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The Role of Artificial Intelligence in Enhancing IT Governance in Saudi Arabia: Opportunities, Challenges, and Future Directions

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Abstract

Saudi Arabia's Vision 2030 aims to transform the Kingdom into a knowledge-based economy by promoting technological innovation and increasing transparency in public administration. In support of this vision, the National Strategy for Data and Artificial Intelligence (AI), led by the Saudi Data and AI Authority (SDAIA), seeks to position Saudi Arabia as a global leader in AI by 2030. This study explores the potential of AI to enhance IT governance within the Saudi context. Drawing on established theoretical frameworks and a structured research methodology, the paper reviews AI adoption across key sectors to contextualize its current trajectory. The analysis highlights areas where AI can improve governance mechanisms and identifies key barriers to implementation, including institutional, technical, and regulatory challenges. The study concludes with strategic recommendations to guide policymakers and practitioners in leveraging AI to strengthen IT governance across the Kingdom.

Keywords: Artificial Intelligence (AI), Governance, Transformation, Saudi Arabia

Introduction

In recent years, artificial intelligence (AI) has emerged as a transformative force across sectors, moving far beyond its origins as a

specialized field of computer science. While early definitions focused on the engineering of intelligent machines (McCarthy, 1956), contemporary perspectives frame AI as systems capable of interpreting external data, learning from that data, and using those learnings to achieve specific goals through flexible adaptation (Haenlein & Kaplan, 2019). These capabilities bring enormous opportunities but also introduce new complexities, particularly in the area of IT governance.

In Saudi Arabia, the rapid development of AI aligns with a broader moment of national transformation. Vision 2030 signals a bold move away from an oil-dependent economy toward a diversified, knowledge-driven future (Khan, 2020). Central to this vision is the aggressive adoption of AI across public and private sectors to enhance efficiency, service delivery, and global competitiveness. The establishment of the Saudi Data and Artificial Intelligence Authority (SDAIA) and the launch of the National Strategy for Data and AI (NSDAI) underscore the Kingdom's commitment to becoming a global leader in the field (Memish et al., 2021). The pace of AI adoption is fast and deliberate.

But speed brings risk. As Saudi organizations integrate AI into core processes (e.g. in healthcare diagnostics, financial services, and smart city initiatives), they introduce new risks related to data privacy, algorithmic bias, cybersecurity, and accountability. For example, AI-driven predictive models can improve decision-making but may also embed opaque reasoning that complicates oversight. Similarly, AI in finance or healthcare offers efficiency gains, but without proper controls it can lead to discriminatory outcomes or privacy breaches. The strategic ambition to leverage AI must therefore be counterbalanced by structured, auditable governance. Without clear frameworks, the unintended consequences of AI, such as unfair outcomes or privacy violations could undermine public trust. The central question this paper addresses is: *How can Saudi Arabia transition from strategic AI ambition to robust, effective, and ethically sound IT governance practices that manage the complexities of AI at scale?*

Research Methodology and Theoretical Frameworks

This study is based on a qualitative literature and policy review such as it covers analysis of academic publications, industry reports, and government documents on AI, IT governance, and Saudi Vision 2030 initiatives. The study also examined international IT governance standards and models to frame the analysis. In particular, the COBIT framework and ISO/IEC 38500 standard are used as theoretical references. COBIT (Control Objectives for Information and Related Technology) is a comprehensive IT governance framework that guides organizations in aligning IT with business goals and improving governance practice (Abu-Musa, 2009). Likewise,

ISO/IEC 38500 is an international standard providing high-level principles for corporate governance of IT; it is aimed at executives and board members to help them evaluate, direct, and monitor IT use in organizations (Calder, 2008). By comparing Saudi Arabia's policies and implementations against these established models, the study identifies critical gaps and potential avenues for improvement.

