THE IMPACT OF DIGITAL TRANSFORMATION IN FISCAL POLICY ON ACHIEVING THE ECONOMIC DIMENSION OF SUSTAINABLE DEVELOPMENT: SELECTED COUNTRY EXPERIENCES WITH REFERENCE TO IRAQ

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Abstract
Background: The value of digital transformation for the economic aspect of sustainable development has not been sufficiently investigated in the context of Iraq, a country with a strong reliance on the oil sector and a history of conflict. The research problem is that the fiscal system in Iraq is hydrocarbon-dependent, has a relatively low international fiscal digital government index, and the tax system has a narrow base relative to oil income, suggesting that the possibility of achieving economic sustainability by digitalizing fiscal administration is questionable. This study aims to (a) review and consolidate academic and institutional sources on digital transformation in fiscal policies and its link to the economic aspect of sustainable development, (b) compare the digital-government journey in Iraq (2003-2024) with those of the region and the world, and (c) explore recent fiscal results in Iraq in the context of the digital-administration reforms. Research design: The research used methodology documentary and secondary data. It is based on the United Nations E-Government Development Index (EGDI) series, International Monetary Fund (IMF) Article IV and Selected Issues reports, World Bank indicators and a structured review of peer-reviewed and institutional literature covering the period 2011-2026. No primary survey or econometric estimation, but descriptive and comparative statistical analysis of publicly available longitudinal indicators. Key findings: Iraq's EGDI has improved from 0.000 in 2003 to 0.457 in 2024 (rank 148 of 193), largely because of improvements in telecommunications-infrastructure dimensions, but not so much via the online-service or human-capital dimensions. At the same time, non-oil revenue grew by just 7% to 12% of total public revenue in the two years from 2023 to 2024 and oil revenue remained at about 90% of public revenue, with fiscal balance shifting from surplus to a deficit of more than 3% of GDP. Originality: The paper provides an integrated technology-organization-environment and institutional-theory interpretation of the failure of technological investment in the public financial management to yield an equivalent increase in non-oil revenues in Iraq, as well as a comparative study of the digital-fiscal environment in the Gulf region and elsewhere in the Middle East, using verifiable secondary data. Policy implications: Digital investment should be sequenced alongside institutional reforms, human-capital development, and legal modernization instead of using digitalisation as a standalone fiscal solution—to diversify revenue in Iraq sustainably.

1. Introduction

1.1. Original Contribution

Three specific ways in which this paper contributes to the literature. First, it is a longitudinal study of the digital government development of Iraq in a clear and unambiguous way, using the United Nations E-Government Development Index (EGDI) time series from 2003 to 2024, which are brokeisown into three sub-indices corresponding to the three dimensions of online service, telecommunication infrastructure, and human capital. Second, it is the first study in the literature that explicitly compares the performance of Iraq's government operations in the digital age with a set of comparable economies in the Gulf and Middle East, as a benchmark. Second, it relates this

digital-government pathway to macro-fiscal outcomes that can be easily observed- oil dependence, share of non-oil revenue, fiscal balance, and growth of non-oil GDP- from the IMF Article IV consultations and Selected Issues papers (International Monetary Fund 2024a, 2024b, 2025a), instead of using broad cross-country panel regressions that remove the specifics of the country's institutions. Third, it combines the technology-organization-environment (TOE) framework (Tornatzky & Fleischer, 1990) with institutional theory (DiMaggio & Powell, 1983; Scott, 2014) to account for the fact that Iraq's huge investments in telecommunications infrastructure have not yet been matched by significant improvements in online public service delivery or non-oil revenue mobilization, an explanatory gap that has been identified conceptually but rarely demonstrated with a single, data-grounded national case (as in the existing literature on digital tax administration, Sari et al., 2026; Okunogbe & Santoro, 2023).

1.2. Background

Digital transformation has shifted from a back-office technical issue to a key focus of fiscal policy design. The United Nations E-Government Survey 2024 titled Accelerating Digital Transformation for Sustainable Development reveals that the global average E-Government Development Index (EGDI) improved from 0.6102 in 2022 to 0.6382 in 2024, while the proportion of the world's population in countries with lagging digital government decreased from 45.0% to 22.4% during the same period (United Nations Department of Economic and Social Affairs [UN DESA], 2024). During this period, the International Monetary Fund has reported on the measurable benefits of an increased use of digital technologies in domestic revenue mobilization, for example, in the case of developing and emerging economies, e-filing, e-invoicing, electronic fiscal devices, and data-analytics-based risk profiling (IMF, 2023; Okunogbe & Santoro, 2023). The question at the heart of these two trends is whether the digitalization of fiscal management can do anything more than just jump-start the economic aspect of sustainable development (which, in this context, is defined as sustainable, viable and inclusive growth of public revenue and expenditure capacity) in economies with comparatively low levels of institutional capacity, human capital and legal frameworks.

