


REPORT

# MUNICIPALITIES AND DIGITAL TRANSFORMATION IN ARAB CITIES

## An Institutional Development Perspective

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**MUNICIPALITIES AND DIGITAL TRANSFORMATION IN ARAB CITIES:** AN INSTITUTIONAL DEVELOPMENT PERSPECTIVE

AUDI Report
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**About the Arab Urban Development Institute (AUDI),** a regional, non-governmental, and non-profit organization, established in 1980 by the Permanent Bureau of the Arab Towns Organization, with its headquarters in Riyadh, Saudi Arabia. AUDI is the first Arab institution specializing in urban development and municipal support. It has over 650 member cities across 22 countries and focuses on research and studies in urban policies, capacity development and training, and networking in the fields of urban development and municipal affairs.

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| AfDB | African Development Bank |
| AFD | French Development Agency |
| AI | Artificial Intelligence |
| CAPEX | Capital Expenditures |
| DTI | Digital Transformation Index |
| ERP | Enterprise Resource Planning |
| GCC | Gulf Cooperation Council |
| GIS | Geographic Information Systems |
| GIZ | German Agency for International Cooperation |
| GPS | Global Positioning System |
| IoT | Internet of Things |
| KPI | Key Performance Indicators |
| OPEX | Operational Expenditures |
| PPP | PublicPrivate Partnership |
| SDG | Sustainable Development Goals |
| UAE | United Arab Emirates |
| 4IR | Fourth Industrial Revolution |
| SAR | Saudi Riyal |
| Cyber VAWG | Cyber Violence Against Women and Girls |
| KSI | Keyless Signature Infrastructure |



# EXECUTIVE SUMMARY



Digital transformation is reshaping urban governance in Arab cities, enabling them to address challenges, optimize resource use, and improve quality of life. This report examines the digital transformation landscape in Arab cities through a rigorous qualitative methodology, which includes an extensive review of academic and grey literature and insights from 37 in-depth interviews conducted between July and November 2024. The interviews involved representatives from 21 cities across the Arab region and 16 experts on digital transformation, focusing on diverse urban contexts and varying levels of digital maturity. Two validation workshops further enriched the findings. The study emphasizes five strategic pillars essential for sustainable digital transformation: strategy and leadership, organizational change, human resources, financial resources, and stakeholder cooperation. By exploring these pillars, the report provides actionable recommendations to guide Arab cities in building resilient and inclusive digital ecosystems.

Arab cities are progressing through distinct stages of digital transformation, from traditional manual systems to cognitive cities characterized by AI-driven, adaptive intelligence. Foundational technologies like IoT and 5G enable data collection and connectivity; while enabling technologies such as GIS and AI provide actionable insights. Advanced tools like digital twins simulate urban scenarios for informed decision-making, and blockchain enhances data security and transparency. However, challenges such as cybersecurity risks, digital divides, and governance complexities remain. Cities must balance innovation, inclusivity, and privacy to create sustainable digital ecosystems.

Leadership and strategic planning are critical to the success of digital transformation. Arab cities exhibit significant variation in their approaches, ranging from formalized frameworks aligned with national agendas to fragmented or ad hoc strategies. Leadership styles—technocratic, entrepreneurial, or popular—affect priorities like efficiency, innovation, and citizen engagement. Stability in leadership and institutionalized strategies help mitigate disruptions caused by political transitions. Multi-stakeholder involvement integrates municipal departments, private sector partners, and citizens to align digital transformation efforts with local needs and public expectations.

Digital transformation is driving structural changes within municipal governments to improve coordination and efficiency. Many cities have established IT departments, cross-departmental teams, and leadership-led initiatives to oversee digital projects. These structures enable better resource allocation and strategic alignment but often encounter resistance from employees accustomed to traditional workflows. Technologies like GIS and mobile platforms are transforming service delivery, requiring robust change management and capacity-building programs to ensure successful adoption. National regulatory frameworks provide essential guidelines but can also constrain flexibility and innovation.

