Drivers and Barriers in Libya's E-Government Implementation - A Case Study.

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Abstract. This study aims to identify and analyse the key drivers and barriers influencing the implementation of e-government initiatives in Libya's public sector, a developing country with a post-conflict context. Employing a combined theoretical framework based on TOE framework and UTAUT, this research adopts a mixed-methods approach. Semi-structured interviews with digital ecosystem multi-stakeholders, were conducted alongside closed-ended surveys. The findings reveal that e-government implementation in Libya is shaped by technological, organizational, and environmental factors, as well as user acceptance dimensions. The study underscores the importance of addressing structural and institutional challenges through a centralized, strategic approach to enable successful digital transformation. Recommendations include enhancing digital infrastructure, fostering public-private partnerships, improving digital literacy, and reforming public sector policies. The insights gained are not only applicable to Libya but also offer valuable lessons for other nations facing similar challenges in digital transformation.

Keywords. Drivers and Barriers, E-Government, Public Sector, Libya, TOE Framework, UTAUT.
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1. Introduction

Digital transformation is reshaping governance globally, enabling streamlined public services, enhanced transparency, and greater citizen engagement (Mergel et al., 2019). The adoption of e-government varies considerably due to socioeconomic, infrastructural, and governance disparities among countries (EGDI, 2023; Samuel et al., 2020). Developing nations particularly face challenges like limited ICT infrastructure, financial constraints, and governance weaknesses (Bwalya & Healy, 2010; Heeks, 2002).

Libya represents a pertinent case for investigating e-government implementation due to its complex post-conflict context. Despite substantial nominal GDP, literacy rates, and high mobile penetration (World Bank, 2022; GSMA, 2022), Libya struggles with public sector inefficiencies and corruption, ranking poorly in global governance indicators (CPI, 2023; EGDI, 2023). Political instability further complicates digital transformation efforts.

This study aims to identify key drivers and barriers influencing Libya's e-government implementation, suggesting actionable strategies for overcoming challenges. Specifically, it addresses:

- What are the key drivers for e-government implementation in Libya?
- What are the key barriers and challenges to e-government implementation in Libya?
- How can these barriers and challenges be addressed to facilitate successful implementation?

The study focuses exclusively on Libya's public administration sector and employs a mixed-methods approach to

analyze qualitative and quantitative data. Semi-structured interviews with stakeholders, surveys of public sector employees and citizens, and policy document reviews form the basis of the analysis. By employing thematic and statistical methods, the research aims to contribute to a nuanced understanding of e-government implementation in Libya and its broader implications for digital transformation in developing contexts.

2. Literature Review

2.1 Foundations of E-Government and Digital Transformation

E-government leverages ICT to improve public service efficiency, transparency, and citizen-government interactions (Musa et al., 2019; Malodia et al., 2021). Adoption rates vary globally due to economic disparities, infrastructural capabilities, and governance quality, highlighting barriers like political resistance, limited stakeholder involvement, and inadequate ICT infrastructure (Abied, 2017; Alsaeh, 2020; Al-Rawahna et al., 2019).

Digital transformation addresses these barriers through citizen-centric services, knowledge management, and institutional reform, improving accountability and public sector competence (Mergel et al., 2019; Alvarenga et al., 2020; Al Yami & Ajmal, 2019). The institutionalization of ICT through clear policies and norms significantly enhances public sector effectiveness, as demonstrated internationally (Manda, 2021; Di Giulio & Vecchi, 2023).

Key technologies driving e-government include social media, blockchain, and cloud computing, which improve communication, accountability, and efficiency (Tapscott & Tapscott, 2016; Al-Ruithe et al., 2018). E-government is further accelerated by increasing digital literacy and mobile technology adoption, aligning with societal behavioral shifts and user expectations (Mensah et al., 2022; Tang et al., 2021; Gounopoulos et al., 2020). Additionally, it serves as a strategic tool for reducing corruption through minimized human intervention (Khan et al., 2021; Adjei-Bamfo et al., 2019).

Despite these benefits, developing countries often encounter significant implementation hurdles including insufficient funding, limited expertise, employee resistance, political interference, and outdated governance frameworks (Dhonju & Shakya, 2019; Filgueiras et al., 2019; Cinar et al., 2019). Successful cases, such as Namibia's public access points for e-government, highlight inclusive strategies as critical for overcoming these barriers (Nengomasha & Shuumbili, 2022).

2.2 Libya's Public Sector and Digital Landscape

Libya's public sector reflects a rentier state model, with oil revenues constituting 90% of national income (CBL, 2022). Approximately 80% of the labor force works in civil service, and public sector wages account for over a third of government expenditures (World Bank, 2015; LAB, 2020). This dependency on oil has fostered inefficiencies, nepotism, and corruption in recruitment and administrative practices, undermining the sector's effectiveness (Vandewalle, 2012; Transparency International, 2023).

