

DOI: 10.5281/zenodo.11425156

REGULATIONS AND THE EVOLVING ROLE THEY PLAY IN ADVANCING DIGITAL TRANSFORMATION AND SUSTAINABILITY IN THE KINGDOM OF SAUDI ARABIA

Nihaya Khalaf¹

¹Assistant Professor, College of Law, Prince Sultan University, KSA.
Email: nkhalaf@psu.edu.sa

Received: 21/08/2025
Accepted: 10/12/2025

Corresponding Author: Nihaya Khalaf
(nkhalaf@psu.edu.sa)

ABSTRACT

Digital transformation (DT) and sustainability have emerged as interlinked global concerns since achieving long-term environmental, economic, and social justice goals, depending on addressing these issues together. The Kingdom of Saudi Arabia, like other nations, recognizes that if DT is not accompanied by sustainable environmental foresight, it may lead to policy silos and inefficiencies. The three main aspects of the national digital policy are to provide the digital infrastructure for digital transformation, to ensure globally competitive policy and regulatory frameworks, and to simultaneously ensure digital inclusion and participation as the third pillar of "ambitious nations". This paper examines the role that policy and regulatory frameworks could play in aligning digital transformation with the Sustainability Goals. The paper employs a doctrinal legal research method to assess the current legal framework's role in supporting sustainability. The analysis highlights the interdependence between the legal, ecological, and technological factors as key components of sustainable digital development. It also shows how new DT laws are placing greater emphasis on balancing innovation with sustainability. While the Digital Identity Act, Digital Signature Act, and the Personal Data Protection Law (PDPL2021) directly provide the foundation for advancing the country's DT, the General Environmental Regulations (GER 165/2001) establishes the basis for protecting the environment, which is closely related to the goals of digital sustainability. To align digital transformation with the GRE (165/2001), relevant agencies must adopt responsible and circular practices, integrating digital technologies as a critical part of implementing and enforcing environmental and digital policies.

KEYWORDS: Digital Transformation, Sustainability, Saudi Arabia, Environmental Law, Personal Data Protection Law (PDPL), Artificial Intelligence Regulation, Digital Governance.

1. INTRODUCTION

Over the past several decades, digital transformation (DT) and sustainability have emerged as global priorities, both seeking to address fundamental, interrelated economic, social, and environmental challenges [1]. Technologies such as big data, AI, the Internet of Things (IOT), and cloud computing are key drivers for innovation and economic growth [2]. It reshapes industries from healthcare and financial services to manufacturing and agriculture. Technologies also modernise the public sector where governmental platforms, mobile applications, and chatbots used to deliver public services in a more accessible, transparent, and efficient manner [3], considering how the Covid-19 pandemic accelerated the digital transition, and how the emphasis on DT post-Covid has become more evident [4].

Similarly, sustainability is recognised as critical to the state of the economy and governance and is no longer limited to environmental concerns. The urgent demand to decarbonise the economy and the shift to green energy are global amid the current climate crisis [5]. Therefore, the United Nations Sustainable Development Goals (SDGs) seek to address poverty, inequality and climate change [6]. According to the World Bank, sustainable policies that adapt to market and climate changes facilitate the building of economic resilience [7]. AI and IOT are tools that can promote sustainable environmental goals by improving resource usage and reducing waste. Advancements in digital transformation have the potential to improve efficiency and promote environmental monitoring. But these technologies may lead to new environmental risks, including increasing energy consumption, E-waste, and increased reliance on extractive technologies; thus, how these technologies are implemented and regulated within the larger sustainability frameworks will determine their actual impact. Legally speaking, these changes reveal regulatory gaps that have led to the emergence of new laws on E-commerce, data protection, and AI. DT is more than just a technical process; it constitutes a governance challenge for states to design rules that ensure innovation advances without compromising legal certainty and social equality [19]. In parallel, sustainability is about the use of public policy and regulatory frameworks to protect the environment while balancing economic growth, ecological conservation, and social justice [20].

The Kingdom of Saudi Arabia, like other nations, is aware that if the DT is not accompanied by sustainable environmental foresight, it may result in

increased environmental harm including resource strain, social inequality and long term lock in [8]. The Kingdom's Vision 2030 constitutes a state-driven attempt to restructure the country's economy, and among its strategic objectives are DT and sustainable development [9]. Significant investments have been made in e-governance, digital infrastructure, artificial intelligence, and smart cities [10]. This is embodied in the National Cyber Security Authority Framework [11], the Data and Artificial Intelligence Authority strategy, and the Green Initiative. These policy instruments are integrated to ensure long-term digital growth. The launch of the national strategy for data and artificial intelligence and, before that, the creation of the Saudi Data and Artificial Intelligence Authority (SDAIA) are both intended to strengthen the country's role in the global digital economy [12].