The success of digital transformation depends on a workforce equipped with advanced technical skills, yet significant gaps persist in Arab cities. Recruitment trends emphasize external talent and international cooperation to build capacity, while targeted training initiatives address internal skill deficits. Partnerships with global organizations expand access to advanced training, equipping municipal staff with the competencies needed to sustain digital innovation. Aligning these efforts with municipal strategies ensures that digital transformation is inclusive and responsive to local needs.

Financing digital transformation is a critical challenge, with cities employing varied approaches, including public-private partnerships, international aid, and innovative funding models. Budgetary constraints, dependency on external funding, and regulatory barriers limit financial flexibility. Cities with strong fiscal governance and integrated budgeting processes are better positioned to secure sustainable investments. By aligning financial strategies with broader development goals, municipalities can ensure the long-term viability of their digital transformation initiatives.

Inclusive digital transformation requires collaboration among cities, private sector actors, and citizens. Arab cities are adopting diverse models of stakeholder engagement to foster trust, reduce inequalities, and ensure equitable access to digital services. Citizen participation is enhanced through platforms that allow residents to contribute to decision-making and urban planning. Efforts to bridge the digital divide, such as improving access to affordable internet and offering digital literacy programs, address socio-economic disparities and promote inclusion. By prioritizing equity and fostering partnerships, cities can create governance models that empower all citizens and drive sustainable urban development.

Arab cities are navigating a complex and uneven digital transformation journey, with notable successes and persistent challenges. While investments in infrastructure, strategic planning, and capacity building have advanced digitalization in some cities, others lag due to resource constraints, institutional inefficiencies, and socio-economic disparities. The report underscores the importance of integrating strategy, skills, funding, organizational change, and stakeholder collaboration. By addressing these interlinked dimensions, Arab cities can harness digital technologies to enhance governance, foster innovation, and improve the quality of life for their populations, ultimately achieving resilient and inclusive urban ecosystems.

CHAPTER 01

# INTRODUCTION

**Digital transformation in urban settings has become increasingly crucial as cities worldwide seek to harness technology to enhance urban centers' quality of life, economic opportunities, and sustainability, while aligning with global urban development agendas like the SDGs and the New Urban Agenda.** Digital Transformation is not just a technology shift; it represents a fundamental change in how cities operate, addressing complex urban challenges by integrating advanced technological solutions. For cities, embracing this transformation allows for more efficient resource management, improved service delivery, and greater citizen engagement. As cities generate vast amounts of data, decision-makers can leverage digital tools to make informed choices that directly benefit urban communities, whether through real-time traffic management, enhanced public safety, or more accessible government services.

**Arab cities and cities worldwide face a multitude of challenges that span demographic pressures, climate vulnerabilities, resource management issues, and complex transportation needs.** As urban populations continue to grow, cities must address the strains on infrastructure, healthcare, and social services while adapting to environmental shifts and limited resources. In this context, urban resilience, consists of the capacity of cities to absorb, recover, and prepare for future shocks, is increasingly critical in a world characterized by complex, interconnected risk (ESCWA, 2021). Smart and digital solutions in the Arab region, provide cities with tools to enhance disaster preparedness, optimize resource use, and ensure continuity of essential services. For instance, digital platforms that integrate real-time data can improve emergency response systems, while smart infrastructure—such as energy grids and water management systems—can adapt dynamically to changing conditions.

**However, to harness the full benefits of digital transformation, several key conditions need to be met.** These conditions include robust infrastructure, skilled human resources, favorable policy frameworks, and reliable data management practice. Equally crucial is the need for an adaptable organizational culture within municipal bodies, which must be prepared to integrate and utilize new technologies effectively. In recent years, diverse dynamics have emerged in how different Arab cities approach the adoption of digital solutions. Some cities have made significant strides, while others face funding and technical expertise hurdles and need more institutional readiness. A comprehensive understanding of these varied experiences can provide valuable insights to guide cities across the region through the complexities of digital transformation. By identifying best practices, common obstacles, and context-specific solutions, stakeholders can better navigate this transformative journey, maximizing the potential for resilient, sustainable, and inclusive urban development.