The question is theoretically important and will have policy implications in the context of Iraq. Additionally, the oil sector still covered an estimated 90% of the total government revenue in 2023 (U.S. Energy Information Administration, 2024), despite the government target of 20%, with non-oil revenue (taxes, fees and income of state-owned enterprises) increasing from 7% of total government revenue in 2023 to 12% in 2024 (Shafaq News, 2025). However, Iraq's EGDI rose from 0.436 in 2020 to 0.457 in 2024, placing it 148th out of 193 countries and territories in the UN member state rankings behind Jordan (0.458), the United Arab Emirates (0.457), and Saudi Arabia (0.457) (UN DESA, Division for Public Institutions and Digital Government, 2024). The government's 'Ur' e-services platform, the 2024 Strategic Management Guide for Services and subsequent 'digital-governance roadmaps' supported by the UNDP reflects a clear policy intention (Iraqi News, 2025; Shafaq News, 2024; United Nations Development Program, 2021), though the fiscal returns of these investments are not empirically proven.

1.3. Importance of the Study

The study is relevant for three audiences. For the Iraqi and similar oil-rentier policy makers, it reflects the likelihood of continued investment in digital fiscal infrastructure on current evidence – a matter that has direct implications for the sustainability of the budget in the medium term, and which is especially relevant in an era of rising oil prices needed to balance Iraq's budget, from approximately $54 per barrel in 2020 to approximately $84 per barrel in 2024 (International Monetary Fund, 2025a, 2025b). It provides a data-backed rationale for sequencing recommendations for international financial institutions and donors who fund digital-governance programs (such as UNDP, IMF technical assistance). For the academic literature, it fills a void between the literature of technology-centered digital tax, which often considers digitalization to be enough on its own (Bentley, 2020; Bassey et al., 2022), and the institutionalist literature focusing on organizational and regulatory prerequisites (Sari et al., 2026).

1.4. Research Problem

After 22 years of incremental investment in e-government, external interventions, and the creation of several digital-transformation roadmaps, Iraq's non-oil revenue base remains among

the narrowest in both oil-exporting and fragile states, and its overall ranking in the UN's assessment of 193 countries is in the mid-to-low tier. The research problem is whether, and how, digital transformation in fiscal administration is likely to contribute to the economic dimension of sustainable development in an oil-rentier, institutionally weak economy like Iraq, given the mixed outcomes in non-oil revenues and technological investments thus far.

1.5. Research Gap

Three gaps motivate the study. First, the literature on digital tax administration relies on cross-country panel studies (Sari et al., 2026) or single-mechanism studies of e-filing and e-invoicing (Okunogbe & Santoro, 2023), and seldom focuses in detail on a single fragile, oil-dependent state. Second, literature on digital government in Iraq focuses more on corruption and service delivery, while sustainable development literature focuses more on the fiscal-sustainability channel (Adam & Dzang Alhassan, 2021). Third, most studies do not disaggregate the EGDI into its sub-indices (online services, telecoms infrastructure, and human capital) to identify which, if any, are growing or declining at the same rate as fiscal results.

1.6. Research Significance

The study is important because Iraq's 2023-2025 budget cycle has already been affected by the shortfall in non-oil revenue (Shafaq News, 2025), and because crude oil prices have fallen globally since 2025, making revenue diversification more urgent (International Monetary Fund, 2025a). This not only informs the broader literature on digital-government comparisons, but is also practically relevant for developing a more accurate, evidence-based understanding of what fiscal sustainability can and cannot be achieved through digital transformation.

1.7. Study Objectives

This study has four main objectives. First, it reviews the existing literature to identify the key components of digital transformation in fiscal policy, with particular emphasis on the economic dimension of sustainable development. Second, it compares the evolution of digital governance in Iraq from 2003 to 2024 with that of selected comparator countries. Third, it examines the relationship between Iraq’s digital fiscal reforms and their outcomes in non-oil revenue generation, fiscal balance, and economic growth from 2020 to 2025. Finally, it draws policy-relevant conclusions on the optimal sequencing of digital investment alongside institutional and human capital reforms..

1.8. Research Questions

RQ1: What is the trend in the development of digital government in Iraq from 2003 to 2024, compared with other countries in the region and worldwide?

RQ2: What is the relative position of Iraq in terms of the digital transformation components (online services, telecommunications infrastructure, human capital)?

RQ3: What is the observed linkage of digital-fiscal reform programs with the mobilization of non-oil revenues, Iraq's fiscal balance and non-oil growth in Iraq?

RQ4: What theoretical models based on the TOE and institutional theories best explain the mismatch between digital investment and fiscal results in Iraq?

