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E-Government as a Strategic Foundation for Building the Digital Economy: Analytical Perspectives on Infrastructure, Governance, and Policy Challenges

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Abstract

The emergence of the digital economy has underscored the pivotal role of e-government as both a catalyst and prerequisite for sustainable socio-economic development. This paper provides an analytical study of e-government as a structural foundation for enabling digital transformation, with a focus on its conceptual underpinnings, defining characteristics, typologies, and necessary conditions for implementation. The study investigates the mechanisms that support effective adoption and critically examines the opportunities and constraints associated with integrating e-government within developing and transitional economies.

The analysis demonstrates that the successful establishment of e-government relies fundamentally on a robust communication infrastructure, universal internet accessibility, and the availability of advanced technological tools. Beyond technical requirements, institutional preparedness and comprehensive legal frameworks emerge as indispensable elements for ensuring transparency, accountability, and the protection of sensitive data. The study emphasizes that safeguarding data confidentiality, reinforcing cybersecurity protocols, and fostering public trust in digital platforms are critical to the long-term sustainability of e-government initiatives. Furthermore, the findings reveal that e-government extends beyond a mere technological shift, representing a governance paradigm that enhances efficiency, strengthens institutional performance, and facilitates inclusive access to public services. In addition, e-government is shown to be a strategic enabler of the digital economy by reducing administrative costs, promoting innovation, and creating favorable conditions for entrepreneurial ecosystems. However, the research also highlights persistent challenges such as the digital divide, resistance to institutional change, limited financial resources, and fragmented regulatory approaches that impede full-scale implementation in many contexts.

By situating the discussion within global best practices while considering regional specificities, this paper contributes to the academic and policy-oriented discourse on digital transformation. The insights presented are particularly relevant for policymakers, economic planners, and international organizations seeking to strengthen the foundations of the digital economy through e-government. The research concludes that a holistic strategy—encompassing infrastructure development, legal harmonization, institutional capacity-building, and citizen engagement—is required to maximize the transformative potential of e-government in driving sustainable economic modernization.

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Introduction

The tremendous advancements in information and communication technology (ICT) have brought about profound changes in various aspects of life—whether at the individual, family, societal, economic, or environmental level. These developments have directly altered the methods and tools of conducting economic activities, giving rise to what is known as the digital economy. The impact of this transformation has been largely positive, as the shift toward a digital economy is capable of generating new dynamics that enhance the economic interests of nations. It can be argued that the current era is indeed the era of the digital economy.

The growing attention to digital transformation stems from the remarkable achievements of technological progress, particularly the rapid diffusion and widespread use of the Internet. This information revolution has introduced new concepts and patterns, including e-management, e-media, e-commerce, and e-government, with e-government being among the most significant outcomes. ICT has necessitated the modernization of government institutions to align with global developments by adopting innovative approaches to public service delivery. This shift has redefined governmental performance by placing transparency, efficiency, and citizen-centered service provision at the core of public administration.

In light of these transformations, governments and public-sector institutions in both developed and developing countries have begun offering digital services under the framework of e-government to conduct their activities more efficiently and deliver services to citizens.

Based on the above, the research problem of this study can be formulated as follows:

What constitutes e-government?

What are the mechanisms for transitioning from traditional government to e-government?

2. Research Objectives

Through this paper, we seek to achieve the following objectives:

To provide a definition of the digital economy.

To present a theoretical discussion of the concept of e-government.

To identify the mechanisms for transitioning to e-government, along with the benefits and obstacles associated with this process.

3. Research Structure

This study is divided into the following main sections:

Section One: Theoretical framework of the digital economy.

Section Two: E-government—concepts, characteristics, and requirements.

Section Three: Mechanisms of transformation toward e-government, advantages, and challenges.