**This report examines the digital transformation in Arab cities, focusing on how cities enhance resource management, improve services, and engage communities through diverse digital technologies.** It emphasizes five strategic pillars essential for sustainable digital transformation: strategy and leadership; internal processes; human resources and skills; financial resources; and stakeholder cooperation. By exploring these pillars, the report sheds light on how cities build digital urban economies, societies, and environments. This introduction provides an overview of key concepts and trends in the digitalization of Arab cities, along with the methodology used to gather insights into these practices.

## Concepts and definitions

**Digital transformation**[1] **is a process involving the comprehensive transformation of complex systems management and functioning through the adoption of digital technologies.** It is ***"a process that aims to improve an entity by causing significant changes in its properties through combinations of information, computing, communication and connectivity technologies"***(Vial, 2019; (p. 121)).

**Since the 1990s, several waves of digital technologies have arrived** (CEPAL, 2022). Each wave of technologies has a higher transformative potential than the previous ones. Currently, the new wave of digital technologies is known as Industry 4.0 or Fourth Industrial Revolution (4IR) and can profoundly transform most industries while posing new economic and social challenges (Ben Youssef, 2020). Industry 4.0 is defined as a new phase of the industrial revolution linked to the development of interconnectivity, automation, machine learning, and data processing in real-time. In addition, the scope of 4IR and its associated frontier technologies spans countless applications affecting all aspects of our lives, including health, education, manufacturing, agriculture, environment, water, energy, security, finance and transport (ESCWA, 2019). Industry 4.0 has led to the development of several brownfield and greenfield smart cities at the global and regional levels.

The **digital transformation of a city** describes a strategic dynamic process through which urban centers leverage digital technologies to optimize and enhance their systemic operations. This involves addressing urban challenges and improving the quality of life for citizens by applying innovative technological solutions. With the rise of diverse technologies, public decision-makers often face complex choices about which technologies to prioritize and implement. Technologies for digital transformation of the cities will be discussed in chapter 1.

## The State of digital transformation in Arab countries

**Over the past few years, the Arab region has achieved significant growth in digital transformation at the macro-economic level.** Indeed, mobile cellular coverage in the Arab States region, which refers to the percentage of the population living within a mobile cellular signal range, is estimated to be at 95% (ITU, 2021). More than 90% of the population is now within range of a 3G satellite, and 61.9% is within range of a mobile broadband signal (ITU, 2021).

**The Arab region has witnessed a substantial increase in internet usage (as shown in figure 1), rising from 28.8% in 2012 to 70.3% in 2022, equating to approximately 327 million users (UNDP, 2023).** The Gulf Cooperation Council (GCC) countries like Bahrain, Qatar, and the United Arab Emirates (UAE) lead with near-universal internet access, reflecting high investment in digital infrastructure. Countries such as Jordan and Morocco also demonstrate substantial growth, while nations like Yemen, Syria, and Somalia lag due to challenges related to political instability and economic barriers. This growth is particularly pronounced in GCC countries[2].

