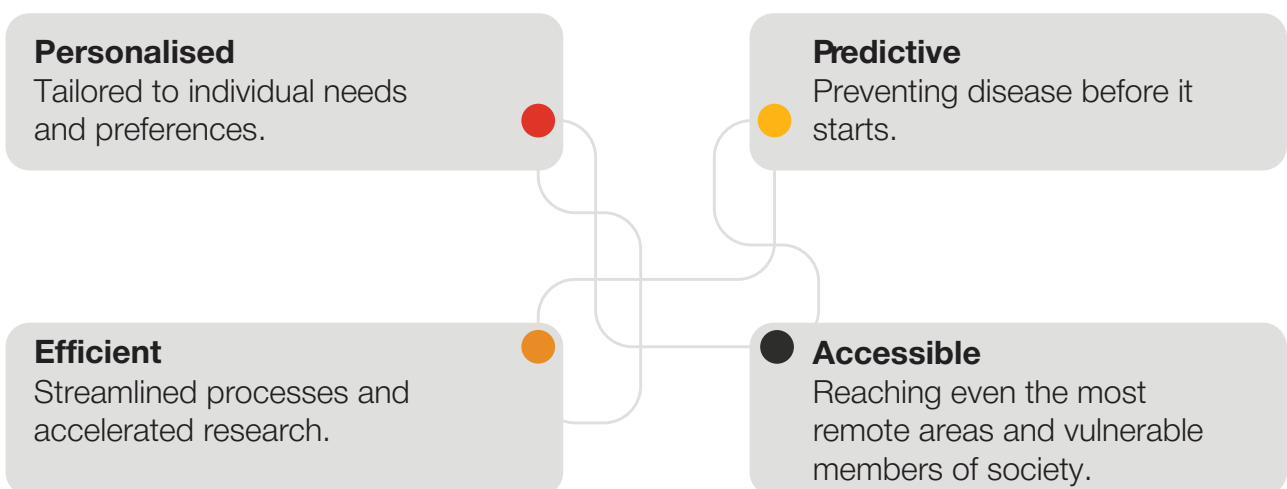**Health Industries Leader,**
PwC Middle East

Introduction

Generative AI (GenAI) has been the biggest tech disruptor in recent times, offering potential opportunities and challenges across all industries, including the public and private sectors.

The overall economic impact of GenAI is estimated to reach almost $24 billion per year by 2030 in the GCC region[1]. Its greatest impact is expected to be felt in Saudi Arabia and the UAE, with a potential $17.5 billion combined annual growth in the next few years. Healthcare is anticipated to be among the foremost industries to be affecected by the rise of GenAI in the region, alongside media and entertainment, banking and financial services, IT and telecommunications.

In the Kingdom, with Vision 2030 goals guiding economic diversification and public service enhancement, the healthcare sector is embracing cutting-edge technologies to pioneer healthcare innovation and boost research and development initiatives. GenAI is set to accelerate and amplify this evolution. With its power to translate complex and unstructured data into meaningful insights, GenAI empowers healthcare professionals from across the whole healthcare ecosystem to make more informed, holistic and tailored decisions to enhance precision medicine and improve patient outcomes. GenAI's impact spans the entire spectrum of healthcare today; enhancing population health management, preventive care and wellness initiatives, improving diagnostic accuracy, chronic care management, facilitating drug research and development, improving costs and operational eciencies, and even predicting outbreaks and epidemics.

By embracing the possibilities of GenAI, while addressing its challenges responsibly, organisations can future proof their healthcare systems and ensure that care is:

Personalised
Tailored to individual needs and preferences.

Predictive
Preventing disease before it starts.

Efficient
Streamlined processes and accelerated research.

Accessible
Reaching even the most remote areas and vulnerable members of society.

PwC Middle East's 28th Annual CEO Survey: Saudi Arabia findings reveals strong enthusiasm for GenAI across the Kingdom, with 81% of CEO's having adopted it in the last 12 months[2]. Trust is also high, with 57% of CEOs saying they trust having the technology embedded in key processes to a large or very large extent – exceeding the global average of 33%. And GenAI implementation is yielding tangible results - two thirds of CEO's have already reported increases in profitability, revenue and workforce efficiencies due to GenAI.

With the health industry suffering an increasing strain on workforce capacity and resourcing, GenAI will prove a useful tool to augment the healthcare professionals of the future. By relieving the administrative burden, it will give them back more time to care for patients while also enhancing the speed, quality and range of medical data for timely and more holistic decision-making.

To what extent did generative AI increase or decrease the following in your company in the last 12 months? (Increased)

	Global	Middle East	GCC	Saudi Arabia
Efficiencies in my own time at work	53%	68%	68%	79%
Efficiencies in my employees' time at work	56%	65%	63%	66%
Revenue	32%	51%	52%	66%
Profitability	34%	52%	53%	66%
Headcount	17%	32%	36%	29%

Healthcare organisations in Saudi Arabia need to move quickly but responsibly on AI. While it presents a transformative opportunity to reshape healthcare for the better, it must be harnessed ethically and responsibly. There are challenges around data privacy, bias, and ethical considerations that need to be addressed to ensure responsible and trustworthy use. Healthcare professionals also need to be adequately trained and equipped to collaborate effectively with GenAI tools.

Personal data protection and data privacy:
Ensuring robust data security measures to prevent unauthorised access, breaches, and misuse of sensitive healthcare data is critical.