1.9. Organization of the Paper

The rest of the paper will follow. The Literature Review provides a context for the study by placing it within the fields of research on digital transformation, tax administration and sustainable development. The TOE-institutional lens is developed in the Theoretical Framework section. The Research Objectives, Research Questions, Methodology, Data Collection and Data Analysis approach are then presented, followed by Results, Discussion and Conclusion.

1.9.1. Digital Transformation and Fiscal/Tax Administration

There is a large and growing body of literature that documents the impact of digital technology in tax and fiscal administration. A PRISMA-guided systematic review of 64 academic studies (2015-

2025) by Sari et al. (2026) concludes that digital technologies, big data analytics, e-filing, e-invoicing and interoperable platforms, consistently benefit tax compliance, administrative efficiency and transparency, but that the benefits of technology alone are mediated by the capabilities of the organizations involved (along with leadership, human capital, governance), and moderated by the institutional environment (legal frameworks, transparency, external pressures). IMF evidence across countries confirms that measured revenue benefits stem from mandatory e-filing, e-invoicing, and electronic fiscal devices, but these benefits vary and depend on complementary legislative and administrative changes (International Monetary Fund, 2023; Okunogbe & Santoro, 2023).

Previous research in this area includes Alink and Van Kommer's (2011) Handbook on Tax Administration, which frames digitalization as part of a broader agenda of administrative modernization, and Bentley's (2020) study of workforce transformation as digital tools are introduced. Bassey et al. (2022) introduce a conceptual model of digital tax administration that prioritizes the preconditions for digital tax administration, including infrastructure, legal conditions, and human capital, while Owens and Hodžić (2022) explore the potential and challenges that blockchain represents for tax administration, and argue that it shouldn't be seen as a panacea. In their report, Olowska and Owens (2021) explore how African governments have implemented new technologies without investing in parallel capacity-building for the tax administration on the enforcement side and taxpayer education side, thus limiting revenue results, which is relevant to the context in which the Iraqi tax administration is implemented.

Similarly, at the continental level, Arthur et al. (2022) suggest that the COVID-19 crisis has fast-tracked the discussion of digital-economy taxation in Africa, but that the revenue mobilization benefits in this area are limited by informality and low-quality digital infrastructure in places other than major urban centres, which is the situation in Iraq outside Baghdad and the Kurdistan Region.

1.9.2. Digital Government, E-Governance, and Sustainable Development

There is a well-established relationship between information/ communication technology and the Sustainable Development Goals (SDGs). Adam and Dzang Alhassan (2021) show that ICT diffusion is linked to progress on a variety of SDGs, including those with an explicit economic dimension, such as decent work and economic growth; industry, innovation and infrastructure. The SDG-acceleration narrative is not equally applicable across country contexts because the UN's very own E-Government Survey 2024 explicitly frames digital government as an accelerator of SDG attainment, and FedScoop's (2024) coverage of the same survey shows that persistent regional disparities (with Africa and fragile states trailing) mean that the narrative is not equally applicable to all country contexts.

The literature on e-governance has focused on anti-corruption and service delivery motives for Iraq specifically. To achieve viable development in Iraq, Mutar (n.d.) suggests a comprehensive e-government transition model that highlights two preconditions for achieving e-government gains: first, citizen trust, and second, institutional readiness. OurIraq (n.d.) also views e-governance as crucial to SDG 16 (Peace, Justice and Strong Institutions), but does not go so far as to determine the fiscal impacts. Shafaq News (2024) reports that Iraqi officials associate the 'Ur' digital platform with a potential 17 trillion Iraqi dinar increase in government revenue if fully implemented, illustrating the scale of expectations placed on digital reform relative to currently realized outcomes.

1.9.3. Iraq's Fiscal and Macroeconomic Context

The IMF has described Iraq's fiscal system as among the most oil-dependent of its peers several times. Other oil exporters, oil-exporting fragile and conflict-affected states (oil-FCAS), and Middle East, North Africa, Afghanistan, and Pakistan (MENAP) oil exporters have all been highlighted as having the lowest share of non-oil revenue in non-oil GDP from 2011-2023 (International Monetary Fund, 2024b). Even the composition of the non-oil revenue that does exist has been dynamic, with non-tax revenues (fees, state-owned-enterprise income) averaging about half of non-oil revenue, while direct taxes accounted for about a quarter (International Monetary Fund, 2024b). The fiscal situation has deteriorated markedly, with the fiscal deficit rising from

1.1% of GDP in 2023 to an estimated 4.2% of GDP in 2024, and the current account surplus shrinking as payment arrears resurface (International Monetary Fund, 2025a). The Bertelsmann Transformation Index also indicates a widening deficit (7.7% of GDP in 2023, estimated 8.0% in 2024) and public debt of 44.5% of GDP in 2023 (Bertelsmann Stiftung, 2026); these slight deviations in numbers between each IMF and BTI vintage are due to reporting dates and methodological adjustments and not to contradictory evidence, and both series confirm the same deterioration.