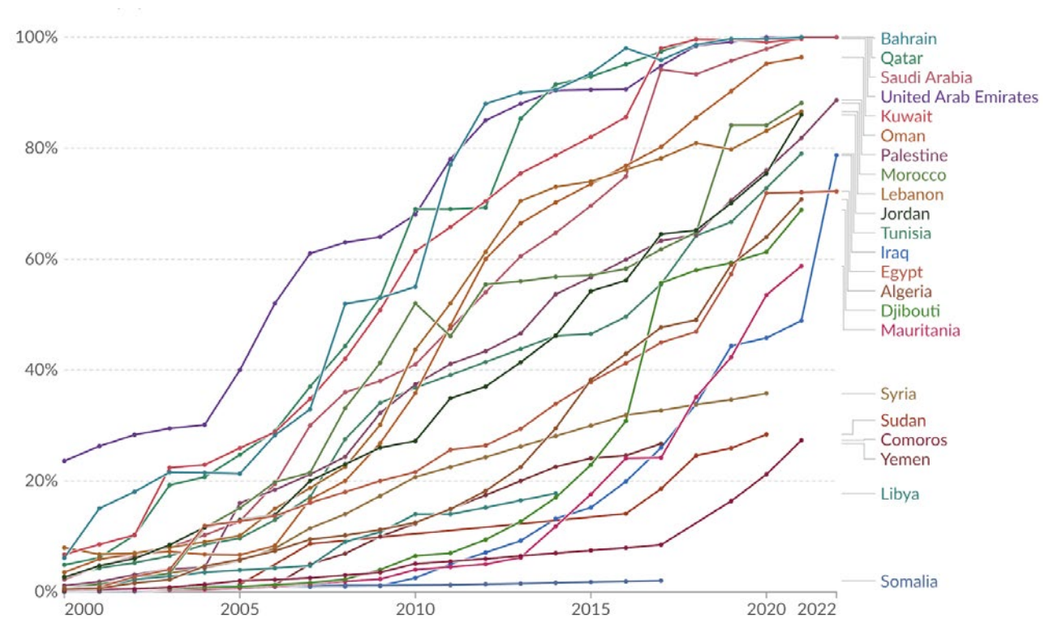



**Figure 1. Share of the population using the internet**
*(Source: International Telecommunication Union (via World Bank))*

1 It is not to be conflated with other close concepts like digitization, digitalization and digital transformation. Digitization is the process of converting analog information (e.g. text) into a digital format that computers can process. Digitalization has a broader meaning and refers to the use of digital technologies, data, and networking that result in new activities or changes to existing activities. Digital transformation goes one step further and considers the institutional, economic and social dynamics and impacts of digitalization.

2 For instance, as of January 2024, the United Arab Emirates (UAE) (Data Reportal, 2024) and Saudi Arabia (Data Reportal, 2024) reported internet penetration rates of 99%.

**The 2024 UN E-Government Development Index highlights wide disparities in digital advancement among Arab countries, as shown in figure 2.** Saudi Arabia, UAE, and Bahrain lead the region with highly developed e-government systems, followed by Oman, Qatar, and Kuwait, which rank above the global average. Tunisia, Jordan, Morocco and Egypt perform around the world average, while other countries like Algeria, and Libya fall below it. Iraq, Syria, Yemen and Somalia face significant challenges, reflected in low scores attributed to conflict and infrastructural limitations.

**Moreover, Arab countries are increasingly developing digital strategies.** 14 out of 22 countries in the region have established formal digital strategies.[3] These strategies vary in scope and integration; some are standalone digital agendas, while others are embedded within broader national frameworks, such as innovation or economic development strategies. Countries with well-defined digital strategies focus on enhancing digital infrastructure, expanding online public services, and promoting digital literacy, all aimed at building robust frameworks for long-term economic and social benefits. For countries without formal digital strategies, there is a risk of falling behind, as they lack the coordinated efforts needed to fully leverage the benefits of digitalization and address key challenges related to infrastructure, accessibility, and digital skills.

**To foster a secure and efficient digital environment, several Arab countries have introduced new laws and regulations.** For instance, Saudi Arabia's Vision 2030 includes regulatory reforms to promote digital economy growth, providing incentives for technology adoption, and establishing frameworks for digital transactions. The UAE has implemented data protection laws to safeguard personal information and enhance public trust in digital services. Such legal frameworks are crucial for enabling the safe expansion of e-commerce, digital banking, and e-government services across the region. Furthermore, regulatory reforms and standards for handling personal information help address data privacy and cybersecurity risks, which become increasingly pertinent as digitalization advances. Only 60% of Arab countries have enacted laws to combat cybercrime, cyber–Violence Against Women and Girls [4](VAWG). The United Arab Emirates was the first country in the region to adopt such a law (Al-Nasrawi, 2021).

