AI and Quantum AI in Advancing Saudi Vision 2030

Transforming Health, Sustainability, Energy, and Economy through Next-Generation Intelligence

Author: Eng. Sadik Basha S.
Electronics Engineer – Central Laboratory & Blood Bank
Samama Company for Operation & Management
Date: October 2025

Executive Summary

Saudi Vision 2030 aspires to transform the Kingdom into a hub of innovation, sustainability, and global leadership in science and technology. Artificial Intelligence (AI) and Quantum AI are central to this transformation, redefining possibilities in healthcare, sustainability, energy, and economy.

This paper presents a roadmap for integrating these technologies with Saudi Arabia's strategic priorities.

1. Human Health

For the Common Man:

Every family in Saudi Arabia has faced challenges with health—whether it's waiting for test results, worrying about cancer, or the high cost of treatments. AI and Quantum AI can make healthcare faster, more accurate, and more affordable. Imagine a doctor who never forgets, who has access to the knowledge of every hospital in the world, and who can give answers in seconds—that is the future of healthcare with these technologies and **in short** AI WITH QUANTUM MECHANICS OR PHYSICS REDUCES WAITING TIMES, PROVIDES FASTER DIAGNOSTICS, AND LOWERS TREATMENT COSTS.

For the Professional:

- **Drug Discovery & Protein Modeling:** Quantum AI allows molecular simulations that currently take years to complete on classical systems. For example, simulating protein folding for diseases like Alzheimer's can be achieved in weeks, accelerating drug development pipelines.

- **Precision Medicine:** AI-driven genetic mapping and quantum optimization enable treatment plans tailored to an individual's DNA. A patient with cancer may receive chemotherapy designed specifically for their genetic profile, minimizing side effects and maximizing success. Quantum algorithms simulate molecular interactions and protein folding, accelerating the development of new medicines from years to weeks. AI-driven analytics personalize treatments based on genetic and lifestyle data, supporting precision medicine.

- **Faster Diagnostics:** Quantum-enhanced AI models process massive imaging and laboratory datasets, enabling faster and more accurate detection of cancer, cardiovascular diseases, and neurological disorders and read X-rays faster than radiologists. Quantum AI can analyze petabytes of medical images, blood results, and lab data to detect anomalies invisible to the human eye.

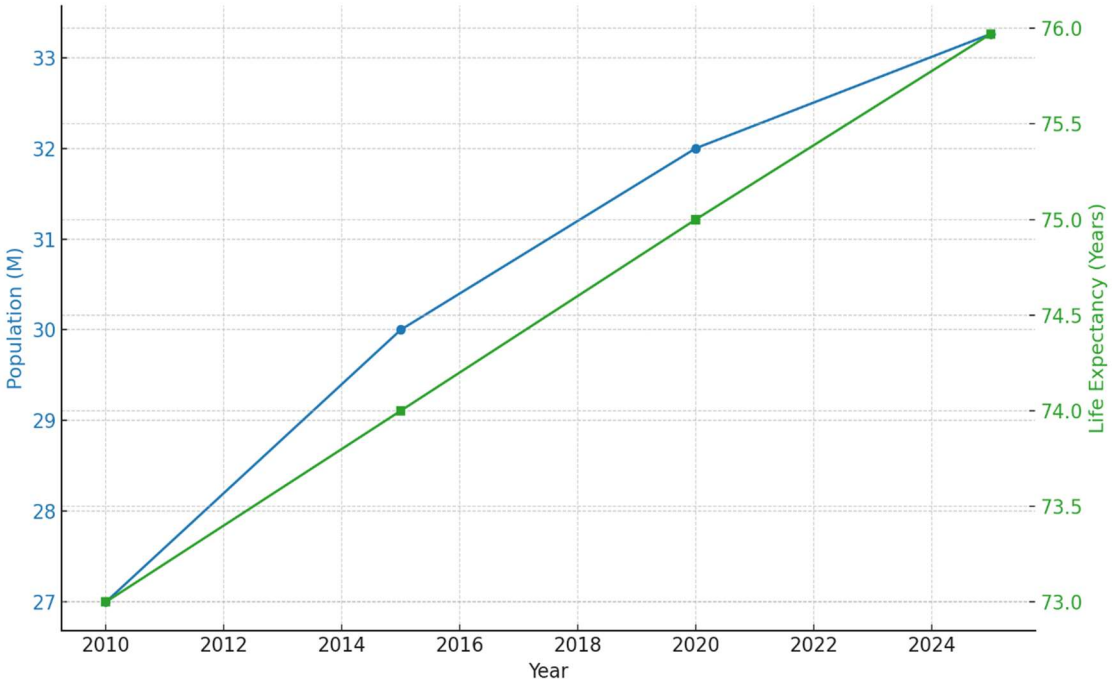
- **Hospital Systems Optimization:** AI-powered predictive models streamline patient flow, reduce wait times, and optimize laboratory operations, while Quantum AI enables rapid real-time decision-making in critical care scenarios.