1.9.4. Synthesis and Positioning of the Present Study

The literature suggests three propositions that will be explored empirically in this study for the case of Iraq: (a) in the general cross-country evidence, digital technology adoption is necessary but not sufficient for fiscal gains, unless it is complemented by organizational and institutional complements (Sari et al., 2026); (b) in the general cross-country evidence, digital government is associated with SDG progress, but country-level outcomes depend on the starting institutional conditions (Adam & Dzang Alhassan, 2021); and (c) the general cross-country evidence is that commitment to fiscal benefits from digital government is less developed than its commitment to progress toward SDG in Iraq; the fiscal channel is comparatively under-examined and this study will address this gap.

1.10. Theoretical Framework

This study draws on three complementary theoretical approaches recently applied by Sari et al. (2026) in the context of digital tax transformation: the Technology-Organization-Environment (TOE) approach, institutional theory, and the dynamic capabilities approach.

The TOE framework (Tornatzky & Fleischer, 1990) provides an explanation of the process of the adoption of organizational technology as a function of three contexts: Technological context (availability and characteristics of the relevant digital tools, like e-filing platforms and interoperable databases); Organizational context (leadership, human capital, governance structures within the tax and fiscal administration); and Environmental context (legal framework, market and donor pressures, public trust). Applied to Iraq, the TOE framework suggests that gains in one area (e.g., telecommunications infrastructure improvements) will not automatically translate into fiscal improvements, unless coupled with gains in other areas (e.g., a workforce of revenue administrators who are digitally competent, a tax policy that is clear, public trust extends to revenue administration, and donors are on board with the revenue administration strategy).

The TOE framework is complemented by institutional theory (DiMaggio & Powell, 1983; Scott, 2014), which explains the contrasting outcomes achieved by formally similar digital reforms in countries with varying regulatory, normative, and cultural-cognitive institutions. For Iraq, institutional theory can help us understand why, despite the emergence of a formal platform (bilingual, ‘Ur’ for instance), it doesn't automatically lead to revenue mobilization, with the coercive pressure to adopt digital systems (from the Council of Ministers on behalf of the Ministry of Finance or international partners) exceeding the normative and cognitive legitimacy of the reform among taxpayers and lower-tier bureaucrats, creating a lag between technological implementation and behavioural compliance.

The dynamic capabilities perspective (Teece, Pisano, & Shuen, 1997) introduces a time dimension: Digital transformation is a journey rather than a one-time event, and initial institutional and infrastructure decisions limit or facilitate subsequent steps. This path dependence is reflected in Iraq's EGDI history, which shows incremental, uneven progress rather than a quick jump.

At the micro level, factors of technology acceptance are relevant, which include the perceived usefulness of, and ease of use of, new digital fiscal tools and the facilitating conditions of digital literacy and internet access, both of which are limited outside of Iraq's key urban centers.

Figure 1 summarizes this theoretical model: technological capability operates through organizational capability (mediator) and is moderated by the institutional environment, while the system's path-dependent evolution over time shapes technological capability. The core expectation is that Iraq's telecommunications-driven digital progress will show a weak association with fiscal

outcomes unless organizations and institutions provide complements; this expectation is tested descriptively in the Results and is the study's central hypothesis.