Regulation and guidelines:
Complexities involved in establishing comprehensive AI healthcare policies, regulations and guidelines.
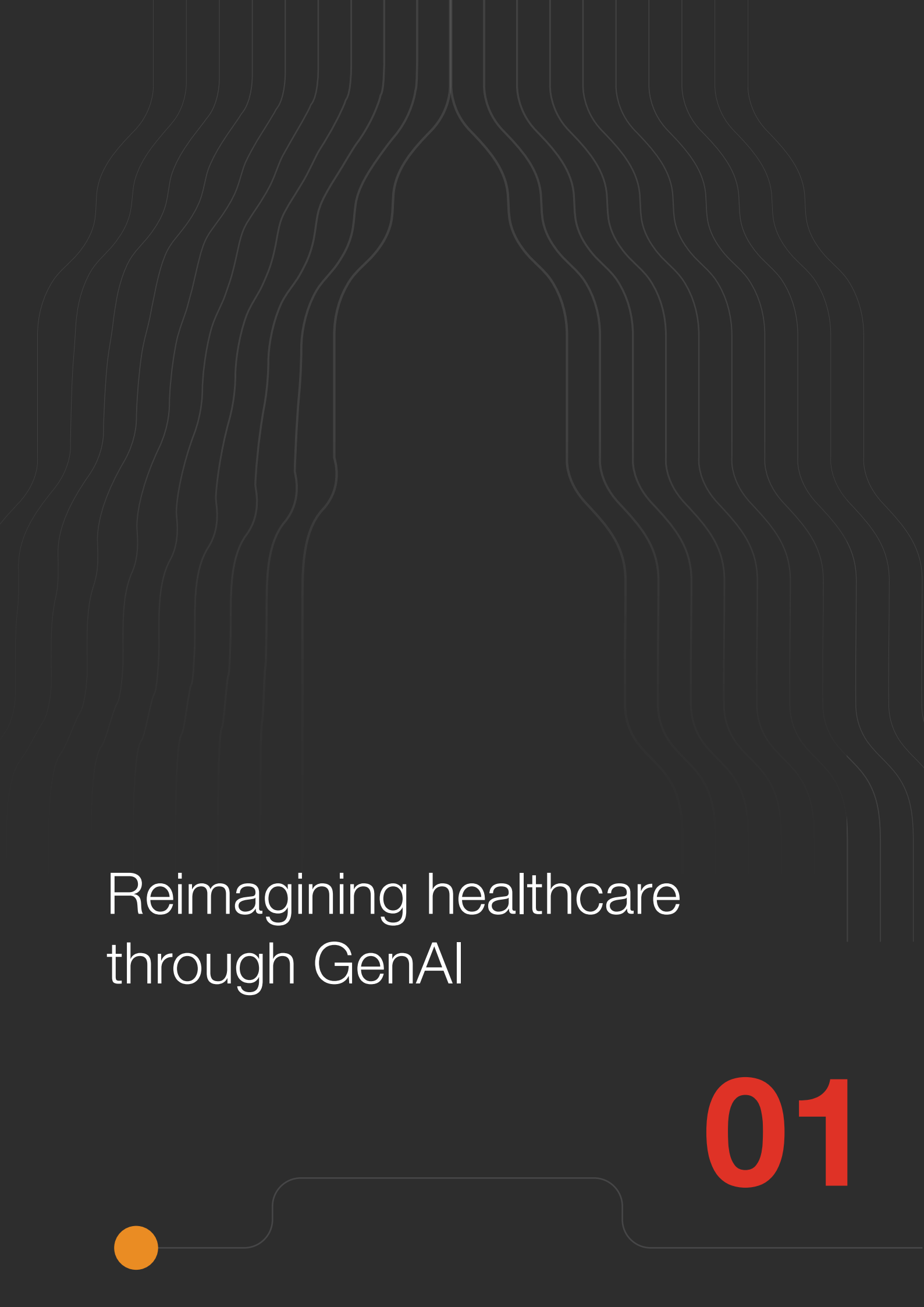
Shortage of skilled workforce:
GenAI integration with healthcare demands professionals with tech and domain knowledge, which is critical for developing and deploying GenAI solutions that address real-world healthcare problems. Lack of such professionals can limit the full potential of GenAI in healthcare.

Cultural hesitancy:
Resistance in acceptance of GenAI-driven healthcare methods by professionals and patients.

This report explores the impacts, challenges, and key strategic considerations healthcare organisations in Saudi Arabia need to take, to enable the successful adoption of GenAI to enhance their existing services and evolve new offerings into the future.
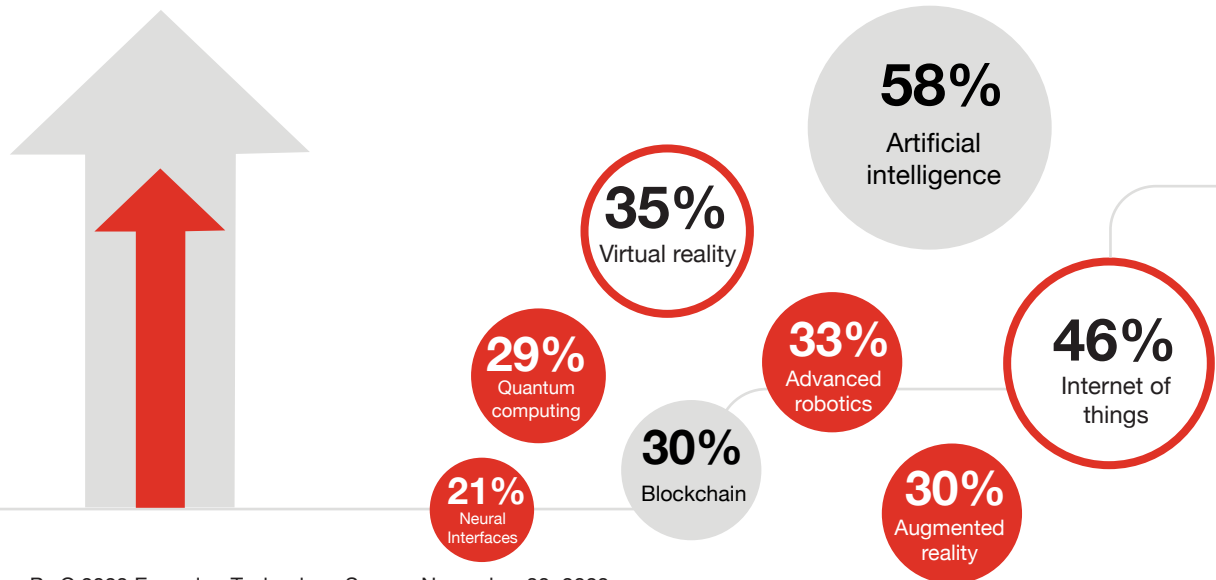
Reimagining healthcare through GenAI