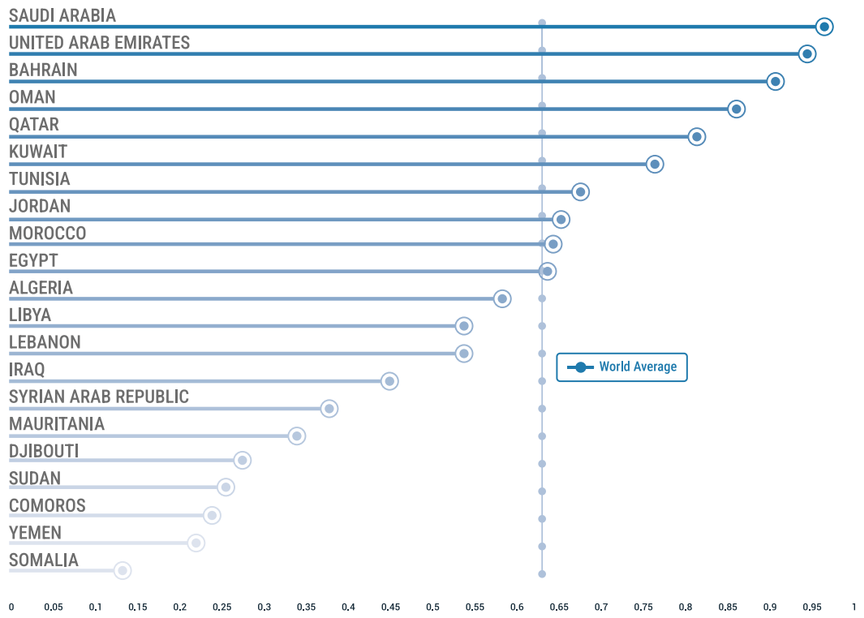



**Figure 2. E-Government Development Index 2024**
*(Source: UN E-Government Knowledge Base)*

3 Including Bahrain, Kuwait, Oman, Qatar, the United Arab Emirates, Algeria, Djibouti, Egypt, Jordan, Lebanon, Morocco, Tunisia, Saudi Arabia, and Libya.

4 Cyber VAWG refers to gender-based violence perpetrated through digital platforms, including online harassment, stalking, non-consensual sharing of intimate images, and other forms of abuse that harm the safety and well-being of women and girls.



**In addition to national policies, digital transformation efforts in the Arab region include targeted strategies to implement and improve urban centers' improving digital infrastructures.** Cities are often prioritized as hubs for digital innovation, serving as focal points for economic activity and models for implementing digital initiatives. For example, countries like the UAE have adopted comprehensive digital agendas incorporating digitalization across all economic sectors, with an emphasis on urban infrastructure and smart city development. Qatar's telecom giant, Ooredoo, further supports this urban-focused approach, having recently committed USD 550 million to expand its data center network, thereby enhancing connectivity and meeting the growing demand for digital services (Financial Times, 2024). Saudi Arabia, for example, invested approximately Saudi Riyal (SAR) 154 billion (USD 41 billion) in digital infrastructure by 2022, positioning the Kingdom as the fastest-growing digital infrastructure market in the Arab region.

## Characteristics and major issues affecting this digital transformation

**The Arab region's digital transformation shows stark disparities, with affluent Gulf countries leading in digital infrastructure investment (ADP, 2021).** These nations have made significant strides in digital services, driven by substantial investment in e-government and smart city initiatives. However, mid-to-low-income countries, such as Jordan, Egypt, and Morocco, along with conflict-affected nations like Yemen, Syria, and Libya, face challenges in digital transformation due to limited resources and governance issues (ESCWA, 2020).

**The digital divide remains a significant challenge, particularly in reaching vulnerable groups.** Despite increasing internet penetration, economic inequality, low digital literacy, and infrastructural challenges hinder digital access among lower-income and rural populations. Nearly 30% of the Arab population remains offline, with significant disparities between urban and rural areas, as well as among different age and gender groups (UNDP, 2023). Urban areas typically enjoy better digital services, while rural regions face connectivity issues. This gap is intensified by rising user expectations for seamless and efficient digital experiences, which governments in lower-income areas often struggle to meet. Addressing this divide requires comprehensive solutions that improve infrastructure, digital literacy, and affordable access to bridge socio-economic disparities, including gender dimension.