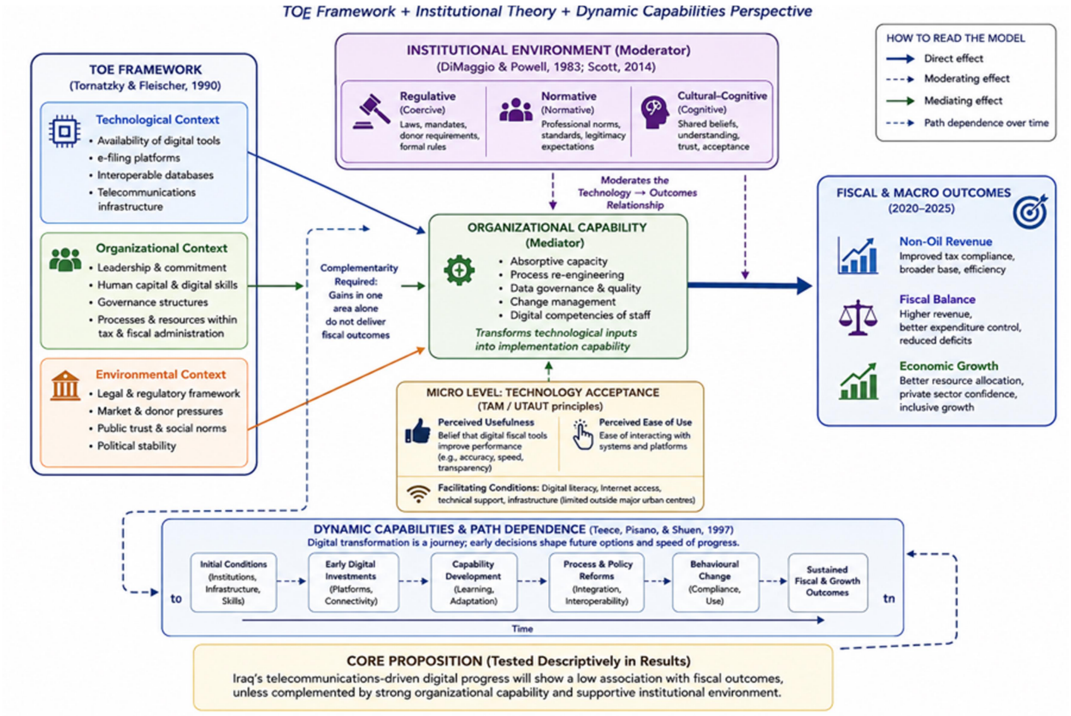


Figure 1. Theoretical Model

1.11. Research Objectives

This study has four main objectives. First, it synthesizes academic and institutional literature that links digital transformation in fiscal policy with the economic dimension of sustainable development. Second, it builds a longitudinal benchmark of Iraq's digital government development from 2003 to 2024. The benchmark uses the United Nations E-Government Development Index (EGDI) and its three sub-indices: the Online Service Index, the Telecommunications Infrastructure Index, and the Human Capital Index. It compares Iraq with Saudi Arabia, the United Arab Emirates, Jordan, Estonia, and the global average. Third, it examines Iraq's non-oil revenue share, fiscal balance, and non-oil GDP growth from 2020 to 2025 in relation to the timing of major digital fiscal reform initiatives. Finally, it interprets the observed patterns through an integrated theoretical lens that combines the Technology–Organization–Environment (TOE) framework with institutional theory, and derives policy implications for sequencing digital investment alongside institutional reform.

1.12. Research Questions

RQ1: How has Iraq's E-Government Development Index evolved between 2003 and 2024, and how does its trajectory compare with regional and global benchmarks?

RQ2: Which EGDI sub-component (online services, telecommunications infrastructure, or human capital) has driven Iraq's overall digital-government trajectory, and which has lagged?

RQ3: What is the observed pattern between Iraq's digital-fiscal reform initiatives (such as the 'Ur' platform and the 2024 Strategic Management Guide for Services) and subsequent non-oil revenue, fiscal balance, and growth outcomes?

RQ4: How can the TOE framework and institutional theory jointly explain the divergence between Iraq's technological investment and its fiscal outcomes?

2. Method

This study uses a qualitative-quantitative documentary research design that does not involve a primary survey or interviews, nor does it model or estimate a panel of econometricians; that is, only secondary, public data were used, and none of the figures reported below were simulated or estimated by the authors. On the one hand, the exploratory nature of the context-specific questions is reflected in the design; on the other hand, the specific questions were asked because information on these matters is not publicly available and, therefore, can be used for independent academic research at the micro-level of administration in Iraq (such as compliance records of individual taxpayers).

The research method involved synthesizing three mixed methods. The literature review and development of the theoretical framework were conducted through a structured narrative review of peer-reviewed journal articles, IMF/World Bank institutional reports, and UN publications from 2011 to 2026. Second, the UN E-Government Development Index (2003-2024) was split into the three components of the indeks Online Service Index, Telecommunication Infrastructure Index, and the Human Capital Index, and a longitudinal descriptive analysis of each was created for Iraq and five comparator cases (Saudi Arabia, the United Arab Emirates, Jordan, Estonia, and the global average). Third, IMF data from Article IV and Selected Issues reports for 2020-25, using the oil prices and adjustment parameters from the previous analysis, were used to build a time-series descriptive analysis of the fiscal indicators of the Iraqi economy: non-oil revenue share, fiscal balance, non-oil GDP growth, and oil price required to balance fiscal position. The two time series are analyzed together, both graphically (through simple display of trends) and statistically (by means of simple correlations), as both periods of data can be compared since there are but a few years of data that overlap; this analysis is therefore descriptive and associative and excludes causal and inferential or predictive aspects, which are valued distinctions and must be emphasized throughout.