01

According to the [PwC 2023 Emerging Technology survey](#), AI has emerged as the top priority for investment among organisational leaders.[3]

Where does your company plan to prioritise investment in emerging technology over the next 12 months?

58% Artificial intelligence

35% Virtual reality

46% Internet of things

29% Quantum computing

33% Advanced robotics

30% Blockchain

30% Augmented reality

21% Neural Interfaces

*Source: PwC 2023 Emerging Technology Survey, November 30, 2023

Across the GCC, the healthcare industry is evolving its care delivery models to more value-driven, community-centred care, and moving away from siloed clinical-focussed insights to more holistic healthcare ecosystems.[4] The application of AI and GenAI harnesses the power of the huge variety of data types available, analysing and synthesising this with unprecedented accuracy to arrive at personalised, predictive and efficient healthcare solutions.

# Applications of AI elevating the science and execution of population health

Personalised, precision, orchestration & action

Computer Vision

NLU

Graph Neural Network
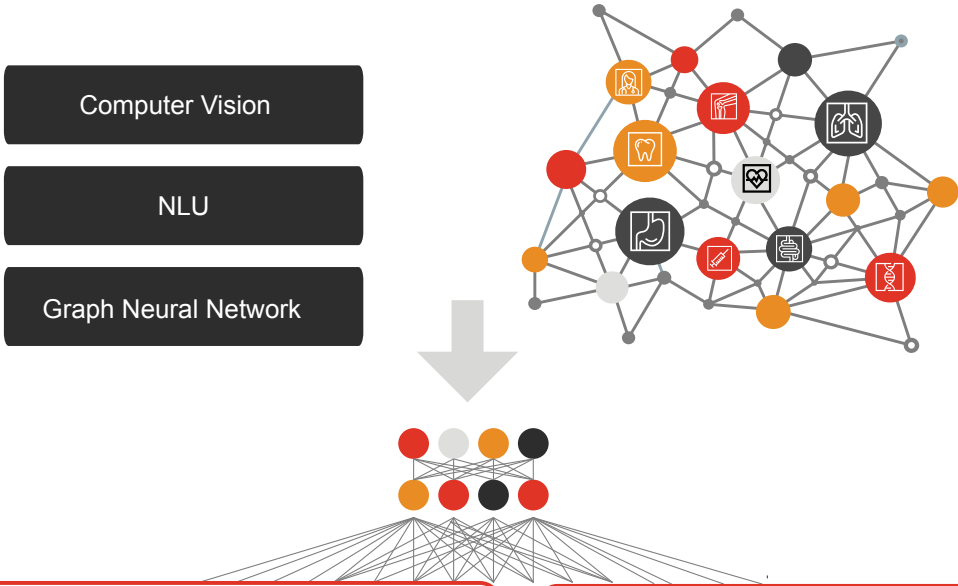
Intelligent insight synthesis & prediction

- Amplifying experience and enabling various digital interaction channels
- Personalised patient engagement
- Virtual health assistants
- Predictive scheduling
- Predictive • GenAI-powered mobile clinics for remote areas
- Portable diagnostic tools
- Enhanced clinical decision support
- Revolutionising medical imaging, analysis, diagnosis and treatment of diseases

- Continuous monitoring, early detection and prediction
- Data-driven health interventions
- Precision medicine
- Predictive analytics
- Automated reporting
- Drug testing, development and discovery
- Target identification and validation
- Molecular designscheduling