This paper examines the regulatory framework governing digital transformation in the Kingdom, focusing on how this evolving framework addresses key sustainability challenges in the context of the digital transition. It specifically looks at the extent to which this framework aligns the country's digital transformation policies with the economic and ecological sustainability goals of Vision 2030. The paper employs a doctrinal legal research method to answer this question. The paper aims to contribute to this emerging area of law relevant to the governance of digital sustainability in a nation that is undergoing rapid transformation.

2. THE STUDY'S CONCEPTUAL FRAMEWORK

This section sets the theoretical foundation of the research topic. To answer the question of how to integrate digital transformation and sustainability, it is essential to define both concepts since the term digital environmental governance has emerged as a new regulatory challenge. The term digital transformation is defined by the United Nations Development Program (UNDP) as:

Digital transformation at the state level refers to the strategic integration of digital technologies into government structures, policies, and services to enhance public administration, promote innovation, and achieve broader national development goals [13].

Digital transformation is therefore about the broad adoption of digital technologies, including AI, IOT, cloud computing, and big data analytics across different sectors [14]. The includes reforms in e-governance, digital infrastructure, and data-based business strategies. At the state level, DT goes beyond merely modernising government services; it

reshapes the business and social spheres by redefining the regulations governing commerce, labour, and daily interactions. In business, DT refers to the comprehensive process of integrating digital technology into all areas of an organisation to change how it operates and deliver value to customers [15]. It involves rethinking traditional business models, optimizing processes, and enhancing customer experiences by leveraging emerging technologies [16]. The aim is to increase efficiency, agility, and innovation, enabling businesses to adapt to evolving market trends and stay competitive in the digital era [17]. DT in the social sphere changes civic engagement, access to public services, and communication patterns. Still, it may also increase the risk of excluding marginalised groups, especially those who lack digital literacy or dependable connectivity [18]. Legally speaking, these changes reveal regulatory gaps that have led to the emergence of new laws on E-commerce, data protection, and AI.

In parallel, sustainability is widely articulated through the lens of sustainable development, which aims to meet present needs without compromising the ability of future generations to meet their own needs. Sustainability primarily draws on an international policy perspective, especially the UN Sustainable Development Goals (SDGs) and the Paris Agreement (2012), which set broad commitments. Both DT and sustainability do not merely entail shifts in technology and the economy; instead, they are subject to national and international regulatory frameworks. While international treaties and national laws [21] heavily shape sustainability, digital transformation remains widely underregulated. The main regulatory frameworks are, for example, the European Union General Data Protection Regulation (2018) and the EU AI Act (2024-2025). The relationship between sustainability and digital transformation is increasingly acknowledged in academia and policy, leading to the emergence of concepts such as green digitalisation and digital circular economy [22].

Digital sustainability is defined as the development and deployment of digital resources and artifacts toward improving the environment, society, and economic welfare [23]. The idea of digital sustainability is about the responsible use and development of digital technologies in their life cycle [24]. The three-dimensional aspects of the above definition include an ecological pillar along with social and economic welfare pillars. And this is an explicit reference to the concept of sustainable development. This normative nature of digital sustainability asserts that digital technologies and

transformation should not only prevent harm but also produce positive outcomes. With the global expansion of digital infrastructure and services, their environmental footprints require urgent regulation, including for data centers and e-waste [25].

3. REGULATORY APPROACH TO SUSTAINABILITY AND DIGITAL TRANSFORMATION

It is argued that the success of the ambitious goals of digital transformation and sustainability is dependent on robust regulatory frameworks and institutional coordination [26]. Thus, this Section provides a thorough legal analysis of the primary laws and regulations governing digital transformation and sustainability in the Kingdom. The study examines key legislative frameworks, including the Digital Identity and Signature Law, the E-transactions Law, the Personal Data Protection Law, and the General Environmental Law.