Section One: Theoretical Framework of the Digital Economy

1. The Emergence of the Digital Economy

With the rapid spread of ICT and the development of the Internet—covering almost all aspects of life, including economic activities—the term digital economy (or electronic economy) has become widespread. This section provides an overview of its main concepts.

The digital economy emerged with the rapid growth of the ICT sector, which contributed to sustained economic expansion. This development coincided with the prosperity experienced by the United States in the early 1990s, marked by rising economic growth, low unemployment and inflation, and budget surpluses. According to a 1999 study by the U.S. Department of Commerce, electronic technologies were central to the exceptional productivity gains achieved by the American economy for seven consecutive years (BOMSEL & GILLES, 1999, pp. 3–5).

These productivity gains can be explained by Joseph Schumpeter's theory of "creative destruction", which describes how innovations disrupt existing structures while creating new assets and job opportunities. The continuous diffusion of innovations forces industries to evolve, as in the case of computers, digital coding, and fiber optics, which threatened the survival of twentieth-century communication monopolies while simultaneously boosting productivity and growth.

The term digital economy gained wide popularity in 1992 under the label of the "Information Superhighway," promoted by U.S. Vice President Al Gore, who emphasized the importance of creating a national information

infrastructure to ensure accessible and affordable information for all Americans. Within a few years, the Internet expanded from serving a small elite to becoming a global phenomenon.

2. Definition of the Digital Economy

The concept of the digital economy can be traced back to the knowledge economy, first introduced by Fritz Machlup in 1962. In this framework, prosperity and growth depend increasingly on the effective use of intangible assets such as knowledge, skills, and creativity as strategic resources for competitive advantage (Rijal & Masai, 2013, pp. 57–58).

Later, Marc Porat introduced the term information economy, describing an economy where information-related labor surpasses traditional sectors like agriculture, industry, and services, especially in advanced economies. By the 1990s, with the advent of the Internet, the term digital economy came into use to denote an economy built on ICT and Internet-driven transformations.

The digital economy can thus be defined as an economy that relies on digital information technologies, employing knowledge and data as new resources for innovation and growth (Al-Razou, 2006, p. 13). It is also referred to as the Internet economy or web economy, encompassing digital customers, firms, technologies, and products (Najm, 2004, p. 204).

3. Characteristics and Foundations of the Digital Economy

According to Al-Najjar (2004, p. 26), the digital economy is characterized by:

3.1. Accessibility of Information: Success in the digital economy depends on individuals' and organizations' ability to engage in digital networks, supported by robust infrastructure.

3.2. Competition and Market Structure: ICT shapes competitive dynamics and market structures at both domestic and international levels, requiring integration across manufacturing, agriculture, education, finance, and investment.

3.3. Macroeconomic Prospects: ICT plays a vital role in accelerating economic growth, capital investment, and domestic and international e-commerce, while reshaping business practices.

3.4. High-Speed Dynamics: The digital economy is defined by rapid communication through satellites and email, demanding agile organizations with real-time information sharing.

4. Elements Shaping the Digital Economy

Several forces influence the structure of the digital economy, notably:

- Supporting digital infrastructure;
- The emergence of the Internet;
- New types of intermediaries;

- Changing marketing preferences of producers and consumers.

5. Manifestations of the Digital Economy

The digital economy has generated several new practices, including:

5.1. E-commerce: Initially introduced in the 1970s through electronic funds transfers among major financial institutions, e-commerce expanded in the 1990s to include online bookings, financial services, and other applications. By 1999, it had permeated nearly all sectors, in addition to the emergence of e-government and e-learning (Nour al-Hidaya & Joudat, 2008, p. 26).

5.2. E-government: The spread of digital technologies and e-commerce reshaped governmental structures, decision-making processes, and performance standards. E-government represents a virtual version of physical government, delivering public services through digital platforms, most notably the Internet.

5.3. E-marketing: Defined as the use of ICT to achieve marketing objectives via digital channels, direct networks, and interactive tools (Ahmed, 2009, p. 132).