Diverse data integration & contextualisation

Machine Learning

Deep Learning

Generative AI
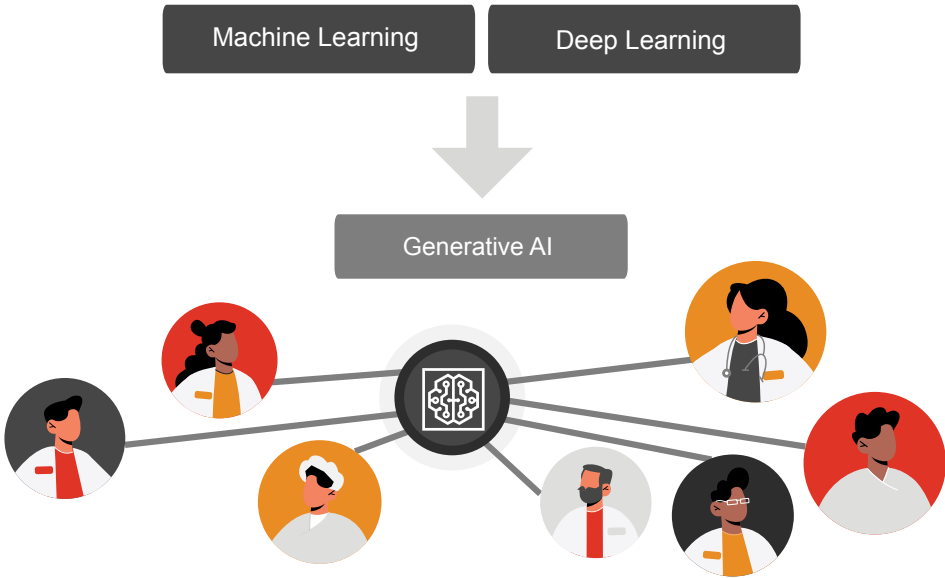
Guided by Vision 2030, GenAI has tremendous potential to fundamentally reshape the Kingdom's healthcare landscape and improve patient outcomes and accessibility, including;

Amplifying experience, enabling various digital interaction channels:

GenAI enhances user experience by enabling various digital interaction channels and providing personalised care, enhanced accessibility and automation. For example, there are mobile apps that are now using GenAI to analyse images of skin lesions and provide real-time risk assessments for skin cancer. A study published by Fierce Healthcare suggests that at a healthcare career marketplace, GenAI has driven a 20% increase in interview acceptance by nurses through customised responses and messages.[5]

Innovating and improving workflow efficiencies:

GenAI can play a pivotal role in redesigning workflows to streamline business processes, prioritising user-friendliness, accessibility and increasing cost effectiveness.

Revolutionising diagnosis and treatment of diseases:

Healthcare professionals can harness GenAI tools to make clinical recommendations and carry out targeted interventions that are specifically tailored to improve patient outcomes. According to a study by MassgeneralBrigham, ChatGPT has demonstrated promising usability in ongoing clinical decision support, achieving an accuracy of up to 77% in making a final diagnosis.[6]

Let's examine some of the key use-cases in action.

🟠 Medical imaging and diagnosis

GenAI can analyse medical images, such as MRI and CT scans, to detect abnormalities. It can scrutinise skin images to identify signs of skin cancer with higher accuracy and efficiency than traditional diagnostic methods, enhancing patient outcomes. For example, a leading digital pathology company has already integrated GenAI into its products to improve the accuracy and efficiency of prostate cancer detection.[7]

Hospitals are also leveraging Generative Adversarial Network (GAN) models to transform low-quality scans into high-resolution images, making it easier for radiologists to spot anomalies and make informed decisions. This provides a significant boost in anomaly detection accuracy, setting a new standard in medical imaging. Integrating GenAI also helps to address quality and standardisation issues caused by variations in imaging protocols and practices, as well as access and availability issues due to concentration of resources in major cities.

Healthcare organisations in Saudi Arabia can leverage the GenAI in medical imaging and diagnosis for addressing some of the key challenges, including:

- Quality and standardisation issues caused by variations in imaging protocols and practices.
- Access and availability issues due to concentration of resources in major cities.

● Drug discovery

Healthcare organisations in the Kingdom face a high burden of chronic diseases[8] , and by analysing large-scale genomic, biological, and chemical data GenAI can identify novel disease targets and prioritise promising candidates for further investigation. GenAI algorithms can reveal complex relationships between genes, proteins, and diseases that traditional methods might miss, leading to previously overlooked therapeutic targets. It aids in designing novel molecular structures and predicting their potential biological impacts with high accuracy. This method can accelerate drug discovery, enhancing the precision with which new compounds are identified and assessed. It complements traditional exhaustive screenings, streamlining the discovery process and potentially leading to significant cost and time savings.

A UK-based biotech company is using GenAI to analyse patient tissue and employ functional precision oncology to improve patient outcomes.[9] Another leading tech company is offering a set of GenAI cloud services that enable customisation of AI foundation models to accelerate drug discovery and research in genomics, chemistry, biology, and molecular dynamics.[10] The Kingdom can overcome the key challenges in drug discovery by introducing :

- **GenAI-enabled virtual labs and simulations that can reduce the need for big capital expenditures.**
- **Virtually simulating drug-target interactions and predicting therapeutic efficacy, reducing the need of extensive upfront experimental trials.**

● GenAI-powered mobile clinics for remote areas

GenAI has the potential to significantly improve healthcare accessibility in remote areas of the Kingdom where there is a shortage of medical professionals. By equipping mobile clinics with GenAI technology, essential medical services such as diagnostics, telemedicine, medication dispensing, and health education can be provided effectively. This technology enables on-site health support and remote consultations, enhancing healthcare delivery in underserved regions.

Leading healthcare organisations around the world increasingly adopting GenAI-powered chatbots that offer patients[11] around the clock access to medical information and support, improving patient engagement and satisfaction by providing timely answers and guidance on health-related queries, thereby optimising the use of healthcare resources.

● Predictive, personalised care

Saudi Arabia can leverage GenAI to analyse vast amounts of patient data, including medical history, genetics, and lifestyle factors, to create personalised risk assessments and leverage clinical pathways to suggest potential treatment plans. This can lead to earlier disease detection, more effective interventions, and improved patient outcomes. Researchers around the globe have developed a deep learning algorithm that can predict the possibility of complications after surgery[12] and recommend personalised treatment plans based on identified risk factors.