Since the beginning, the government has worked to create a transparent, agile, and enforceable legal framework that encourages digital innovation while managing significant risks and guaranteeing adherence to the digital transformation requirements [27]. Policies developed have focused on promoting economic diversification while tackling issues like data privacy, cybersecurity, and digital inclusion [28]. The key guiding principles have been transparency, accountability, and openness across both public and private sectors. These policy principles aim to align national and international agendas, promote innovation, and offer clarity, as such a regulatory environment forms the foundation for DT. A robust legal environment not only drives innovation but also ensures that transformation occurs in a planned, inclusive, and sustainable way [29]. The government has positioned itself as an enabler of technological and socio-economic development and, for this end, has swiftly adopted more cooperative approaches to regulating Vision 2030 goals. Agile regulation is further supported by the Saudi Communications Commission (CITC), whose latest policies, initiatives, consultations, and frameworks encourage investment and innovation in the information and communication technology (ICT) sector and other industries [30].

Looking at the institutional aspect, the Digital Government Authority (DGA) was created in March 2021. Although it has not yet implemented any significant policies, the Authority is responsible for developing technological standards and regulating the government cloud. It is also responsible for creating the national e-government strategy and

managing digital government websites and platforms.

3.1. Fundamental Regulatory and Legal Foundations for Digital Transformation

From the beginning, there was a bundle of laws and regulations that provided the initial infrastructure for transformation in the kingdom [31]. These include:

- The Electronic Identification (eID) Law: the law was initially adopted to enable and ensure secure identification for individuals and businesses in the digital environment. This law is essential to foster efficiency and trust in online interactions [32].
- The Electronic Signatures and Public Key Infrastructure (PKI) Act offers a thorough legal framework to control and promote the use of electronic signatures. It provides that, under certain conditions, this framework guarantees that electronic signatures will have the same legal significance as handwritten signatures [33].
- The Telecommunications Act: the Act aims to develop the ICT sector in a way that will boost its infrastructure and efficiency, encouraging the use of ICT services across all domains [34].
- The Electronic Transactions Act: this Act is of crucial importance since it establishes the validity of online transactions in the same manner as traditional paper-based transactions. The Act aims to facilitate efficient and secure electronic exchanges in different sectors, including banking, online commerce, and e-governance. The Act also enables the introduction and development of new financial technologies and helps reduce the administrative burdens associated with paperwork, thereby promoting innovation and creative solutions [35].
- E-Commerce Law (M/126/2019): digital transformation is about the strategic adoption of technology to enable e-business to access new markets and open more opportunities. Thus, the E-commerce Law is designed to promote confidence in e-commerce transactions, giving both businesses and customers the protection they need against fraud and disinformation, and thereby strengthening confidence in e-commerce transactions [36]. To accomplish these goals, the law addresses data protection, consumer rights, intellectual property, and digital advertising.

3.2. The National Strategy for Data Protection and AI Regulation

It is widely recognised that digital sustainability is inseparable from the legal framework governing AI and data protection. Thus, the adoption of the PDPL(19/2021) and the AI Guidelines constitutes the cornerstone of the country's digital transformation by securing data privacy, promoting responsible AI adoption, and ensuring ethical governance [37]. This legislative development guarantees that digital transformation does not compromise individual rights. By mandating lawful data processing bases, limiting unnecessary data collection, and ensuring accountability, the PDPL (19-2021) restricts unregulated commercial practices. It builds public trust, which is crucial for sustainable digital ecosystems. This legal and regulatory framework is in line with the international standards of fairness, accountability, and transparency [38].

Similarly, the regulatory framework for AI is anchored in guidelines issued by the Saudi Data and AI Authority (SDAIA) [39]. The guidelines set out ethical principles, responsible use of AI, and ensure consistency with Vision 2030's objectives on innovation and competitiveness [40]. The Guidelines emphasise fairness, accountability, transparency, social benefit, and reliability [41]. Within this regulatory approach, individuals and institutions can experiment with and deploy AI in a flexible environment, free from heavy compliance burdens and the threat of immediate legal sanctions. By lowering adoption barriers, this agile approach facilitates digital transformation.

Like technological infrastructure, the PDPL (19/2021) is a significant step in the nation's digital transformation because it offers guarantees that facilitate its growth by safeguarding people's rights and liberties concerning their personal data [42]. The fundamental principle of data protection is designed around the idea that any use of personal data that harms people also harms the digital transformation [43].