5.4. Electronic Investment

Electronic investment refers to the type of investment that relies on the use of information and communication technologies (ICT) to conduct financial and investment transactions and exchange information in real time. This approach reduces investment risks, enhances information transparency, and minimizes both the cost and time of transactions.

Section Two: E-Government—Concepts, Characteristics, and Requirements

The Internet has recently become a driving force across multiple fields, and no country seeking to keep pace with the modern era can avoid moving toward a digital society. While the private sector was the first to adopt e-management—whereby companies leveraged the Internet to expand their markets and streamline transactions—the public sector soon followed. The United Kingdom was among the pioneers, adopting in 1999 a comprehensive strategy to modernize government operations, starting with local authorities and extending to central administrations. This initiative aimed to create a full-fledged e-government framework capable of taking proactive measures to address anticipated challenges rather than reacting after problems arise (Al-Safi & Mohamed, 2021, pp. 30–31).

1. Defining E-Government

Numerous terms are used interchangeably with e-government, such as e-business, e-management, and digital government. According to Al-Rifa'i (2009, p. 308), digital government represents a form of e-business. Differences in definitions largely reflect the perspectives of individual researchers. Below are some of the most recognized definitions:

- United Nations: Defines e-government as "the use of the Internet and the World Wide Web to deliver information and services to citizens." The OECD adds that it is the use of ICT, particularly the Internet, to

achieve better governance, including:

- Interactions between government and businesses (G2B).
- Interactions among governmental entities (G2G).

Interactions between government and its employees (G2E) (Sakhri & Mbareki, 2022, p. 239).

World Bank: Defines e-government as "the use by government agencies of information technologies (such as wide-area networks, the Internet, and mobile computing) to transform relations with citizens, businesses, and other arms of government," with objectives including greater transparency, improved service delivery, and reduced corruption.

International Telecommunication Union (ITU): Defines it as the use of ICT in government to deliver public services more efficiently and to strengthen democratic values and mechanisms.

Alternative Definition: E-government can also be understood as a comprehensive framework and integrated technological system distinct from traditional administration, involving a fundamental transformation of governmental, social, economic, and productive activities. Its ultimate goal is to deliver services more effectively than conventional administration (Al-Suwaifan, 2011, p. 51).

2. Characteristics of E-Government

E-government possesses several features that distinguish it from traditional government, including:

- Reliance on ICT as the primary tool for conducting operations, accompanied by continuous modernization, reducing dependence on paper-based and manual processes.
- Paperless administration: Traditional archives are replaced with electronic records.
- Timeless administration: Services are available around the clock, with most interactions conducted online.
- Improved quality of public services through simplified procedures, streamlined workflows, and reduced duplication.
- Reduced costs of delivering and developing services by utilizing modern technologies, thereby saving time and resources while ensuring quality.

3. Drivers Behind the Emergence of E-Government

The rapid development of ICT, especially in recent decades, has influenced nearly all aspects of life, compelling traditional governments to transition toward digital models. These drivers can be summarized as follows (Abbas, 2009, pp. 46–47):

3.1. Political Drivers:

- The emergence of globalization.
- Political competition to gain public approval through easier service delivery in advanced societies.
- World Bank support for e-government projects in developing countries.

3.2. Technological Drivers:

- The rise of the Internet.
- Decreasing costs of ICT hardware.
- Advances in data encryption technologies, increasing network trust and security.
- The invention of electronic signatures.

3.3. Economic Drivers:

- ✓ The expansion of e-commerce.
- ✓ Governments leveraging ICT to reduce costs.
- ✓ The shift toward privatization projects requiring enhanced communication across sectors.

4. Models of E-Government

Governments may adopt various types of e-government, either simultaneously or gradually:

4.1. Government-to-Citizen (G2C):

This model enables governments to provide citizens with information and services online, including communication, research tools, and enhanced participation (e-democracy and online voting). It also covers essential services such as online payments, appointment booking, and passport or license renewals (Al-Saif, 2013, p. 25). G2C initiatives aim to centralize citizen services in one platform, available 24/7.