GenAI readiness assessment:

In order to get started and take advantage of these opportunities to reimagine healthcare, it is important to first ensure your organisation, infrastructure, stakeholders and resources are fully prepared and ready to effect change. A thorough assessment and robust planning are essential for a successful implementation outcome.
The following checklist will help you to assess your organisation's level of readiness across the key parameters.

01 Business case and vision:

☐ Identify and prioritise potential use cases which align with the organisation's mission and vision, and assess the ROI of those prioritised use cases.

☐ Create clear and specific objectives and goals of those potential use cases.

02 Skills and expertise:

☐ Evaluate the team's skill and expertise in GenAI, machine learning, data science and all related technologies.

☐ Identify the gaps and create a plan to bridge those through lateral hiring, internal and external training programmes.

03 Data and infrastructure:

☐ Identify the data points needed for use cases, including the range of data sources and data quality.

☐ Assess the capacity to access, clean and compute the high volume of data and its growth over time.

☐ Assess the privacy, cyber and data security capabilities.

04 Regulatory and compliance:

☐ Ensure you have a thorough and robust implementation system in place that can proactively monitor the changing regulatory landscape and adapt accordingly.
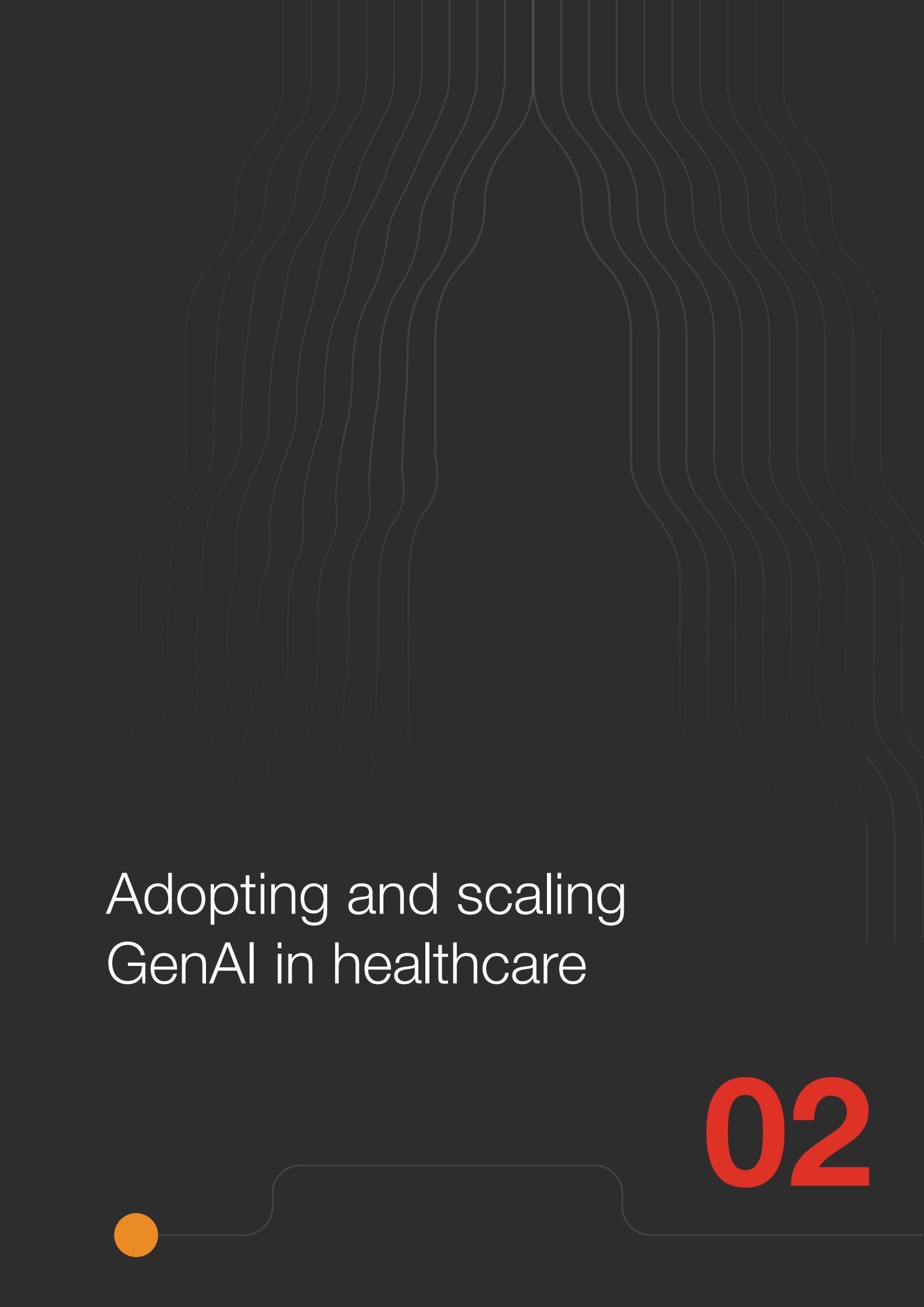
05 Partnerships

☐ Identify any current partnerships already in place that can be leveraged to support delivery.

☐ Identify potential new ones that you will need to develop.

06 Monitoring and evaluation

☐ Review your current monitoring and evaluation mechanisms and identify potential gaps or methodologies that will need to be adapted or adopted.

Once organisations have completed their readiness assessment and mapped out a path forward, it is time to start on the journey to GenAI adoption.