In short , QUANTUM AI ACCELERATES DRUG DISCOVERY, ENABLES PRECISION ONCOLOGY, AND PROCESSES PETABYTES OF MEDICAL IMAGES FOR EARLY DETECTION

Improvement Plan:
Saudi Arabia can establish Quantum AI healthcare labs in major hospitals (Riyadh, Jeddah, Dammam) to run pilot projects on cancer detection, rare disease genomics, and real-time pandemic response systems.

Saudi Context: Population ~33.26M, life expectancy ~75.97 years (2025), healthcare expenditure ~5.97% of GDP.

Chart: Saudi Arabia Population vs Life Expectancy (2010–2025) with available data on web



2. Sustainable Environment and Provision of Basic Needs

For the Common Man:

Water, food, and clean air are the most basic needs. Farmers in the desert struggle with unpredictable weather, and cities face water scarcity. AI and Quantum AI can predict rainfall, soil quality, and water needs in advance, helping farmers grow more food with less water **and in short AI PREDICTS RAINFALL, SAVES WATER, AND SUPPORTS SMARTER FARMING.**

For the Professional:

- **Climate Modeling:** Classical computers struggle with millions of interacting variables in climate systems. Quantum AI enables real-time simulation of atmospheric conditions for Saudi Arabia, helping with dust storm prediction, water desalination planning, and desert greening projects.
- **Smart Agriculture:** AI-powered drones monitor crops, detect pests, and recommend irrigation schedules. Quantum optimization ensures maximum yield with minimum water use, crucial for arid zones.
- **Water Resource Management:** Quantum AI models optimize desalination plants and national water grids, reducing energy use and ensuring continuous supply.

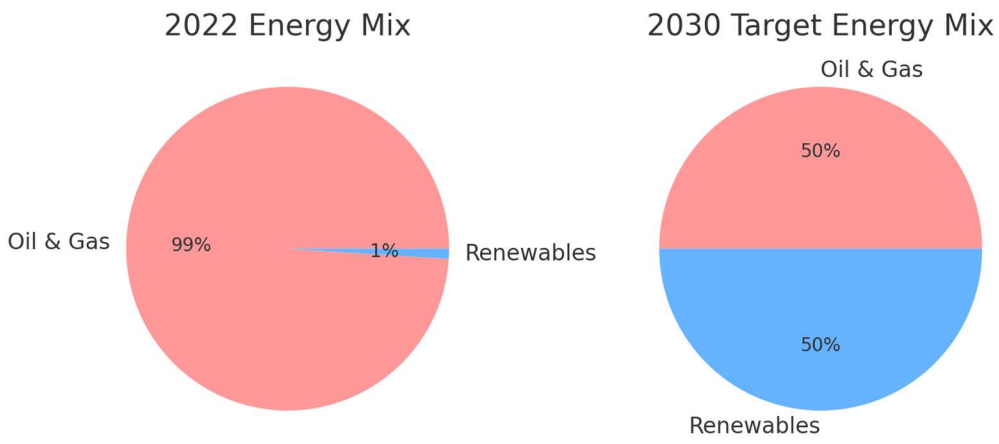
IN SHORT ,QUANTUM AI MODELS CLIMATE SYSTEMS, OPTIMIZES DESALINATION, AND ENHANCES FOOD SECURITY.