Strategic Analysis of Saudi Arabia's AI Vision and Regulatory Framework

Saudi Arabia's approach to AI governance is driven by Vision 2030 and related national strategies and shaped by a rapidly evolving regulatory environment. Understanding this context is essential to appreciating both the opportunities and challenges for IT governance.

Vision 2030 is Saudi Arabia's wide-ranging reform agenda aimed at diversifying the economy and driving innovation. Central to this vision are digital transformation and artificial intelligence (AI), which are identified as key engines of future growth (Accenture, 2025). To translate this vision into action, the Saudi Data and AI Authority (SDAIA) launched the National Strategy for Data and AI (NSDAI) in 2020. It focuses on attracting investment, strengthening research and innovation as well as accelerating technology adoption through strong digital infrastructure. The NSDAI sets bold goals for 2030. These include ranking among the top 15 countries in AI, training 20,000 AI specialists, attracting SAR 75 billion in investment, and supporting 300 AI startups. Five priority sectors are highlighted: education, healthcare, energy, mobility, and government (Middle East Institute, 2025).
The Saudi Data and Artificial Intelligence Authority (SDAIA), established by royal decree in August 2019, is the central coordinating body for AI in the Kingdom. SDAIA oversees the NSDAI and drives its implementation, serving as a national regulator for data and AI by formulating policies, standards, and guidelines. For example, SDAIA leads the development of the regulatory framework for data (including data governance and protection) and promotes ethical AI practices across sectors. In practice, SDAIA has collaborated with global partners to build infrastructure (e.g., the National Data Bank and cloud) and to train talent so far upskilling over 45,000 professionals with plans to train an additional 25,000 women in AI skills (Accenture, 2025).

Moreover, these sectoral priorities align with observed AI-driven transformations: in healthcare, institutions are deploying AI tools for diagnostics and operational efficiency improving image interpretation in radiology and monitoring COVID-19 infection patterns to manage resources (Memish et al., 2021; Saeed et al., 2023; Radwan et al., 2021). In finance, banks use algorithms for credit scoring positioning Saudi Arabia as a

budding fintech hub (Al-Baity, 2023). Moving forward to the education, adaptive learning platforms tailor instructional materials to individual student needs, though effective adoption demands teacher training and ethical guidelines (Alshehri & Alotaibi, 2023; Elhajji et al., 2020). These examples illustrate the momentum behind AI adoption and underscore why robust governance is needed to sustain growth while addressing challenges like data privacy, talent gaps, and the regulatory maturity (Muafa et al., 2024).

Analytical Framework: COBIT 2019 and ISO/IEC 38500 Series

To systematically assess AI's impact on IT governance, the study focuses on two established frameworks:

- **COBIT 2019**

COBIT (Control Objectives for Information and Related Technologies) is an ISACA framework for enterprise IT governance and management. COBIT 2019 is the latest version, building on a 20-year legacy (Almaawi et al., 2020). This framework is organized into domains (EDM: Evaluate, Direct and Monitor; APO: Align, Plan and Organize; BAI: Build, Acquire and Implement; DSS: Deliver, Service and Support; MEA: Monitor, Evaluate and Assess) and defines 40 high-level processes and numerous management objectives. COBIT emphasizes a governance system that is holistic, end-to-end, dynamic, and it distinguishes governance (overarching control by the board) from management (implementation by executives). For example, COBIT's EDM domain focuses on board-level practices, while APO and DSS deal with operational processes. COBIT framework was used to map AI initiatives and challenges to specific processes and objectives, and to ensure alignment between technology use and enterprise goals.

- **ISO/IEC 38500 (and 38507)**

The second framework is ISO/IEC 38500, which is an international standard for corporate governance of IT. It provides six guiding principles, including: Responsibility, Strategy, Acquisition, Performance, Conformance and Human Behavior (Calder, 2008). These principles are intended for boards and executives. For AI, ISO/IEC 38507:2022 is a companion standard that addresses the governance implications of AI specifically (ISO/IEC 38507, 2022). ISO/IEC 38507 provides guidance for governing bodies to oversee the use of AI so that it remains effective, efficient, secure, and ethical. ISO/IEC 38500 offers a high-level, principle-based lens (e.g. requiring conformance with laws and ethics, and ensuring accountability) that complements COBIT's process-level detail.