Adopting and scaling GenAI in healthcare

02

The following steps ensure that organisations can successfully adopt and scale GenAI in healthcare, driving innovation and ensuring sustainable, ethical, and effective implementation.

01

Business case and vision

Develop clear guidelines

- **Create guidelines and protocols for responsible GenAI development, deployment, and use.** Ensure these address data privacy, security, ethical considerations, and regulatory compliance.

Understand strategic implications

- **Assess technology maturity:** Understand GenAI and its underlying technologies to inform strategic decisions. Evaluate the impact on organisational and commercial strategies, as well as on people, culture, ethics, and purpose.

- **Industry benchmarking:** Analyse how other organisations and regions are responding to GenAI. Identify strategic opportunities and areas within core business functions where GenAI can create significant value.

- **Define a strategic vision:** Envision how GenAI will support the health sector, enhance patient outcomes, and align with ethical principles and risk thresholds.

Focus on value creation

- **Identify use cases:** Determine the most valuable and functional GenAI use cases across the organisation, leveraging industry insights and technical expertise.

- **Evaluate benefits and risks:** Assess the benefits and risks of each GenAI use case, considering ethical, regulatory, operational, and cybersecurity factors. Prioritise based on viability, feasibility, and potential ROI.

- **Develop a technical roadmap:** Create a roadmap and vendor assessment for developing use cases into Proofs of Concept (PoCs) to demonstrate GenAI's value.

02

Invest in workforce skills and expertise

- **Assess workforce readiness:** Evaluate the organisational structure, operating model, employee skills, leadership capabilities, and readiness for GenAI integration.

- **Design training programmes:** Develop training programmes to equip the workforce with the necessary skills to understand, utilise, and interpret GenAI outputs. Partner with universities and research institutions for specialised training.

- **Assess impact:** Analyse the impact of GenAI on key roles using industry benchmarks and qualitative modelling. zxUpdate employee personas to align with the organisation's GenAI vision.

- **Build use cases:** Design and implement use cases in human capital and workforce domains, such as HR operations and talent recruitment.

03

Strengthen data and infrastructure

- **Evaluate data quality:** Evaluate the current state of your data to ensure it meets the necessary standards of scale, maturity, quality, and confidentiality required for effective GenAI implementation. Create a harmonised data fabric.

- **Strengthen data security:** Implement robust data security measures to protect sensitive healthcare information, ensuring compliance with regulatory standards and maintaining patient confidentiality.

- **Invest in infrastructure:** Invest in robust, interoperable health data systems.

- **Optimise data management:** Develop and maintain a comprehensive data management strategy that supports efficient data collection, storage, and retrieval. Utilise advanced data governance practices to ensure data integrity and accessibility.

- **Focus on the tech vision:** Develop a refreshed tech and data vision to leverage AI across operating models and geographies, maximising previous investments in cloud platforms and open Application Programming Interfaces (APIs).

- **Leverage advanced technologies:** Integrate GenAI with your data infrastructure to harness its full potential. Ensure that your systems can handle the computational demands of AI technologies and support seamless data integration.

04

Ensure regulatory compliance

- **Govern processes:** Implement end-to-end GenAI governance processes, operating models, and artefacts. Establish a GenAI council to oversee policies and priorities.

- **Create regulatory awareness:** Understand existing and emerging regulatory standards and practices. Assess the fitness and maturity of governance, compliance, and risk management processes.

05

Foster strategic partnerships

- **Strengthen collaborations:** Promote innovation through partnerships with the government, private sector, research centres, and academia. Allocate research and development funding to keep pace with global AI advancements.

- **Boost global cooperation:** Exchange expertise with global AI and healthcare leaders to establish common standards for data collection, model development, and legal and ethical considerations (see appendices for Ethical AI governance framework).

06

Monitor and evaluate performance

- **Monitor performance:** Regularly monitor the performance and effectiveness of GenAI solutions, collecting feedback from healthcare professionals and patients and identify potential biases in AI models to ensure fairness and responsible AI.

- **Educate the workforce:** Create awareness of potential uses and limitations of AI, as well as its potential impacts on society and the environment.

- **Regularly review and update your data policies:** Keep pace with technological advancements and evolving industry standards. Aim for continuous optimisation to maximise data value and business outcomes.

03

GenAI guidelines
in the Kingdom

This section aims to comprehensively address the responsible and effective development and use of GenAI in Saudi Arabia, as mandated by the Saudi Data and Artificial Intelligence Authority (SDAIA). It applies to all stakeholders designing, developing, deploying, implementing, using or being affected by GenAI systems within the Kingdom[13,14].

All stakeholders in the Kingdom are required by SDAIA to adhere to the AI Ethics Principles[15] when engaging with GenAI tools throughout all stages of their life cycle, ensuring ethical considerations are integrated from development to deployment and maintenance. Stakeholders include, but are not limited to, workers in public, private, and nonprofit entities, researchers, employees in both public and private sectors, and consumers. Notably, these principles are intended to be universally applicable, encompassing all artificial intelligence tools used, and are not exclusive to generative artificial intelligence.

Here is a breakdown of the mandatory regulations governing the use of government data in GenAI tools:

Fairness

Stakeholders must take necessary actions to eliminate bias, discrimination, or stigmatisation of individuals, communities, or groups in the design, data, development, deployment, and use of GenAI systems. To ensure consistent systems that are based on fairness and inclusiveness, GenAI systems should be trained on data that is cleansed from bias and is representative of affected minority groups.