Improvement Plan:

Saudi Arabia can create an AI-Quantum Sustainability Center to integrate satellite imagery, quantum climate models, and smart farming solutions to secure food and water security for Vision 2030.

Saudi Context: Renewable share <1% in 2022, target 50% by 2030; major solar and wind projects underway.

Chart: Energy Mix Transition in Saudi Arabia



3. Leadership in Energy and Industry

For the Common Man:

Energy drives everything—from air conditioning at home to industries that provide jobs. AI ensures electricity is reliable and affordable, while Quantum AI helps industries produce more with fewer resources and **in short** **AI ENSURES RELIABLE ENERGY AT LOWER COSTS, SUPPORTING INDUSTRIES AND JOBS.**

For the Professional:

- **Oil & Gas:** Quantum simulations improve reservoir modeling, enhancing extraction efficiency and lowering costs. Predictive AI reduces equipment downtime by forecasting maintenance needs.

- **Renewable Energy Integration:** Solar and wind energy vary with weather. Quantum AI optimizes the national grid, balancing renewable sources with oil and gas to ensure 24/7 stability.

- **Industry 4.0:** Factories equipped with AI-driven robots, predictive logistics, and supply chain optimization can double productivity. Quantum AI enables global-scale optimization across trade routes, raw material supply, and manufacturing cycles.

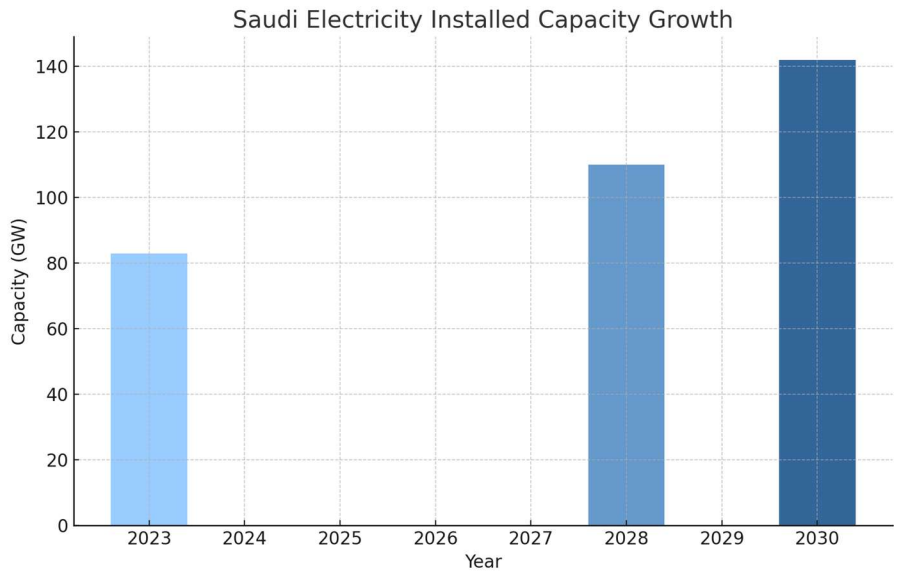
IN SHORT QUANTUM SIMULATIONS ENHANCE OIL & GAS RESERVOIR MODELING, AI PREDICTS ENERGY DEMAND, AND INDUSTRY 4.0 ROBOTICS BOOST PRODUCTIVITY.

Improvement Plan:

Saudi Arabia can establish Smart Industry Zones powered by AI and quantum technologies, where oil, gas, and renewable systems operate seamlessly, making the Kingdom a global model for sustainable energy and smart industries.

Saudi Context: Installed capacity ~83GW (2023) to ~110GW by 2028; 58.7 GW renewable target by 2030.