Using both frameworks in the Saudi context helps identify where AI supports governance goals. For example, AI's strength in predictive analytics (an opportunity) and the risk of algorithmic bias (a challenge) can be linked

to COBIT processes and ISO principles. This combined approach provides a clear and organized way to assess AI governance.

AI Opportunities in Enhancing IT Governance in Saudi Arabia

Saudi Arabia's aggressive AI agenda creates concrete opportunities to enhance IT governance. Various opportunities emerge when AI capabilities are aligned with COBIT 2019 objectives and ISO/IEC 38500 principles:

A key opportunity is the shift to data-driven decision-making. Traditional IT governance relies on retrospective analyses of past data, whereas AI enables predictive analytics to anticipate future challenges and opportunities. Machine learning models can process vast amounts of operational data to detect patterns, anomalies, and risks in real time, allowing IT leaders to make more informed, proactive decisions (Kumar et al., 2025). For organizations undergoing rapid digital transformation, the ability to generate predictive insights will be pivotal for maintaining competitiveness and modernizing governance practices. Within COBIT, this strengthens the EDM (Evaluate, Direct and Monitor) domain. For example, AI tools can support EDM02: Ensure Benefits Delivery by forecasting the value of IT investments, and EDM01: Governance Framework Maintenance by allowing governance processes to adapt dynamically to insights rather than lagging behind.

Another significant opportunity lies in automating routine governance tasks. Activities like compliance monitoring, audit reporting, and policy enforcement can now be handled by AI-based systems. These tools not only lower administrative costs and reduce human error, but they also enhance accuracy in governance processes (Alshehri & Mulyata, 2024). In the public sector, this kind of automation supports the goals of the National Transformation Program (NTP) and Vision 2030, both of which emphasize greater efficiency and improved public service delivery (Al-Subaie, 2025).

AI also significantly impacts risk management and cybersecurity. For example, AI techniques such as anomaly detection and threat intelligence can continuously monitor network traffic, identifying unusual patterns and alerting administrators before minor issues escalate into major breaches (Abdallah et al., 2025).

Moreover, AI can enhance transparency and accountability through advanced reporting and visualization. It simplifies complex data by turning it into clear, user-friendly dashboards and reports (Farraj, 2024). This helps stakeholders better understand key insights, improving oversight and aligning decisions with strategic goals. In environments where trust from both citizens and the private sector is essential, such transparency can build institutional credibility and foster stronger public engagement.

AI also provides new methods for optimal resource allocation and project management. For instance, AI-driven tools can prioritize IT initiatives by evaluating risk, potential value, and alignment with Vision 2030 goals, ensuring that resources are allocated to the most impactful projects (Al-Subaie, 2025). For Saudi institutions managing extensive IT portfolios under tight budget constraints, such AI-enabled portfolio management can streamline governance and improve both efficiency and strategic outcomes.

Incorporating AI into IT governance frameworks empowers organizations to become more adaptive and forward-thinking. By spotting inefficiencies and suggesting ways to enhance processes, AI supports continuous improvement and fosters a more agile governance culture (Shammah et al., 2025). This approach aligns closely with Saudi Arabia's Vision 2030, which aims to establish the nation as a global center for innovation.

AI can also improve stakeholder communication and engagement. This addresses ISO/IEC 38500's Human Behavior principle by respecting stakeholders' need to understand IT decisions. Natural language processing and AI-driven chatbots can provide real-time, user-friendly explanations of governance information to diverse stakeholders, including non-technical audiences (Alshehri & Mulyata, 2024). Enhanced stakeholder engagement promotes better alignment between IT governance policies and organizational objectives, further strengthening governance effectiveness.