**Effective data management and governance also pose critical challenges.** The increase in data generation offers opportunities for insights into areas like urban management, but many cities lack the infrastructure and regulatory frameworks for secure data management (UN E-Government Knowledge Base, 2024). Open data initiatives are not prioritized, limiting public access to valuable data that could drive innovation and transparency (Digital Regulation, 2024; Financial Times, 2024). The COVID-19 pandemic precipitated the accelerated adoption and utilization of intelligent and digital solutions, thereby underscoring the inherent constraints associated with these technologies (ESCWA, 2021). While some countries demonstrated a capacity to rapidly adapt to remote service delivery, others encountered significant challenges in ensuring basic digital access. Going forward, the region needs investments in digital infrastructure, inclusive policies, and robust data governance to ensure digital transformation supports equitable growth and resilience.

**The Arab region's digital transformation journey reflects progress and challenges.** While substantial investments and strategic plans have enabled many countries to advance in digital infrastructure and e-government services, significant disparities remain. Continued efforts to enhance infrastructure, improve digital literacy, and implement vigorous legal frameworks will be essential to ensuring that digital transformation benefits all segments of society, fostering sustainable economic development and social inclusivity across the region.

## A wide range of disparities in Arab municipalities[5]

**There is a high expectation for cities and local authorities in the Arab region to manage an increasingly broad range of responsibilities, from waste management and infrastructure development to digital services and public health initiatives. However, they face numerous challenges and limitations that impact their ability to drive local development effectively (UN Habitat, 2022).** A general trend across the region reveals significant disparities in municipal capabilities, which vary widely depending, among others, on the country's economic status, the size and resources of the city, and the national regulatory framework governing local authorities (Farah et al., 2023).

**The size of the city also heavily influences the resources and capabilities.** Larger cities in the region face considerable challenges, often due to rapid population growth and demand for housing and services. However, with more significant economic influence, cities such as Riyadh, Cairo, and Casablanca tend to have more extensive budgets, as they can count on a larger tax base or strong financial support from national governments. They also often have de facto greater autonomy, allowing for comprehensive urban planning and development initiatives. These cities typically have larger administrative structures and

5 This report uses the word "municipalities" to indicate the diverse types of local authorities in charge of cities in the Arab region.

are better equipped to implement digital transformation, waste management, transport infrastructure projects among others. In smaller cities, local economic and infrastructure development issues remain their main priority. These cities frequently need adequate financial and technical resources, limiting their ability to address critical issues like sanitation and infrastructure repair. This disparity leads to a highly uneven quality of life and access to services across the region, particularly between major urban centers and less-developed areas.

In some cases, cities operate with outdated governance structures and limited autonomy, relying heavily on central governments for decision-making, budget allocations, and strategic direction. In some others, while local governments may have greater autonomy, they need more institutional framework and training to fulfill their mandates effectively. Consequently, many cities require substantial institutional development, including improvements in administrative structures and regulatory reforms to empower local authorities to act independently within their jurisdictions.

**A major challenge facing cities across the region is the need for more sufficient budgets and human resources relative to their assigned tasks.** Many cities operate with limited financial resources, making investment in necessary infrastructure, technology, and workforce development difficult. This issue is exacerbated in countries facing economic instability or political challenges, where local governments are often among the first to experience budget cuts. In addition to limited funding, cities frequently struggle with human resource shortages. The need for more skilled staff, particularly in areas like urban planning, public administration, and digital services, hampers the capacity of these cities to deliver quality services and respond effectively to the evolving needs of their populations (Ben Youssef et al., 2025). For instance, without adequate staff trained in urban development, cities may struggle to implement or monitor large-scale infrastructure projects effectively.