Historical efforts to reform the public sector, including workforce reductions and incentives for private sector growth, faced resistance from entrenched informal institutions and public employees (World Bank, 2015). Post-2011, political instability and economic challenges have further strained the public sector. Informal actors, such as tribal leaders and militias, exert significant influence, complicating governance and exacerbating inefficiencies (Tantoush, 2022).

To contextualize the broader theoretical and regional insights, it is critical to examine Libya's unique public sector dynamics, digital infrastructure, and past e-government efforts, all of which shape the country's current opportunities and persistent challenges in digital transformation. Libya's digital infrastructure remains underdeveloped, with limited rural connectivity and outdated telecommunications policies (USAID DECA, 2022). The Libyan Post Telecommunications & Information Technology Company (LPTIC) monopolizes the telecommunications sector, overseeing fiber networks and mobile operators, while regulatory functions are managed by the General Authority for Communication and Informatics (World Bank, 2015). Political instability has impeded infrastructure investments, resulting in $1 billion in damages to telecom facilities since 2011 (OECD, 2016).

Despite these challenges, Libya boasts high mobile penetration (169.6%) but low internet penetration (21%) and modest internet speeds (Ookla, 2023). Digital literacy remains low, with many citizens relying on social media rather than broader digital platforms (USAID DECA, 2022). Recent government initiatives, including the formation of the National Committee for Digital Transformation in 2022, aim to address these gaps and advance digital governance (Government of National Unity 394, 2022)

While Libya's digital infrastructure remains underdeveloped, recent initiatives signal a renewed interest in leveraging technology for governance. These infrastructural realities directly impact the implementation and

sustainability of e-government programs across the country.

E-government initiatives in Libya date back to the early 2000s but have faced significant setbacks due to political instability. Early efforts, such as the 2013 eLibya initiative, sought to modernize public services through ICT but were suspended following the 2014 conflict (Wynn et al., 2021). Subsequent projects, including the Ejraat Portal for administrative services, have demonstrated potential but remain limited in scope (Ministry of Economy and Trade, 2020).

The establishment of the National Committee for Digital Transformation in 2022 marked a renewed effort to develop a comprehensive digital strategy. This strategy emphasizes regulatory reform, capacity building, infrastructure development, and citizen participation, with a target for implementation by 2030 (GIA, 2022). However, progress has been slow, and Libya continues to rank poorly on global indices such as the UN E-Government Development Index (EGDI), where it placed 169th in 2022 (EGDI, 2023).

Although several e-government initiatives have been launched in Libya, their progress has been uneven and often hindered by systemic issues. A closer look at these challenges — alongside emerging opportunities — reveals the complex landscape in which digital transformation efforts are unfolding. Libya's e-government initiatives face numerous challenges, including inadequate infrastructure, low digital literacy, and entrenched corruption (Ahmed et al., 2013). Resistance to change within the public sector and a lack of trust in government institutions further complicate adoption (Forti, 2019). However, opportunities exist to leverage ICT for improving governance and service delivery, particularly by addressing systemic inefficiencies and fostering citizen engagement.

2.3 Synthesis and Research Gap

Libya's unique socio-political context and underdeveloped digital infrastructure significantly impede e-government adoption. Nonetheless, its youthful population, international support, and emerging strategies offer opportunities for progress. This research addresses existing gaps by analysing Libya's digital transformation potential comprehensively, offering insights applicable to other developing nations.

3. Methodology

3.1 Frameworks Applied

This study adopts a combined theoretical framework integrating the Technology-Organization-Environment (TOE) and Unified Theory of Acceptance and Use of Technology (UTAUT) models to provide a comprehensive understanding of e-government implementation in Libya. The TOE framework, developed by Tornatzky and Fleischer (1990), focuses on how technological, organizational, and environmental contexts influence adoption at the institutional level. In contrast, the UTAUT model (Venkatesh et al., 2003) centers on user-level acceptance factors, including performance expectancy, effort expectancy, social influence, and facilitating conditions. By combining these frameworks, the study captures both macro-level institutional drivers/barriers and micro-level user perceptions, which is particularly important in post-conflict contexts like Libya where fragmented institutions and varying user readiness coexist. This integrative approach is supported by prior research (e.g., Lee & Lee, 2014; Bouteraa, 2024), which highlights the value of combining TOE and UTAUT to gain deeper insights into complex adoption environments.