Ethics represent another crucial aspect. AI can play a key role in upholding ethical standards by identifying biases in decision-making algorithms and encouraging fairness and inclusivity within IT governance (Shammah et al., 2025). As Saudi Arabia navigates the ethical challenges posed by emerging technologies, leveraging AI to oversee and implement ethical guidelines will be essential for sustaining public trust. In this way, AI holds considerable promise for strengthening ethical governance practices.

Key Challenges for AI-Enhanced IT Governance

As AI becomes central to Saudi IT governance, regulatory and legal frameworks remain in flux: although the Saudi Data and Artificial Intelligence Authority (SDAIA) has published voluntary ethics principles and the new Personal Data Protection Law (PDPL) strengthens privacy, the absence of binding, AI-specific legislation leaves organizations without clear rules on fairness, safety, liability or reporting. This regulatory uncertainty not only complicates compliance - undermining ISO/IEC 38500's Conformance principle by leaving requirements undefined - but also weakens COBIT 2019's APO01 (Managed I&T Management Framework) and makes MEA03 (Monitor Compliance with External Requirements) difficult to

execute, since the scope of "external requirements" is ambiguous. Bridging this gap will require Saudi regulators to codify ethics principles into enforceable standards rather than incentives alone (Polok & Dussin, 2025).

At the same time, there's a major shortage of skilled professionals in AI and data science, which is becoming a serious hurdle for advancing governance efforts. Surveys show that while around 56% of employees have been exposed to AI in some way, just as many don't have the deeper programming or analytical skills that are really needed (AlQahtani, 2023). On top of that, a lot of managers and auditors aren't fully prepared to evaluate and handle AI-related risks. This skills gap makes it hard to meet the Responsibility principle in ISO/IEC 38500 that stresses the importance of having qualified people in place for effective oversight. Although bringing in international experts has added valuable expertise to Saudi Arabia, achieving the National Strategy for Data and AI's goal of training 20,000 specialists by 2030 will demand significant investment in local education and building strong strategic partnerships.

Infrastructure disparities further constrain nationwide AI deployment. While 5G networks and advanced data centers in urban hubs such as NEOM demonstrate what is possible, many rural areas still lack reliable high-speed connectivity, impeding e-government and telemedicine services. Addressing these gaps will require both extending high-speed networks to remote regions and modernizing legacy systems, as well as carefully managing data-sovereignty concerns tied to foreign cloud and AI vendors (Aljijakli & Akkari, 2025).

Another challenge is that by introducing AI, the cybersecurity attack surface also expands. Such as: adversarial machine-learning attacks, data poisoning, and model theft create vulnerabilities that traditional defenses cannot address. This risk is compounded by uneven cybersecurity awareness. Studies show only moderate familiarity with best practices among non-technical staff and students outside computing disciplines (Aljohni et al., 2021). This further threatens ISO/IEC 38500's Performance principle and COBIT's DSS05 (Managed Security Services) as well as APO12/APO13 (Managed Risk/Security). Saudi organizations must therefore develop AI-specific security controls such as continuous model monitoring and anomaly detection as well as establish a dynamically adaptive cybersecurity posture in line with COBIT's Dynamic Governance principle.

Finally, ethical and societal considerations loom large. Government uses of AI for surveillance or control risk eroding public trust and reinforcing authoritarian structures (Ibrahim, 2024), while biased training data can perpetuate discrimination in hiring or policing. The "black-box" nature of many advanced models complicates accountability. In this situation, such concerns implicate ISO/IEC 38500's Responsibility and Human Behavior

principles and COBIT's EDM05 (Stakeholder Engagement), calling for both technical measures (bias testing, explainability tools) and cultural initiatives (ethics training, reporting mechanisms) to make sure AI aligns with Islamic values and human-rights norms. Only by addressing regulatory uncertainty, talent shortages, infrastructure gaps, cybersecurity vulnerabilities, and ethical risks in a coordinated, framework-driven manner can Saudi governance bodies fully realize AI's potential to enhance decision-making.