4.2. Government-to-Business (G2B):

This involves delivering online services to the business community, including tax filing, company registration, and licensing. G2B services simplify procedures for small and medium-sized enterprises (SMEs), facilitate approvals, and enhance transparency in government-business interactions.

4.3. Government-to-Government (G2G):

This model covers electronic exchanges among government agencies, enhancing internal communication, information-sharing, and workflow efficiency. It serves as the backbone of e-government by promoting integration, coordination, and standardization across public institutions.

4.4. Government-to-Employee (G2E):

This model focuses on services for government employees, such as training, email, e-learning, and secure access to databases. G2E enhances internal efficiency and reduces administrative costs.

5. Requirements for Implementing E-Government

- Successful implementation of e-government necessitates several prerequisites that provide the essential infrastructure for this transformation (Lutfi, 2007, p. 6):
- Availability of advanced computer hardware and software applications supported by integrated ICT infrastructure.
- Accurate identification of government information, data, and forms to be digitized.
- Coordination among government agencies to avoid duplication and conflicts.
- Establishing multiple electronic payment systems (e.g., credit cards, utility bill add-ons).
- A legal framework regulating e-government transactions to safeguard citizens' rights and interests during the transition.
- Launching pilot projects requiring limited restructuring to ensure success before full-scale implementation.
- Continuous monitoring and evaluation of implementation outcomes with transparency.
- Training programs for government employees.
- Establishing an official government website for citizen inquiries and complaints.
- Public awareness campaigns about e-government services and how to use them.
- Political support and financial resources for the responsible implementation team.

Axis Three: Mechanisms of Transition to E-Government Management – Advantages and Challenges

The shift from traditional management to e-government does not occur suddenly or without preparation. Transitioning to e-government provides numerous benefits for both the government and citizens. However, adopting this new model is not without its drawbacks.

1. Stages of Transition to E-Government

There are several successive phases required for shifting from traditional administration to e-government, as follows:

1.1. Publication Stage:

This represents the birth stage, in which efforts focus on supporting, establishing, and developing the infrastructure of networks, equipment, and tools, in addition to publishing information through an online portal via the internet and government networks for members of society (Al-Sharif, 2010, pp. 74–75).

1.2. Interaction Stage:

This stage signifies the growth of data presentation across all government and private sectors. Information is exchanged with the public through websites, resulting in a fundamental transformation in procedures and the presentation of transaction processes and related forms.

1.3. Online Transaction Implementation Stage:

In this stage, services or transactions, or parts thereof, are executed electronically through the internet. This requires agreements with service providers to accept this method of completing transactions, issuing regulations to facilitate the process, and designing websites that include information pages on government services available online (Al-Ma'ani, Ahmed, Asmaa, & Nasser, 2011, pp. 117–118).

1.4. Integration of Government Services to Achieve E-Connectivity:

At this point, the government achieves interconnection among its entities through information exchange. Citizens and businesses can access services via a unified portal that brings together all ministries. Customers can conduct complete and secure transactions online after identity verification. The government's official portal at this stage provides secure access to all ministries and agencies, enabling citizens to reach services based on their needs and priorities. Most transactions are electronically processed through the site.

1.5. Fully Integrated E-Government:

At this advanced stage, the government provides all its services through a single website acting as a comprehensive portal that integrates services based on needs and functions rather than ministries. Institutional barriers are removed in favor of citizens. Individuals and businesses can view their records, manage accounts, and handle financial interactions with the government entirely online with confidence in data security and confidentiality. The government also invests in research, analysis, and public feedback to address shortcomings and further enhance its services (Al-Ma'ani, Ahmed, Asmaa, & Nasser, 2011, p. 118).