Chart: Installed Electricity Capacity Growth in Saudi Arabia



4. Future Economies

For the Common Man:

The future economy means **better jobs, new businesses, and financial security**. AI and Quantum AI can help detect fraud in banks, create new startup opportunities, and ensure economic growth beyond oil. And **in short AI AND QUANTUM AI CREATE BETTER JOBS, STARTUPS, AND SAFER BANKING SYSTEMS.**

For the Professional:

- **Financial Systems:** Quantum AI enables portfolio optimization, advanced fraud detection, and predictive modeling for banks and fintech.
- **Education & Research:** AI tutors provide personalized learning paths. Quantum AI in universities trains future scientists capable of working on next-generation technologies.
- **Entrepreneurship:** Startups in biotech, logistics, and clean energy will flourish with AI-driven platforms and quantum-backed modeling.
- **Artificial Superintelligence:** By leading Quantum AI research, Saudi Arabia positions itself as a **global hub of innovation**, attracting investments, talent, and partnerships.

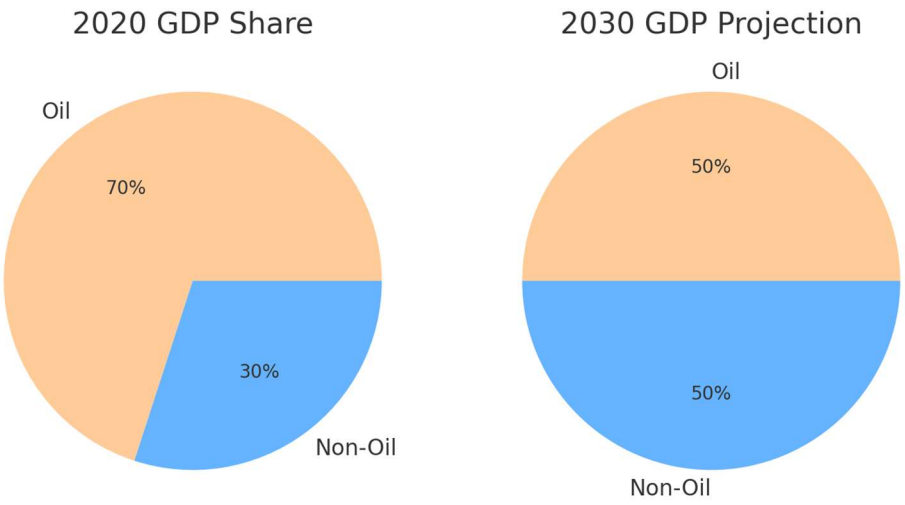
IN SHORT QUANTUM AI STRENGTHENS FINTECH FRAUD DETECTION, EDUCATION, AND ENTREPRENEURSHIP ECOSYSTEMS.

- **Improvement Plan:**

Establish a Multiple **Saudi Quantum Innovation Hub** that supports startups, universities, and investors to build a diversified, future-proof economy aligned with Vision 2030.

Saudi Context: Vision 2030 emphasizes economic diversification beyond oil, with investments in technology and innovation hubs.

Chart: Saudi Arabia GDP Share – Oil vs Non-Oil



Integration of Expertise

Eng. Sadik Basha S. brings over 20 years of experience in Biomedical Engineering, IT, Telecommunication and Artificial Intelligence applications. Currently serving in the Directorate of Health Affairs, Central Laboratory and Blood Bank, Albaha, he has successfully driven AI-powered solutions in healthcare diagnostics, HL7 integration, and Quantum AI feasibility studies. His independent research over the past six months has focused on Quantum AI applications in drug discovery, protein modeling, and precision diagnostics, aligning directly with Vision 2030.

Conclusion

AI and Quantum AI are not distant concepts but present-day tools that can accelerate Saudi Arabia's Vision 2030 transformation. By embedding these technologies into healthcare, sustainability, energy, and economic development, the Kingdom can secure global leadership in innovation, artificial superintelligence, and future-ready economies.

WITH GRATITUDE,

ENG. SADIK BASHA S