Future Directions for Policy and Practice

Building a robust AI governance ecosystem in Saudi Arabia begins with a comprehensive national framework that integrates ethical, legal, and operational standards at every stage of AI deployment. Such a framework should clearly define developer and user responsibilities, mandate regular algorithm audits, and establish stringent data management and cybersecurity guidelines. Adapting international models such as the European Union's AI Act while tailoring regulations to Saudi Arabia's cultural and economic context can help ensure adherence to global best practices without sacrificing local relevance (Jobin, Ienca, & Vayena, 2019; European Commission, 2021).

Another important strategy is building a workforce that's not only technically skilled in AI but also understands its ethical and governance dimensions. This means expanding university programs, investing in specialized research centers, and providing government-funded scholarships to develop talent in areas like data governance, machine learning, and related disciplines. Encouraging participation from women and people in underrepresented regions is also crucial, as their diverse perspectives can lead to more innovative and inclusive AI solutions (Alsaeed, 2022).

To maintain public confidence in AI-driven decisions, future systems should incorporate explainability at their core. Establishing internal ethics committees or independent regulatory bodies can help oversee these efforts, ensuring that AI systems remain transparent, free from bias, and aligned with societal values (Arrieta et al., 2020).

Building a resilient and inclusive AI ecosystem also requires broad-based AI literacy and a strong innovation environment. Governments can engage citizens through workshops, town halls, and educational campaigns that demystify AI concepts and illustrate real-world use cases and risks, empowering the public to contribute feedback on policy proposals, flag emerging concerns, or co-design AI safeguards (Cave et al., 2019). Simultaneously, investing in national AI hubs, incubators, and collaborative research parks especially those focused on strategic areas such as Arabic-language natural language processing (NLP), cybersecurity analytics, and smart city management will catalyze homegrown breakthroughs. Cross-

sector partnerships with international academic and industry leaders can further amplify these efforts by enabling resource sharing, joint research projects, and rapid diffusion of best practices, ensuring that AI systems reflect and serve the collective interest (Salah et al., 2022).

No AI strategy can truly succeed without a solid digital infrastructure behind it so it is essential to make sure that everyone has access to fast internet, dependable cloud services, and edge computing especially in rural and underserved areas. Key investments like nationwide 5G coverage and robust data centers need to be backed up with strong contingency plans to handle cyberattacks or system failures. This ensures that critical governance services can keep running without interruption (Alsharif, Al-Samman, & Alzahrani, 2021).

Another key area is active engagement in international AI ethics bodies and standards-setting forums. This will position Saudi Arabia as both a contributor to and beneficiary of global best practices. By aligning domestic regulations with emerging international norms and participating in cross-border dialogues on data governance and digital trade, the Kingdom can strengthen its credibility and better anticipate regulatory trends that may affect its AI ecosystem (Floridi et al., 2018).

Conclusion

In conclusion, artificial intelligence offers substantial opportunities to strengthen IT governance in Saudi Arabia by facilitating data-driven decision-making, automating key control processes, enhancing risk management, and increasing transparency. Plus, all these contributions align with global best practices and directly support the ambitions of Saudi Vision 2030 to build a more efficient, accountable, and digitally advanced government.

Nevertheless, the path to fully realizing these benefits is not without challenges. Addressing regulatory and technical concerns alongside bridging talent gaps and securing digital infrastructure is essential for sustainable implementation. By anchoring AI integration within established governance models such as COBIT and ISO/IEC 38500, the institutions can greatly benefit from AI.

With the right policies and investments such as leveraging SDAIA's strategy to position Saudi Arabia as a global AI leader, the Kingdom can unlock the benefits of AI-driven IT governance while upholding societal values and public trust.

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