2.1. Data Collection

Four key types of primary institutional sources were used to obtain data. (1) E-government indicators: UN Department of Economic and Social Affairs (UN DESA) Knowledgebase on E-government, publishing the E-government indicators (EGDI) and its three sub-indices for all 193 UN member states in eleven survey rounds (2003, 2005, 2007, 2008, 2010, 2012, 2014, 2017, 2020, 2023, 2024) (UN DESA, Division for Public Institutions and Digital Government, 2024; UN DESA, 2024). Macro-fiscal indicators: IMF Article IV consultation reports and Selected Issues papers for Iraq (IMF, 2024a, 2024b, 2025a, 2025b): These are those indicators, including the non-oil revenue share, the fiscal balance, non-oil GDP growth, international reserves, and the required oil price to maintain a balanced budget. (3) Governance and socio-economic context indicators: Bertelsmann Transformation Index 2026 (Bertelsmann Stiftung, 2026), Freedom in the World report 2024 (Freedom House, 2024) and World Bank Open Data (World Bank, 2026). (4) Policy and news documentation of specific measures for Iraq's digital/fiscal projects drawn from UNDP, the Iraqi Council of Ministers' communications as reported by Shafaq News, 2024, 2025 and Iraqi News, 2025 and the OurIraq policy brief (n.d.) was used to document when and what reform initiatives are referenced in the Results/Discussion sections. The data in this paper are cited from these documents freely released into the public domain and direct data were not re-calculated, imputed or fabricated by the author.

2.2. Data Analysis

Two analyses were performed. First descriptive trend analysis: Tabulation and charting of the EGDI series and sub-components for Iraq; visual and tabular assessment of relative position and rate of change (shown in accompanying Excel workbook, and summarized in Results section), for 2024 against the 5 comparator cases. Second, descriptive fiscal-trend analysis: The degree of Iraq's non-oil revenue share; fiscal balance; and the growth rate of non-oil GDP sectors for 2020-2025 were calculated and analyzed with consideration of the timing of digital fence-investments announcements to determine whether general periods of digital investment were similar or not, and whether they coincided or preceded the consecutive improvement periods in the fiscal indicators. Due to limited overlap among survey years (2020, 2022, 2024) and the few years of available annual fiscal data, no regression or hypothesis-testing procedure is used, the analysis is limited to describing trends, calculating percentage points of change, and calculating simple

correlation coefficients in a clearly labeled workbook, and the results are reported with appropriate caution about small samples of comparable years.

3. Results and Discussion

3.1. Iraq's Digital-Government Trajectory, 2003-2024

Iraq's Unified Framework indicators (EGDI) and its three sub-indices for each round of the UN surveys from 2003 through 2024 can be seen in Table 1 (also available as an Excel workbook in the EGDI Iraq Trend file). Overall, the EGDI for Iraq fell from 0.000 in 2003 (where there was no participation, as well as data unavailability in that round) to a low of 0.269 in 2008, due to the effects of postconflict instability, and then gradually rose to 0.436 in 2020, followed by 0.438 in 2022, and 0.457 in 2024 (UN DESA, Division for Public Institutions and Digital Government, 2024). Six years later, Iraq's worldwide rank rose from 155th (of 193) in 2018 to 148th in 2024, an improvement of seven positions.

Table 1. Iraq's E-Government Development Index (EGDI) and Sub-Indices, 2005–2024

Year	EGDI	Rank (of 193)	Online Service Index	Telecom. Infrastructure Index	Human Capital Index
2005	0.3334	118	0.0538	0.0164	n/a
2008	0.2690	151	0.1070	0.0127	0.6922
2010	0.2996	136	0.1524	0.0552	0.6956
2012	0.3409	137	0.2876	0.1201	0.6151
2014	0.3141	134	0.1969	0.2173	0.5283
2016	0.3334	141	0.3551	0.1647	0.4803
2018	0.3376	155	0.3194	0.1840	0.5094
2020	0.4360	143	0.3353	0.5370	0.4358
2022	0.4383	146	0.2060	0.5201	0.5888
2024	0.4572	148	0.1876	0.6874	0.4967

Source: United Nations Department of Economic and Social Affairs, Division for Public Institutions and Digital Government, E-Government Knowledgebase (2024). Values for 2003 (EGDI = 0.000) are omitted as they reflect non-assessment rather than a substantive score.

However, disaggregating Table 1 shows that the Telecommunication Infrastructure Index increased rapidly, from 0.016 in 2005 to 0.687 in 2024, reflecting greater mobile and internet penetration. The Online Service Index, which measures the variety and quality of government services provided in Iraq, shifted toward lower importance by 2024 (0.188) than in 2016 (0.355), despite rising connectivity. The Human Capital Index has been moving in a relatively small range (0.44-0.70) and there is no directionality. With this pattern, infrastructure innovation continues, even as online service provision may not increase. This interpretation is based on this pattern: accelerating change in infrastructure, while online service provision remains flat or decreases.

3.2. Iraq in Comparative Regional Context, 2024

Iraq's 2024 EGDI position relative to regional and global comparators can be seen in Table 2 (see also workbook sheet 'EGDI_Comparators_2024').