3.3. The Saudi Environmental Law and Digital Transformation

The kingdom has made significant progress in environmental protection since the adoption of the environment law and policy, based on Article 32 of the Basic Law of Governance, which states that "[t]he State shall work towards the preservation, protection and improvement of the environment." [44] The General Environmental Regulation (No.192/2001) sets out the main safeguards against water, land, and

air pollution regarding industrial and economic activities. The GER (192/2001) serves as the principal legislation for environmental protection in Saudi Arabia. However, the question is what role GER (192/2001) can play in advancing sustainability in the context of the country's digital transformation. In other words, this section examines the applicability of the GER (192/2001) principles to digital transformation to ensure the sustainable use of environmental resources, highlighting strengths and gaps in the current legal framework.

Article 6 of the GER (192/2001) establishes a preventive principle in environmental governance stipulating that "any activity that may pollute, harm, or adversely affect the use of environmental mediums and water resources shall be prohibited, as specified by the regulations." The prevention principle, as set out in Art. 6, requires that governmental policy prohibit any activity that may pollute, harm, or adversely affect the environment. Practically speaking, the principle ought to inform policy design options that prevent environmental damage before it starts or, at least, limit damage that has already occurred. This policy approach appears to offer economic benefits, as it can prevent additional costs arising from environmental harm. In the context of digital transformation, the principle implies that digital technologies are developed and deployed in an environmentally, socially, and economically sustainable way. Also, new technologies should minimise negative digital impacts such as e-waste and energy use. In the context of regulation-based control under Art. 6, the principle extends to enforcing compliance through data-driven governance and monitoring pollution, by deploying digital tools such as IoT sensors.

Article 10 of the GER (192/2001) stipulates that all projects likely to affect the environment must undergo an environmental impact assessment before licensing. This obligation implies that assessments should identify pollution risks, the effectiveness of resource use, and proposed mitigation strategies. Also, Art. 16 provides that "commitment to environmental protection regulations and standards must be a prerequisite for receiving loans for projects from lending agencies." Similarly, a strict precautionary obligation is set out in Art. 13 for any entity involved in productive or service activities across all sectors. Despite the precautionary principle being originally conceived with resource-intensive industries in mind, digital infrastructure development is likewise covered under Art. 13. The application of the precautionary principle according to Art. 13 to digital technologies suggests that these

technologies may entail environmental risks that are not fully known. Applying the principle requires that the damage be serious or irreversible, raising the question of whether we should wait for complete scientific proof before acting. Therefore, ensuring environmental sustainability in digital technologies might include limiting e-waste and reducing energy consumption by cloud computing, IOT, and AI. In this context, the precautionary principle requires that, before rolling out IOT systems or data centres, an environmental assessment should be conducted. Those measures also include the use of renewable energy and green computing. Fundamentally, these measures align with the broader objective of designing safe, inclusive, and sustainable digital transformation policies at the national level.

3.4. Digital Transformation and Contextual Policy Challenges

Digital transformation is one of the main pillars for achieving Saudi Arabia's Vision 2030; thus, it has been a key goal of several national strategy documents, including the Smart Government Strategy, ICT Strategy 2023, National Strategy for data and AI, Cyber Security Strategy, and Digital Health Strategy [45]. A well-defined digital transformation strategy at the national level can act as a roadmap offering a framework for decision-making, aiding in the prioritisation of national goals, and directing the allocation of resources toward intended results [46]. It also improves stakeholder coordination and collaboration and assists in navigating uncertainty in times of change and difficulty [47].

Maintaining relevance in a rapidly evolving digital ecosystem requires constant adaptation and substantial investment, as well as the capacity to address complex ethical and legal challenges. In practical terms, the challenge is in balancing innovation with regulation, accountability with efficiency, and adaptation with inclusiveness [48]. White recognised these challenges and divided them into the following four major categories:

- Complexity of perspectives and stakeholders
- The fast and exponential growth of technologies
- The boundaryless nature of digital transformation
- The disruptive nature of digital transformation

The process of the digital revolution is intricate and involves many players with divergent interests across key sectors including government, health, energy, education, transportation and the environment. The issue that could lead to

institutional resistance, fragmented policies, duplicated projects and weak data governance. The Digital Governance Authority (DGA) identifies fragmentation in the public sector as a critical challenge for digital transformation. This is mainly due to the number of policies and institutions involved in digital transformation, including the Digital Economy Policy and the National Committee for Digital Transformation (NCDT) [49]. To address this fragmentation gap, the DGA prioritises a holistic tracking approach above a specific strategy, the significance of it as an integrated system impacted by diverse technologies, industries, and difficulties rather than as a discrete initiative [50].