2. Advantages of E-Government

E-government is not an end in itself but rather a tool for achieving multiple benefits, including (Halima, 2018, pp. 172–173):

- ✓ Enhancing cooperation and information exchange between government institutions, thereby improving efficiency in achieving governmental objectives through seamless data flows.

- ✓ Saving time, effort, and money for all parties involved.
- ✓ Eliminating bureaucracy and mismanagement associated with traditional government structures by creating new rules, work environments, and efficient service delivery.
- ✓ Transforming from routine executive management to one characterized by innovation, research, planning, coordination, teamwork, productivity, transparency, and constant engagement with citizens.
- ✓ Reducing reliance on large central agencies and committees that consume resources without contributing to productivity.
- ✓ Optimizing the use of strategic resources.
- ✓ Developing communication activities
- ✓ Providing quantitative data to assist decision-makers.
- ✓ Promoting transparency by disclosing government policies and decision-making rationales.
- ✓ Reducing the costs of government services and processes.
- ✓ Facilitating global marketing of products and services.
- ✓ Strengthening inter-agency cooperation (Hossam & Khairbek, 2004, p. 124).

3. Challenges of Transition to E-Government

The transition to e-government faces multiple challenges, categorized as follows:

3.1. Legislative and Regulatory Challenges:

Providing services online requires a proper legal framework to ensure security, privacy, and trust. Without it, citizens may lose confidence if their data is compromised. Thus, specialized legislation is needed, drawing on international best practices (Al-Safi & Mohamed, 2021, p. 46).

3.2. Administrative Challenges:

Studies highlight several barriers, including:

- ➢ Weak planning and coordination at senior administrative levels.
- ➢ Failure to implement necessary organizational changes, such as restructuring departments and workflows.
- ➢ Lack of a clear strategic vision for ICT use.
- ➢ Dependence on outdated managerial methods.

- Resistance to change by employees fearing job insecurity.

3.3. Political Challenges:

The absence of coherent political planning or commitment can hinder adoption. The success of such a national project requires strong political will and support from the highest levels of government (Al-Safi & Mohamed, 2021, p. 47).

3.4. Financial and Technical Challenges:

These revolve around (Ashour, 2010, p. 32):

- High infrastructure costs.
- Limited financial resources for training and acquiring skilled ICT expertise.
- Weak financial allocations for system maintenance.
- Unequal access to internet services due to high usage costs.
- Multiple technical difficulties in ICT applications.

3.5. Human Challenges:

Key issues include:

- ✓ Widespread digital illiteracy in many developing countries.
- ✓ Lack of training and professional development for government employees.
- ✓ Poverty and low income levels limiting access to digital services.

Conclusion

E-government is a fundamental requirement for the digital economy, as it utilizes ICT to deliver public services more effectively. Its successful implementation requires significant resources to ensure quality service delivery and satisfactory performance levels. Nevertheless, obstacles such as digital illiteracy, weak infrastructure, and limited public awareness remain.

Study Findings

- The study reached the following key conclusions:
- Transitioning to the digital economy requires multiple enablers, including ICT, education, and research and development.

- E-government implementation requires sufficient infrastructure, internet access, computer availability, relevant legislation, and business process reengineering.

- E-government provides benefits such as enhanced inter-agency collaboration, economic development support, cost and time savings, and elimination of bureaucracy.

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Conflict of Interest

The author declares no conflict of interest related to the publication of this article.

Recommendations

Based on these findings, the study proposes:

- Enhancing ICT infrastructure to accelerate the digital transition and ensure affordability while supporting R&D
- Enacting legislation to safeguard intellectual property, data security, and privacy.
- Investing in human capital development and eradicating digital illiteracy.
- Raising policymakers' awareness of e-government's role in transparency and citizen engagement.
- Promoting e-government projects through educational campaigns in schools, universities, and institutes.
- Learning from international e-government experiences.