Table 2. EGDI Scores and Rankings of Iraq and Comparator Countries, 2024

Country	2024 EGDI	2024 Rank (of 193)	EGDI Group
Estonia	0.9727	2	Very High
Saudi Arabia	0.9602	6	Very High
United Arab Emirates	0.9533	11	Very High
Jordan	0.6849	89	High
Global average	0.6382	-	High
Iran	0.6564	101	High
Iraq	0.4572	148	Middle

Source: United Nations Department of Economic and Social Affairs, Division for Public Institutions and Digital Government, E-Government Knowledgebase (2024); global average from UN DESA (2024).

As illustrated by the UAE's score (38.495), which is 0.496 lower than Iraq's (38.677), both scores are nearly the same, suggesting that digital government outcomes depend not only on oil dependence but also on institutional and policy decisions.

3.3. Iraq's Fiscal Trajectory, 2020-2025

For Iraq, the key fiscal indicators obtained before and after the introduction of key digital-fiscal reforms in the 'Ur' platform expansion (2023–2024) and Strategic Management Guide for Services (2024–2026), are summarized and can be seen in Table 3 (see workbook sheet 'Iraq_Fiscal_Indicators').

Table 3. Iraq's Key Fiscal Indicators Before and After Digital-Fiscal Reforms, 2020–2024

Indicator	2020	2023	2024	Source
Non-oil revenue, % of total public revenue	n/a	7%	12%	Shafaq News (2025)
Oil revenue, % of total government revenue	n/a	~90%	n/a	U.S. EIA (2024)
Fiscal balance, % of GDP	n/a	+ (surplus)	-4.2%	IMF (2025a)
Non-oil real GDP growth, %	n/a	13.8%	2.5%	IMF (2025a, 2025b)
Oil price to balance budget, US$/barrel	$54	n/a	$84	IMF (2025a, 2025b)
Public debt, % of GDP	n/a	44.5%	n/a	Bertelsmann Stiftung (2026)
International reserves, US$ billion	n/a	n/a	$100.3bn	IMF (2025a)

Note: n/a = the specific figure is not reported for that year in the cited source, and is therefore not provided. There is a minor difference in the fiscal balance reported by the IMF (e.g., deficit in 2018 versus surplus in 2023) since the reports are released on different dates and revisions are performed regularly, and in the estimated fiscal balance using the Bertelsmann Stiftung, since the reports differ in date and modification cycles; in both instances, the direction and approximate size of the deteriorating fiscal balance is the same.

In the period from 2023 to 2024 during which digital-fiscal reform was most active, the share of non-oil revenue in government revenue almost doubled (from 7% to 12%; see Table 3), a positive development, but one that failed to reach the government's target of 20% and still leaves nine-tenths of government revenue tied to the oil industry (U.S. Energy Information Administration, 2024; Shaqiq News, 2025). During the same period, the fiscal balance worsened remarkably, the growth of non-oil GDP fell from 13.8% to 2.5%, and the break-even oil price increased from $54 to $84 per barrel, indicating that any additional non-oil revenue gains outweighed growth in expenditure commitments, notably the public-sector wage bill (International Monetary Fund, 2024a, 2025a).

3.4. Association Between Digital-Government Development and Fiscal Outcomes

Due to non-overlapping years of comparable non-oil revenue-share data, only two correlation exercises were mathematically created, and were not considered to be statistically informative since they did not permit the computation of an inferential statistic, it is not reported. On a descriptive basis, the baseline changes in Iraq indicated an increase in the EGDI between 2022 and 2024 (4.3% relative, or 0.019 absolute) and in the non-oil revenue share (71% relative, or +5 absolute) over the corresponding time period-which is a change in both dimensions that is consistent, but very small base change. This is expected based on the limited length of this time series and the difficulty that oil-price fluctuations and the public-sector wage policy pose to define any causal ME of public-sector wages on revenue mobilization as a digital-transformation effect, and interpreted as an indication of a possible weak positive correlation.

The results overall are broadly in line with the theoretical expectation formulated in the Theoretical Framework section which is that technological investment alone does not seem to be sufficient to stimulate fiscal transformation in Iraq. In the technological set-up of the TOE framework, this has been a true advance as in 2024, the Telecommunication Infrastructure Index of Iraq has increased considerably from 0.016 in 2005, giving Iraq a much better connectivity than 20 years ago. However, the drop in the Online Service Index since 2016 indicates that this infrastructure is not reflected in a corresponding growth in quantity and quality of actual digital public services, as would be predicted by the TOE framework that technology alone doesn't achieve

results unless followed by a solid organizational response (Tornatzky & Fleischer, 1990; Sari et al., 2026).