3.2 Data Collection and Analysis

A mixed-methods approach was employed to gather comprehensive data. The qualitative component involved semi-structured interviews with 23 key informants, including government officials, public sector employees, private sector representatives, and ICT experts. Interviewees were identified using a snowball sampling technique, where each participant recommended additional experts to be consulted. After conducting over 20 interviews, thematic saturation was reached, as responses became repetitive, and no new informants were suggested. This confirmed the adequacy of the sample for capturing a well-rounded understanding of the topic. The quantitative component consisted of a survey administered to 419 respondents, including citizens and public sector employees. The survey featured closed-ended questions to measure perceptions of e-government initiatives and assess the impact of technological, organizational, and environmental factors. The sample size exceeded the minimum threshold required for descriptive and inferential statistical analysis, ensuring robustness and representativeness within the scope of the study.

Qualitative data from the interviews were analyzed using thematic analysis to identify recurring patterns and underlying narratives. This approach allowed for the extraction of key themes related to the drivers and barriers of e-government implementation. Quantitative data from the survey were analyzed using descriptive and inferential statistical techniques, including regression and correlation analyses. These methods helped identify

relationships between variables and assess the significance of technological, organizational, and environmental factors in shaping e-government adoption.

3.3 Ethical Considerations

Ethical approval was obtained before data collection, ensuring compliance with guidelines for research involving human participants and data privacy and anonymity.

3.4 Validity

To ensure data validity, both the interview questions and the survey questionnaire were developed based on the combined model of the TOE and UTAUT and reviewed by experts in the field. Moreover, a pilot test was conducted to ensure the clarity and relevance of the questions. The survey and interview guides are available upon request for research transparency.

4. Findings

This chapter presents the main findings from the mixed-method data collection process, divided into quantitative and qualitative sections. The analysis highlights the interconnected themes and correlations between the two methods.

4.1 Quantitative Analysis

Survey respondents evaluated Libya's ICT infrastructure as moderately adequate for e-government implementation. However, gaps in technological compatibility and innovation were noted, particularly regarding system interoperability and reliability. Despite these challenges, respondents expressed confidence in their ability to use ICT and adapt to digital services. This aligns with expert observations, which highlight the need for targeted infrastructure upgrades to meet future demands.

Leadership, organizational culture, resource availability, and readiness emerged as critical organizational factors influencing e-government initiatives. Survey respondents rated leadership effectiveness as low, citing a lack of strategic direction and inconsistent promotion of e-government projects. Resource availability was also identified as moderate, reflecting a misalignment between institutional needs and allocated budgets. These findings echo expert concerns about fragmented strategies and limited leadership competencies within public institutions.

Political instability was highlighted as the most significant environmental barrier, with 77% of respondents identifying it as a major hindrance to e-government adoption. Additionally, only 48% of respondents were aware of existing legal frameworks supporting e-government, underscoring the need for regulatory reforms and increased public awareness.

Survey participants overwhelmingly agreed on the benefits of e-government, particularly in enhancing efficiency, transparency, and communication between citizens and the government. However, effort expectancy scores revealed challenges related to user accessibility and system design, with respondents citing issues such as non-user-friendly interfaces and limited alignment with users' technical expertise.

Respondents noted moderate social influence from peers and superiors in encouraging e-government adoption, suggesting that societal norms and workplace environments play a role, albeit not a decisive one, in shaping attitudes toward digital services.

Facilitating conditions, including training, technical support, and resource availability, were rated as low. This reinforces expert views on the lack of capacity-building initiatives and support mechanisms necessary for successful e-government implementation.

Key barriers identified by respondents include leadership quality, institutional structure, and lack of strategic management, with financial resources deemed less critical. Conversely, drivers such as reducing corruption, increasing transparency, and improving service quality ranked highest, reflecting public demand for accountability and efficiency.

4.2 Qualitative Analysis

Experts emphasized the administrative complexities hindering e-government adoption, including overlapping mandates, a lack of procedural guides, and weak leadership. Political conflict and the absence of legislative

oversight exacerbate these issues, creating a fragmented and inefficient public sector.

Experts acknowledged the potential of Libya's extensive fibre optic network but noted significant disruptions due to armed conflict, regulatory constraints, and unreliable power supplies. The government's monopoly over telecommunications infrastructure was identified as a key obstacle, limiting private sector participation and innovation.

A critical shortage of qualified IT personnel in the public sector, coupled with insufficient capacity-building initiatives, was highlighted. Experts also pointed to cultural resistance among employees and decision-makers as a barrier to adopting digital technologies. High reliance on individual initiatives further undermines institutional progress.

Experts observed a high level of digital literacy among Libya's young population but noted gaps in decision-makers' understanding of technology. Citizen trust in digital services remains low due to prior negative experiences, emphasizing the need for reliable, user-centric solutions and robust public communication strategies.

Both experts and survey respondents noted the limited availability and reliability of digital government services. Successful initiatives, such as the Marriage Facilitation Fund, demonstrate the potential for effective e-government when backed by strategic planning, private sector partnerships, and integration with existing systems.