4. CONCLUSIONS

This Saudi journey underpinned a comprehensive framework of laws and policies aiming to foster innovation, economic growth, and a sustainable environment. On policy level, the three main aspects of the national digital policy are to provide the digital and physical infrastructure for DT, to ensure globally competitive policy and regulatory frameworks, and to simultaneously ensure digital inclusion and participation as the third pillar of "ambitious nations". This integrated framework provides legal certainty, cross-sector coordination and institutional stability that is necessary to align DT with national development policies, sustainability objectives and accountability systems. The digital government strategy for (2023-2030) operationalises this framework, pledging to "transform government by embedding digital in operations and decisions," through the integration of digital solutions across all

References

- 1-United Nations, The Sustainable Development Goals Report 2023 (UN 2023) <https://unstats.un.org/sdgs/report/2023/> accessed 29 July 2025; European Commission, Shaping Europe's Digital Future (2020) <https://digital-strategy.ec.europa.eu>.
- 2-OECD, Digital Transformation for Building Back Better: A Green and Inclusive Recovery (OECD 2021) <https://www.oecd.org/digital/digital-economy-outlook-2021.htm>; World Bank, Digital Development Overview (2023)
- 3-UN DESA, E-Government Survey 2022: The Future of Digital Government (United Nations 2022) <https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2022>; OECD, The Digital Transformation of the Public Sector (OECD 2020).
- 4-World Bank, Digital Dividends: World Development Report 2016 (World Bank 2016); ITU, Measuring Digital Development: Facts and Figures 2022 (International Telecommunication Union 2022).
- 5-IPCC, Climate Change 2023: Synthesis Report (Intergovernmental Panel on Climate Change 2023) https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf accessed 29 July 2025.
- 6-Ibid.
- 7- OECD. (2021). Strengthening climate resilience: Guidance for governments and development co-operation. OECD Publishing. https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/03/strengthening-climate-resilience_be146744/4b08b7be-en.pdf
- 8-Kingdom of Saudi Arabia, Vision 2030 (2016) <https://www.vision2030.gov.sa/en> accessed 29 July 2025.

aspects of governmental functions. The goal is to modernise the way governmental agencies operate, provide services to people, create policies, and make decisions.

The laws examined reveal an evolving legislative landscape encompassing laws that set the infrastructure for digital transformation, regulations protecting data privacy, and the statutory provisions of the GER (192/2001) aimed at environmental protection. While the analysis highlights the interdependence between the legal, ecological, and technological factors as key components of sustainable digital development, it shows that digital sustainability presents both regulatory and technological challenges, making the law an essential foundation for guiding responsible digital transformation. For instance, while digital identity and digital signature, and the PDPL directly provide the foundation for the country's digital transformation, the GER (192/2001) establishes the basis for the protection of the environment, which is closely related to the goals of digital sustainability. To align digital transformation with the GRE (192/2001), responsible, circular practices must be adopted by relevant agencies, including ICT. Thus, regulatory bodies should integrate digital technologies as part of their implementation of environmental and digital policies.

Acknowledgement

The author acknowledges that this research has been conducted with the support of Prince Sultan University.