Users must:

- Carefully evaluate the created content to ensure alignment with the Kingdom of Saudi Arabia's regulations, values, and ethics. This evaluation must also include comprehensive and careful scrutiny of biases or stereotypical associations.

- Make efforts to obtain a comprehensive understanding of the data used to train the tool, including knowing the source of the data, its contents, and how it is selected and prepared.

- Enhance users' understanding and awareness of bias, the importance of diversity and inclusion, anti-racism, values and ethics, to improve their ability to identify biassed content.

Reliability and safety

Ensure that GenAI systems adhere to set specifications, operating consistently as intended throughout its life cycle. Reliability serves as a measure of the credibility and dependability of the system in carrying out its specific functions and achieving intended results. Ensuring quality necessitates a multi-faceted approach encompassing monitoring, human supervision, and user education to effectively harness the capabilities of GenAI and reduce associated risks. A reliable and safe working system should have built-in mechanisms to prevent harm.

Users must:

- Identify and assess content generated with GenAI to ensure that users are prepared to address potential reliability issues and have the ability to verify content using other sources.

- Seek to understand the quality and sources of training data used by a GenAI system to enhance content reliability.

- Encourage supplementing content created with GenAI with information from trusted sources to ensure accuracy.

Transparency and interpretability

It is crucial to construct GenAI tools with a high degree of clarity and interpretability, incorporating features that allow for the tracking of automated decision-making stages. Transparency is essential when building trust in interactions between humans and GenAI, and alerts help to identify and demystify content generated by GenAI.

Users must:

- Communicate clearly and meaningfully when using GenAI to interact with the public.

- Notify beneficiaries when messages or content is created with GenAI.

- Provide alternative, non-automated communication channels for beneficiaries who prefer human interactions.

- Use watermarks to help beneficiaries identify content created with GenAI.

Accountability and responsibility

Designers, developers, users, and evaluators of GenAI tools have ethical responsibility for decisions and actions that may lead to potential risks and negative impacts on individuals and communities. Adopting a GenAI system may carry legal and ethical implications, requiring comprehensive consideration including, but not limited to, the risk of infringement of intellectual property rights, concerns about data protection, and the potential for human rights violations.

Users must:

- Consult with relevant legal professionals to assess the risks associated with the use of GenAI tools and find a way to avoid or reduce these risks.

- Comply with relevant legislation, including the Personal Data Protection Law, and protect user rights.

- Ensure that content created with GenAI tools respects intellectual property rights and adheres to copyright legislation.

Privacy and security

Comply with the relevant regulatory requirements, including the protection of personal data, robust cybersecurity standards issued by the National Cybersecurity Authority, and the Data Classification Policy[16]. GenAI tools should be designed using mechanisms and controls that enable managing and monitoring the results throughout the system's life cycle.

<u>**Users must:**</u>

- Refrain from entering any data classified as restricted or higher (restricted, secret, and top secret).

- Implement strict data protection measures in accordance with the provisions of the Personal Data Protection Law.

- Check the privacy policies of these tools, including their disclosure and sharing terms.

- Assess the risks arising from the use of tools, including data leakage, misinformation, deepfake, bias, and decisions affecting the safety of individuals. Risk levels are classified as follows in accordance with the AI Ethics Principles stated by SDAIA:

<u>**Little or no risk:**</u> There are no restrictions on AI systems that pose little or no risk, such as spam filters but, it is recommended that these systems be ethically compliant.

<u>**Limited risk:**</u> AI systems that pose limited risks, such as technical programs related to function, development, and performance, are subject to the application of the AI Ethics principles mentioned in this document.

<u>**High risk:**</u> AI systems that pose high risks to basic rights must undergo pre-and post-conformity assessments, and in addition to adhering to ethics, the relevant statutory requirements must be considered.

<u>**Unacceptable risk:**</u> AI systems that pose an unacceptable risk to people's safety, livelihoods, and rights, such as those related to social profiling, exploitation of children, or distorted behaviour, that are likely to occur are not allowed.

Humanity

It is essential to design and build GenAI systems and tools according to a fair and ethical methodology grounded in championing human rights and values. They must be used in a manner that avoids deception, manipulation, or the establishment of behaviour contrary to the empowerment, enhancement, or augmentation of human skills. Ultimately, they should be created for the benefit of all of humanity.

Social and environmental benefits

This principle ensures that GenAI systems and tools support social good and environmental sustainability, avoiding harm and promoting progress, to benefit individuals and the wider community. With a focus on sustainable goals and objectives, GenAI systems should neither cause nor accelerate harm or otherwise adversely affect human beings but rather contribute to empowering and complementing social and environmental progress while addressing associated social and environmental ills. They should ensure the protection of social good as well as environmental sustainability, contributing to the Kingdom's sustainable development.
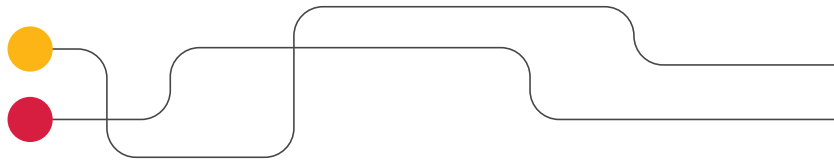
The way forward

For initial pilots in Saudi's healthcare sector, it is critical to prioritise alignment with strategic goals and focus on core business processes. Players must choose use cases offering moderate value that can be readily replicated. This approach prioritises learning from successful pilots and ensures long-term sustainability of GenAI implementation.