References

1. Mohamed Alsaif. (2013). Factors Affecting Citizens' Adoption of E-Government Moderated by Socio-Cultural Values in Saudi Arabia (Ph.D. dissertation). College of Social Sciences, University of Birmingham, UK, p. 25.
2. Olivier Bomsel, & Leblanc Gilles. (1999). Qu'est-ce que l'économie numérique. France: CERNA.
3. Qarawi, Ahmed Al-Saghir, & Nadhir, Abdelrazzaq. (2005). The Role of E-Government in Achieving Governmental Performance Effectiveness. International Scientific Conference on Distinguished Performance of Organizations and Government (pp. 154–155). Ouargla, Algeria: University of Ouargla.
4. Al-Ma'ani, Ahmed, Oreiqat, Ahmed, Saleh, Asmaa, & Jarradat, Nasser. (2011). Contemporary Economic Issues. Jordan: Dar Wael for Publishing and Distribution.
5. Al-Saadi, Rijal, & Massai, Samir. (2013). Knowledge Economy and Change in the Business Environment.

Al-Hikma Journal of Economic Studies, Konooz Al-Hikma, (21)

6. Al-Mulhim, Hossam, & Khairbek, Ammar. (2004). Internet Networks: Infrastructure and Impact on Institutions. Damascus: Dar Al-Ridha Publishing.
7. Badran, Abbas. (2009). E-Government: From Strategy to Implementation. Beirut: The Arab Institution for Studies and Publishing.
8. Bazzaz, Halima. (2018). E-Government: A Presentation and Evaluation of the Bahraini E-Government Experience. Journal of Sharia and Economics, 7(1).
9. Hassan, Mudhaffar Al-Razu. (2006). Foundations of the Digital Economy and an Introduction to Internet Economics. Riyadh: Research Center.
10. Al-Rifa'i, Sahar Qadouri. (2009). E-Government and Means of Implementation. Journal of North African Economics, 7.
11. Al-Suwaifan, Abdulsalam Habes. (2011). Managing Security Positions through Electronic Means: An Applied Study on the General Traffic Department in Kuwait. Alexandria: New University House.
12. Ashour, Abdelkarim. (2010). The Role of E-Management in Rationalizing Public Service in the United States and Algeria (Master's thesis). Faculty of Law and Political Science, University of Mentouri, Constantine, Algeria.
13. Sakhri, Abdelwahab, & Mbareki, Safaa. (2022). The Role of E-Management Requirements in Enhancing Performance Quality: An Exploratory Study. Journal of Al-Mohtarif for Sports Sciences and Social and Human Sciences, 9(1)
14. Al-Sharif, Abda Nouman. (2010). E-Government as a Strategy for Restructuring the Role of the State and the Functions of Its Institutions: Reality and Challenges – A Study on the GCC. Ph.D. dissertation, Faculty of Economic Sciences, Commercial Sciences, and Management Sciences, University of Algiers 3, Algeria.
15. Lotfi, Ali. (2007). E-Government between Theory and Applied Practice. Sixth E-Government Conference, Dubai.
16. Al-Najjar, Farid. (2004). Investment in Electronic Systems and the Digital Economy. Alexandria: Shabab Al-Jami'a Publishing.
17. Ahmed, Mohamed Samir. (2009). E-Marketing (1st ed.). Amman: Dar Al-Maysara for Publishing and Distribution.
18. Al-Hidaya, Mohamed Nour, & Khalaf, Sanaa Joudat. (2008). E-Commerce. Jordan: Dar Al-Hamid for Publishing.
19. Najm, Aboud Najm. (2004). E-Management: Strategies, Functions, and Challenges. Saudi Arabia: Dar Al-Mareekh Publishing.
20. Al-Safi, Hisham Abdelsayed, & Mohamed, Badr Eddine. (2021). E-Government and the Digital Economy. Al-Mutala'a Al-Qanouniya, 3(2