**Furthermore, a considerable number of cities across the Arab region do not have mid- and long-term development strategies.** In the absence of well-defined strategic plans, these cities often take a reactive rather than a proactive approach to governance and service provision. They lack direction and are less able to allocate resources effectively, prioritize projects, or measure progress toward long-term goals. This not only limits cities' effectiveness but also hampers the potential for sustainable and inclusive urban development. Developing municipal strategies could enable local governments to align their goals with national development objectives, attract investment, and plan for long-term needs, particularly in fast-growing urban areas.

## Methodology

**This research employs a qualitative approach to analyze digital transformation trends in Arab cities comprehensively.** The methodology includes an extensive literature review that goes through scientific and grey literature on digital transformation in the Arab region. However, it mainly builds on in-depth interviews to provide actionable insights and policy recommendations for cities seeking to enhance their digital capacities in urban management. Conducted between July and November 2024, the research involved 37 interviews: 21 with representatives from cities across the Arab region and 16 with experts on digital transformation from academia, consulting, international organizations, and the public sector. The selection of cities aimed to cover diverse geographic areas within the Arab region and include cities with varying levels of resources and digital maturity. The cities interviewed represent a wide range of contexts, including Aden (Yemen), Alexandria (Egypt), Baghdad (Iraq), Bizerte (Tunisia), Casablanca (Morocco), Hebron (Palestine), Irbid (Jordan), Madaba (Jordan), Manama (Bahrain), Medina (Saudi Arabia), Mogadishu (Somalia), Muscat (Oman), Nouakchott (Mauritania), Rabat (Morocco), Ramallah (Palestine), Riyadh (Saudi Arabia), Sfax (Tunisia), Sharjah City (United Arab Emirates), Tripoli (Libya), Tunis (Tunisia), and Zgharta (Lebanon). Cases of other cities not directly covered in the interviews were also investigated based on available literature.

**The study's selection of cities encompasses a diverse spectrum of urban environments across the Arab region, including both large metropolitan centers and smaller cities.** The larger cities in the study, such as Alexandria, Casablanca, Muscat, Baghdad, Riyadh, and Tunis, represent economically significant urban hubs with advanced infrastructure. However, they also face unique challenges due to their size and complexity. These larger cities provide insights into the digital demands of densely populated areas, where the scope and scale of digital transformation initiatives are often extensive. In contrast, medium-sized and smaller cities, such as: Irbid, Madaba, Hebron, Nouakchott, and Zgharta, illustrate the disparate obstacles and priorities cities with more limited resources encounter in their digital journeys. This range of city sizes and economic contexts provides a comprehensive overview of the digital transformation across diverse urban contexts, encompassing both common challenges and context-specific issues.

**The research leverages insights from municipal representatives and experts, focusing on municipal strategy and capacity in dealing with the digital transformation, as well as how the introduction of digital technologies and systems is affecting municipal work. Other areas of importance in relation to digital transformation such as the digital divide, cybersecurity, data privacy, resource constraints, and shifting public expectations, were also included.** This blend of perspectives allows the study to investigate how different cities approach digital transformation, identifying challenges and opportunities that impact their digitalization journeys. The in-depth interviews with 16 experts and researchers on digital transformation of cities from different Arab countries, such as Palestine, KSA, Jordan, Tunisia, Morocco, Oman, Egypt, and the UAE, enrich the study with a nuanced understanding of smart city initiatives. These discussions highlight the issues of data management, financial constraints, and capacity-building needs, providing a comprehensive view of the digital transformation landscape in the Arab region.




Figure 3. Arab cities included in the research

**In investigating the relations between digital transformation and cities, we focus on five key strategic pillars shaping this transformation:** high-level decision making through strategy and leadership; internal processes and organizational structures and regulatory frameworks; human resources and skills; financial resources; and stakeholder cooperation. These pillars represent the foundational elements cities must strengthen to navigate the stages of digital maturity effectively. In the following chapters, we explore how these pillars are being addressed across different Arab cities, illustrating the successes and challenges encountered in their digital transformation efforts.