This starts with getting involved. As a first step, get educated and allow yourself to understand what GenAI can and cannot offer you, given the context and background of your healthcare organisation. We suggest creating a small task force that can start to explore use cases and champion the concept.

You can also determine the applications that are most relevant to your healthcare organisation. Organisations can create a group of cross-functional leaders, including, but not limited to, those who oversee data and technology, to determine the value that GenAI (and AI more broadly) could bring to their respective divisions.

It is important to create a clear benefits case, leveraging lessons learned and existing case studies. Ensure there is a clear understanding of the desired outcomes, and how the use cases will add additional value and contribute towards the achievement of a target such as the Quadruple Aim[17].

And finally, build a Minimal Viable Product (MVP) before going for wider implementation. During this, embed trust with regulators, stakeholders, and clients through risk mitigation strategies for cybersecurity, privacy and compliance. The MVP will serve as a foundation for broader deployment, setting a precedent for success and scalability in GenAI initiatives.

Keep mindful of the emerging legislation for GenAI as the use-cases continue to evolve - for example future Gen-AI powered applications and devices may also be subject to medical device regulation.

Get involved — **1**

2 — **Estimate value proposition**

Build Minimal Viable Product — **4**

3 — **Create benefits case**

GenAI has tremendous potential to fundamentally reshape the healthcare landscape in the Kingdom, improving patient outcomes and empowering a healthy and vibrant society under Vision 2030. It offers a path towards a more personalised, efficient, and accessible healthcare system. Ensuring its successful integration requires a robust framework for technology adoption, including ethical governance, strategic partnerships, and continuous skills development that will position the Kingdom at the forefront of healthcare innovation.

"GenAI is redefining the boundaries of healthcare, enabling us to unlock unprecedented levels of precision, personalisation, and potential in patient care. It's not just a tool; it's a catalyst transforming the future. We must all act to navigate this latest frontier in health, and reimagine healthcare in the Kingdom of Saudi Arabia."

Tariq Beshtawi, Partner,
Health Industries, PwC

Appendices
Ethical AI governance

GenAI offers both opportunity and risk, with some of the key risks entering the realm of ethics and responsibility including:

- **Distribution of harmful content**
- **Copyright and legal exposure**
- **Data privacy violations**
- **Sensitive information disclosure**
- **Amplification of existing bias**
- **Deepfakes**
- **Hallucinations**
- **Data provenance concerns**

As we find ourselves on the brink of an era influenced by GenAI, it is crucial for healthcare leaders across the region to ensure the responsible and ethical utilisation of this transformative technology in their organisations. The path towards integrating GenAI demands a collective effort that goes beyond mere technological advancements; it requires a comprehensive approach to the ethical considerations too.

PwC Middle East has developed the below ethical framework for responsible use of GenAI, to help ensure that the development and use of GenAI in organisations includes a careful ethical analysis, ensures open dialogue, and a commitment to balancing competing values to ensure that the technology is used to benefit humanity.[18] This framework can be used alongside the AI Ethics Principles stated by SDAIA to guide GenAI development in healthcare.

Ethical framework for responsible use of GenAI

Transparency

Ensure openness and clarity in the development, deployment, and impact of GenAI systems.
Guidelines:
- Disclose AI usage in systems affecting users.
- Clearly communicate GenAI's role in content generation or decision-making.
- Provide accessible documentation on algorithms, datasets, and methodologies.

Fairness & inclusiveness

Promote unbiased outcomes and equitable treatment for all individuals affected by GenAI.
Guidelines:
- Conduct regular audits to identify and address biases in training data and algorithms.
- Include diverse perspectives throughout the development process to ensure inclusivity.
- Implement corrective measures to mitigate biases and ensure fairness in decision-making.

Accountability & responsibility

Establish accountability for GenAI's ethical use, delineating responsibilities for individuals and organisations.
Guidelines:
- Define clear roles and responsibilities for individuals involved in GenAI's life cycle.
- Create mechanisms for addressing ethical breaches and unintended outcomes.
- Ensure feedback mechanisms are in place to improve ethical practices and consider cultural nuances.
- Implement continuous monitoring and assessment of GenAI systems for ethical implications.

Privacy preservation

Safeguard individuals' privacy and prevent unauthorised use or disclosure of sensitive information.
Guidelines:
- Implement robust data anonymisation techniques to protect PII.
- Develop and enforce stringent data access controls to limit unauthorised access.
- Comply with privacy regulations and obtain explicit consent when handling user data.
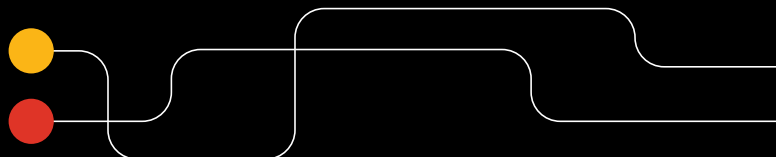
Continuous ethical review

Establish a continuous and adaptive ethical review process to address the dynamic challenges and advancements in GenAI.
Guidelines:
- Regularly review and update ethical guidelines to align with emerging ethical considerations.
- Foster collaboration among ethicists, technologists, and other stakeholders.
- Engage with the public for a broader understanding of GenAI's ethical impact.

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PwC and the Health Sector Transformation Program (HSTP) collaborated on this white paper to deliver critical insights on the future of healthcare, emphasising the role of Generative AI in enhancing medical services. This collaboration supports Vision 2030, aiming to revolutionise the healthcare sector by integrating AI-driven solutions to improve patient care, operational efficiency, and advance innovation in healthcare delivery.

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