- 9-Ibid; World Bank Group & Digital Government Authority (Saudi Arabia). (2023). Digital sustainability framework: Experiences from KSA's digital government transformation. <https://documents1.worldbank.org/curated/en/099120524174040649/pdf/P501653-c398b936-880c-471e-b7a3-57840799d0a3.pdf>
- 10-Saudi Data and AI Authority (SDAIA), National Strategy for Data and AI (NSDAI) (2020) <https://www.sdaia.gov.sa>; UNDP Saudi Arabia, Saudi Arabia Country Programme Document 2022–2026: Digital Transformation Pillar (UNDP 2024) https://www.undp.org/sites/g/files/zskgke326/files/2024-04/sa_undp_-_en_single_pages.pdf.
- 11- National Cybersecurity Authority, Essential Cybersecurity Controls (ECC 2-2024) (National Cybersecurity Authority 2024) https://cdn.nca.gov.sa/api/files/public/upload/86e09090-44e4-481f-bc28-355673607654_ECC--2024-EN.pdf; Saudi Green Initiative, *ibid*.
- 12- Digital Government Authority, Digital Government Strategy 2023–2030 (Digital Government Authority 2023) <https://dga.gov.sa/en/node/593> accessed 29 July 2025.
- 13-UN Department of Economic and Social Affairs (UNDESA, 2020). E-Government Survey 2020: Digital Government in the Decade of Action for Sustainable Development.
- 14- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144.
- 15-Mohamed A Ramady, *The Saudi Arabian Economy: Policies, Achievements and Challenges* (Springer 2010).
- 16-Meshal Alhumaid and Ibrahim Alotaibi, 'Artificial Intelligence, Big Data, and Their Impact on Improving Marketing Effectiveness and Customer Experience in the Retail Sector in the Kingdom of Saudi Arabia' (2025) 13 *Jazan University Journal of Human Sciences (JUHHS)* 431 https://www.researchgate.net/publication/388028349_Artificial_Intelligence_Big_Data_and_Their_Impact_on_Improving_Marketing_Effectiveness_and_Customer_Experience_in_the_Retail_Sector_in_the_Kingdom_of_Saudi_Arabia.
- 17-Karam Zaki and others, 'Digital Synergy and Strategic Vision: Unlocking Sustainability-Oriented Innovation in Saudi SMEs' (2025) 15 *Administrative Sciences* 59 https://www.researchgate.net/publication/388926627_Digital_Synergy_and_Strategic_Vision_Unlocking_Sustainability-Oriented_Innovation_in_Saudi_SMEs. Oliver Kohnke, 'It's Not Just about Technology: The People Side of Digitization' (2016) 2 *Shaping the Digital Enterprise* 69 https://link.springer.com/chapter/10.1007/978-3-319-40967-2_3.
- 18- The OECD Digital Government Policy Framework: Six Dimensions of a Digital Government (2020)
- 19- The Austrian Federal Chamber of Labour and European Commission, 2030 Digital Compass: The European Way for the Digital Decade COM (2021) 118 final.
- 20-World Commission on Environment and Development, *Our Common Future* (Oxford University Press 1987).
- 21-Examples of such policy and legislative frameworks include for examples Paris Agreement (2015); The UN Sustainable Development Goals (SDGs); the EU Green Deal & EU Climate Law: and finally Environmental Protection Acts at various jurisdictions.
- 22-Trushkina, N., & Prokopyshyn, O. (2021). CIRCULAR ECONOMY AS A NEW WAY OF MANAGING IN THE CONDITIONS OF DIGITAL TRANSFORMATIONS. *Green, Blue and Digital Economy Journal*, 2(3), 64-71. <https://doi.org/10.30525/2661-5169/2021-3-10>.
- 23- Julia Kotlarsky, Ilan Oshri and Nevena Sekulic, *Digital Sustainability in Information Systems Research: Conceptual Foundations and Future Directions* (2023) *Journal of the Association for Information Systems* 24(4) 936–952, 936
- 24-Matthias Stuermer, Georges Abu-Tayeh and Thomas Myrach, 'Digital sustainability: basic conditions for sustainable digital artifacts and their ecosystems' (2017) 6 *Sustainability Science* 1.
- 25- OECD, 'Digital transformation' (OECD) <https://www.oecd.org/en/topics/digital-transformation.html> accessed 29 July 2025.
- 26-Khalid Al-Faris and Waleed Al-Sultan, 'Public Sector Transformation in Saudi Arabia: Achievements and Challenges' (2022) IMF Working Paper WP/22/143.
- 27-ALGhazzawi & Partners, 'DIGITAL TRANSFORMATION in the KINGDOM of SAUDI ARABIA' (ALGhazzawi & Partners 8 July 2024) <https://www.ghazzawilawfirm.com/insights/digital-transformation-in-the-kingdom-of-saudi-arabia/>.
- 28-Mame Astou Diouf and others, 'A Conceptual Policy Framework for Leveraging Digitalization to Support Diversification in Sub-Saharan Africa' (2024) 2024 IMF Working Papers <https://www.elibrary.imf.org/view/journals/001/2024/123/article-A001-en.xml>.