Experts identified the private sector as a critical partner for e-government implementation, particularly in providing infrastructure and hardware. However, regulatory barriers, lack of trust, and limited investment opportunities hinder private sector involvement.

Political instability and weak leadership were identified as major obstacles to e-government initiatives. Experts emphasized the importance of consistent leadership and strategic vision, noting that fragmented governance and frequent leadership changes undermine project continuity.

Outdated and inconsistent legal frameworks were cited as significant barriers to digital transformation. Experts highlighted the absence of laws recognizing electronic transactions and digital identities, as well as regulatory gaps that discourage private sector participation.

Corruption within the public sector presents a dual challenge, both obstructing digital transformation efforts and potentially being mitigated by increased transparency through e-government. Experts advocated for a multi-stakeholder approach to address these issues.

International organizations have played a significant role in supporting Libya's digital transformation efforts. However, the lack of a unified national strategy has resulted in fragmented initiatives, reducing their overall impact.

Based on the experts, the drivers and motives of implementing e-government initiatives in Libya vary from one institution to another and from leadership to another. However, the political aspect and agenda were presented heavily when the experts analysed the current government efforts in this field. Moreover, the understanding is that e-government may increase the citizens' trust, help decentralise government services, and unify the country, especially with current circumstances, by providing the same services to all of Libya, wherever they are. Facilitating those services to the citizens is also one of the motives, where some institutions have issues with long waiting lines and queues. Other institutions are interested in increasing transparency and accountability and fighting bureaucracy and corruption.

4.3 Finding Summary

Both qualitative and quantitative analyses highlighted political instability, inadequate infrastructure, leadership deficits, and regulatory challenges as critical barriers. Despite these obstacles, there is strong consensus on e-government's potential to improve transparency, accountability, and service delivery through targeted reforms, capacity building, and strategic collaboration.

5. Discussion and Recommendations

Administrative challenges, such as rigid hierarchies and lack of procedural guidance, significantly hinder e-government implementation in Libya. Promoting a digital culture, adopting standardized procedures, and fostering innovative leadership are essential to overcoming these barriers. Overlapping institutional mandates create inefficiencies and resource conflicts. A centralized authority should coordinate e-government efforts, ensuring strategic alignment and resource efficiency. Political instability impacts policy continuity and trust. A long-term

digital transformation strategy, supported by robust public-private partnerships and transparent civil society oversight, can mitigate these effects and foster resilience. Outdated legal frameworks must be urgently updated to support digital governance, including digital transactions and data privacy. Interim policies and international collaboration can bridge current legislative gaps. Corruption undermines both project procurement and public confidence. Implementing transparent procurement processes and digital accountability tools, alongside civil society monitoring, can enhance integrity and public trust. The shortage of qualified IT personnel requires targeted capacity-building and change management initiatives. International partnerships can supplement immediate expertise needs while developing local capabilities. Enhancing citizen engagement and digital literacy through user-centric digital services and public awareness campaigns is critical. Services should be accessible, reliable, and responsive to encourage widespread adoption. Finally, public-private partnerships and international collaborations are vital. These partnerships should prioritize knowledge transfer and equitable implementation, supporting Libya's long-term digital infrastructure growth.

6. Conclusion

This research provides a focused analysis of the multifaceted factors influencing e-government implementation in Libya. Using the TOE and UTAUT frameworks, it highlights how institutional structures, leadership, political stability, and citizen engagement shape digital transformation efforts. Key barriers identified include overlapping institutional mandates, lack of procedural guidance, public sector inefficiencies, political instability, poor strategic planning, and outdated legal frameworks. Addressing these requires the establishment of a centralized agency with executive support to ensure coherence and effective resource allocation. Leadership is a crucial enabler. Visionary leaders must define strategic direction, foster collaboration, and ensure sustained commitment. This effort must be reinforced by a legal framework that supports electronic transactions, privacy, and digital identity. Upgrading ICT infrastructure and developing human capital are essential. While Libya has foundational infrastructure, expanding coverage and ensuring interoperability are priorities. Capacity-building initiatives are also vital to address the digital skills gap. Combating corruption and fostering public trust are equally critical. Transparent procurement systems, digital accountability tools, and civil society oversight can help build legitimacy and trust in e-government initiatives. Furthermore, public-private partnerships and international collaborations are necessary to provide technical expertise, stimulate innovation, and support capacity development. E-government can contribute to national unity and decentralization by offering equitable access to services across regions. Though Libya's socio-political complexity poses challenges, this study provides actionable insights. Future research should explore the long-term impact of these initiatives and the role of emerging technologies like AI and blockchain. Ultimately, the findings serve as a roadmap for advancing inclusive, accountable, and effective digital governance in Libya and similarly fragile contexts.

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