The very small but positive movement in non-oil revenue share, and a worsening overall fiscal position, reflect the organizational-institutional limitation in the literature. In contrast, Iraq's non-oil revenue structure is also skewed toward non-tax revenue (NTRE) (International Monetary Fund, 2024b), indicating that digital revenues have not yet relied heavily on direct taxes but rather on administrative taxes (fees, income from state enterprises) that support the formal tax base. This echoes Olowska and Owens's 2021 observation of low revenue capacities due to a limited focus on the formal tax base, even with the incorporation of digital technologies. However, the difference between the lofty words of such platforms as 'Ur' (which is supposed to bring in an additional revenue of 17 trillion Iraqi dinars to the State budget; Shafaq News, 2024) and the comparatively small revenue generated to date is explained by institutional theory (DiMaggio & Powell, 1983), which would predict that coercive adoption pressures from the Council of Ministers would exceed normative and cognitive legitimacy of digital compliance among taxpayers and lower-level administrative employees.

It bears comparison with the United Arab Emirates and Saudi Arabia. "Being a hydrocarbon-dependent Gulf economy is not by itself an obstacle to digital-government progress; sustained political commitment, strong investments in human capital (as measured by Human Capital Index scores), and coherent digital-government strategies (like Saudi Arabia's Vision 2030 digital programs) seem to be the key differentiating factors. The relatively low and erratic Human Capital Index scores (between 0.44 and 0.70 across two survey rounds) indicate Iraq's need for human-capital development, separate from additional infrastructure investment.

The decline in Iraq's headline fiscal indicators from 13.8% non-oil GDP growth to 2.5% growth, the fiscal balance from surplus to being in deficit of more than 3-4% of GDP, and the break-even oil price rising from $54 to $84 per barrel (International Monetary Fund, 2024a, 2025a, 2025b) must not be interpreted as evidence that digital reform has failed or that it is counterproductive. Instead, the results are in accord with the "dynamic capabilities" and "path-dependence" view of transformation (as put forward by Teece et al., 1997), with the reform of digital fiscalization in Iraq being still in a relatively early phase of a longer journey of transformation and with the revenue benefits, thus far, of the digital reconstruction reform agenda being driven negatively by pressure on expenditure sides, in particular the growth of the public sector workforce (International Monetary Fund, 2024a). This emphasizes that digital transformation is part of Iraq's fiscal sustainability approach, not a one-off measure.

Here may be some limitations to consider: The analysis is descriptive and associational; no causal conclusions are drawn, and only limited and brief overlap of the EGDI survey years and fiscal years' data is available to make causal conclusions. Second, it is difficult to find micro-level data on use, and compliance with digital tax tools, at an Iraqi level, and this makes it hard to distinguish the direct fiscal contribution of specific digital tax platforms (e.g, 'Ur'). Third, there are differences between the countries to be used for cross-country comparisons (UAE, Saudi Arabia, Jordan, Estonia) and Iraq that must be considered when making useful comparisons, although the direction of the comparison is informative: Iraq has had more conflict experience, many fewer conflicts responsible for the decline of Iraq's level of institutional maturity, and many fewer resources available to be included in the comparisons. Future studies would benefit from using the administrative level microdata from the Iraqi Ministry of Finance (IMF), if available, to assess the associations detected in the present study.

4. Conclusion

This study examined how the digital transformation of fiscal policy relates to the economic dimension of sustainable development in Iraq. The results show uneven progress in e-government. Telecommunications infrastructure improved sharply, with the EGDI Telecommunication Infrastructure Index rising from 0.016 in 2005 to 0.687 in 2024. Online public service provision, however, deteriorated: the Online Service Index fell from its 2016 peak of 0.355 to 0.188 in 2024. Iraq also ranked 148th on the overall index in 2024, well behind hydrocarbon-rich regional peers such as Saudi Arabia and the United Arab Emirates. During the 2023–2024 reform period, the non-oil share of total public revenue rose from 7% to 12%, a notable relative gain. Over the same period,

however, Iraq's overall fiscal position weakened sharply because of pressures unrelated to the digital reforms. Theoretically, the study applies Sari et al.'s (2026) conceptual synthesis, developed from general cross-country literature, to a concrete, data-based country case. In practice, the findings suggest three implications. First, Iraqi policymakers should turn improved connectivity into better online public services. Second, digital fiscal investment should be explicitly sequenced with human capital development, such as training tax and customs officials in data analytics, and with legal reforms that clarify taxpayer obligations under digital systems. This is consistent with the IMF's recommendation that Iraq adopt a VAT and broaden its formal tax base (International Monetary Fund, 2024b). Third, donors and international partners should keep realistic expectations, because digital tools alone cannot deliver expenditure discipline or structural non-oil diversification. The study is limited by its reliance on secondary data, the small overlap between EGDI and fiscal data, which prevents causal estimation, and imperfect matching of the comparator countries. Future research could use administrative data to measure the revenue effects of specific tools such as the "Ur" platform, extend the analysis to a wider panel of oil-exporting fragile states, and use primary surveys to test the institutional trust and technology acceptance mechanisms proposed in this study.

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