- 29-OECD, '«Public Sector Transparency and Accountability MAKING IT HAPPEN' (2002) https://www.oecd.org/content/dam/oecd/en/publications/reports/2002/09/public-sector-transparency-and-accountability_g1gh2c53/9789264176287-en.pdf.
- 30-Country review: Saudi Arabia's digital transformation and collaborative regulation¹⁹, <https://share.google/ZSGs7b4VTRQhkS3Fz>
- 31-DIGITAL TRANSFORMATION, 'Legal Parameters of Digital Transformation' (Digital Transformation | Erasmus+ Project2024) <https://digital-transformation-tool.eu/legal-parameters-of-digital-transformation/>.
- 32-European Commission, 'EIDAS Regulation | Shaping Europe's Digital Future' (digital-strategy.ec.europa.eu4 April 2024) <https://share.google/JUcDxtltGKzA6KEVX>.
- 33-UNITED NATIONS, 'UNITED NATIONS UNCITRAL Model Law on Electronic Signatures with Guide to Enactment 2001' (2002) <https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/ml-elecsig-e.pdf>.
- 34-Department of ICT, 'PNG DIGITAL TRANSFORMATION POLICY PNG Digital Transformation POLICY' (2020) https://www.ict.gov.pg/Policies/Digital%20Transformation%20Policy/PNG%20Digital%20Transformation%20Policy_21122020_updated.pdf.
- 35-commonwealth, 'Electronic Transactions Act | the Commonwealth Connectivity Agenda Repository of Digital Policies and Regulations' (tradecca.thecommonwealth.org2012) <https://tradecca.thecommonwealth.org/document/electronic-transactions-0>.
- 36-Alan A Ahi, Noemi Sinkovics and Rudolf R Sinkovics, 'E-Commerce Policy and the Global Economy: A Path to More Inclusive Development?' (2022) 63 *Management International Review* 27 <https://link.springer.com/article/10.1007/s11575-022-00490-1>.
- 37-Data Protection Commission, 'Principles of Data Protection | Data Protection Commission' (Principles of Data Protection | Data Protection Commission2022) <https://www.dataprotection.ie/en/individuals/data-protection-basics/principles-data-protection>
- 38-OECD ARTIFICIAL INTELLIGENCE PAPERS, 'AI, DATA GOVERNANCE and PRIVACY SYNERGIES and AREAS of INTERNATIONAL CO-OPERATION OECD ARTIFICIAL INTELLIGENCE PAPERS' (2024) https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/06/ai-data-governance-and-privacy_2ac13a42/2476b1a4-en.pdf.
- 39-Saudi Data and Artificial Intelligence Authority (SDAIA), AI Ethics Principles (2020) <https://ai.sa.gov.sa/> accessed 23 September 2025.
- 40-Ibid.
- 41-SDAIA, Generative AI Guidelines for Government (version 1, January 2024) <https://sdaia.gov.sa/en/SDAIA/about/Files/GenAIGuidelinesForGovernmentENCompressed.pdf> accessed 24 September 2025.
- 42-World Bank, 'Data Protection in Development: Where Are We Headed?' (World Bank Blogs2025) <https://blogs.worldbank.org/en/digital-development/data-protection-in-development--where-are-we-headed-->
- 43-DIGITAL ECONOMY, 'THE IMPORTANCE of DATA PROTECTION for the DIGITAL ECONOMY' (2022) <https://www.gra.gi/uploads/documents/data-protection/Privacy%20Awareness/Social%20Media%20Campaigns/The%20Digital%20Economy%20-%20Infographics.pdf>.
- 44-Ministry of Environment, Water and Agriculture (Kingdom of Saudi Arabia), Sustainable Development (online, 6 July 2025) <https://www.mewa.gov.sa/en/Ministry/initiatives/SustainableDevelopment/Pages/MinistrySustainable.aspx> accessed 19 July 2025.
- 45-Digital Regulation Platform, 'Digital Regulation Platform' (digitalregulation.org7 July 2023) <https://digitalregulation.org/national-digital-transformation-strategy-mapping-the-digital-journey/>
- 46-Digital Regulation Platform, 'National digital transformation strategy - mapping the digital journey' (6 July 2023) (Digital Regulation Platform) <https://share.google/ASG6zLh863Mo9Dp1o> accessed 30 July 2025.
- 47-Ibid.
- 48-Ibid.
- 49-Development Sector, 'Country Review: Saudi Arabia's Digital Transformation and Collaborative Regulation' (2022)https://digitalregulation.org/wp-content/uploads/21-00770_R3_Saudi-Arabia-digital-transformation_E_web.pdf.

50-Dmitry Plekhanov, Henrik Franke and Torbjørn H Netland, 'Digital Transformation: A Review and Research Agenda' (2022) 41 European Management Journal <https://www.sciencedirect.com/science/article/pii/S0263237322001219>.