**The first results of the research were tested with the feedback of municipal representatives and experts in two validation workshops.** The main limitation of the methodology is that does it not hence allow to thoroughly assess the impact of specific digital interventions. However, as the report aims to provide an overview of the ways municipalities are dealing with digital transformation in Arab cities, the research's rigorous methodology and comprehensive data sources ensure that findings and recommendations are well-rounded and applicable across diverse urban landscapes in the Arab region, promoting sustainable digital transformation practices.

## Structure of the report

**The following chapter provides a conceptual framework that characterizes different situations where the use of digital technology impacts how cities and local authorities operate.** Throughout this and subsequent sections, illustrative case boxes offer concrete examples of how cities address digital transformation challenges. These examples are drawn from interviews and project documentation provided by city representatives and experts, offering valuable insights into practical approaches and lessons learned. **Chapter 3** discusses the importance of strategy and leadership, analyzing the variations in digital strategies across Arab cities, their diverse

focus, the weight of national digital strategies, and how different leadership styles might frame priorities and strategies. In **Chapter 4**, the report focuses on organizational changes necessitated by digital transformation, covering how digitalization reshapes municipal structures, impacts coordination, and encounters resistance within municipal operations. **Chapter 5** addresses the critical role of skills and human resources, identifying persistent gaps in digital competencies, recruitment trends, and the influence of international cooperation on capacity-building efforts within cities. **Chapter 6** explores the financial dimension of digital transformation, investigating diverse funding approaches, dependencies on external financing, and the implications for municipal autonomy and flexibility in implementing digital initiatives. Finally, **Chapter 7** emphasizes collaboration and engagement, presenting various models of cooperation and highlighting the role of digital inclusion in bridging socio-economic divides, as well as fostering equitable citizen participation in municipal governance. The concluding chapter synthesizes findings from each thematic area, offering a holistic understanding of the digital transformation landscape in Arab cities.



CHAPTER 02

# TECHNOLOGIES FOR DIGITAL TRANSFORMATION OF CITIES

## KEY MESSAGES

01 **Digital transformation follows a progressive journey through stages that increase in technological maturity.** Cities progress from manual traditional systems to digitized silos, integrated smart solutions, connected services, and AI-driven cognitive environments

02 **Various technology layers form the foundation for cities' digital transformation.** digital transformation. Digital transformation builds on four layers: Foundational (e.g., IoT, 5G) for data collection, Enabling (e.g., AI, GIS) for insights, advanced (e.g., digital twins, blockchain) for complex needs, and Application-specific (e.g., telemedicine) for targeted solutions.

03 **Digital transformation brings several challenges:** (i) Cybersecurity risks demand robust protection measures; (ii) Inclusivity ensures advancements like IoT and 5G benefit all groups; (iii) Privacy and Governance frameworks maintain trust and transparency.

04 **Successful digital transformation allows cities to become adaptive ecosystems.** Achieving cognitive city status enables real-time learning and predictive insights, enhancing resilience, sustainability, and quality of life. This requires balancing innovation, inclusivity, and sustainable development to benefit all citizens.

**The digital transformation of a city is a strategic process in which digital technologies are utilized to optimize and enhance the city's systemic operations.** By adopting technological solutions, cities can effectively address urban challenges, streamline service delivery, and improve the overall quality of life for residents. This transformation is not limited to isolated technological upgrades but rather involves a holistic rethinking of city management and service provision to create a more responsive, efficient, and citizen-centered urban environment (Angelidou, 2017).

**The rapid evolution of digital tools presents opportunities and challenges, requiring cities to be strategic in their approach to digitalization.** This chapter introduces a conceptual framework to classify and assess the stages of a city's digital transformation journey, offering cities a structured approach to evaluate their current state and map out future steps toward smarter, more integrated urban systems. It also provides a concise yet comprehensive overview of the different layers of technologies that play a crucial role at each stage.

## Conceptual framework: traditional, digitized, smart, connected, and cognitive cities

The digital transformation of cities can be viewed as a progressive journey that can be classified into distinct stages, each representing a different level of maturity in adoption and integrating digital technologies. These stages include traditional cities, digitized cities, smart cities, connected cities, and cognitive cities, as shown to figure 4.

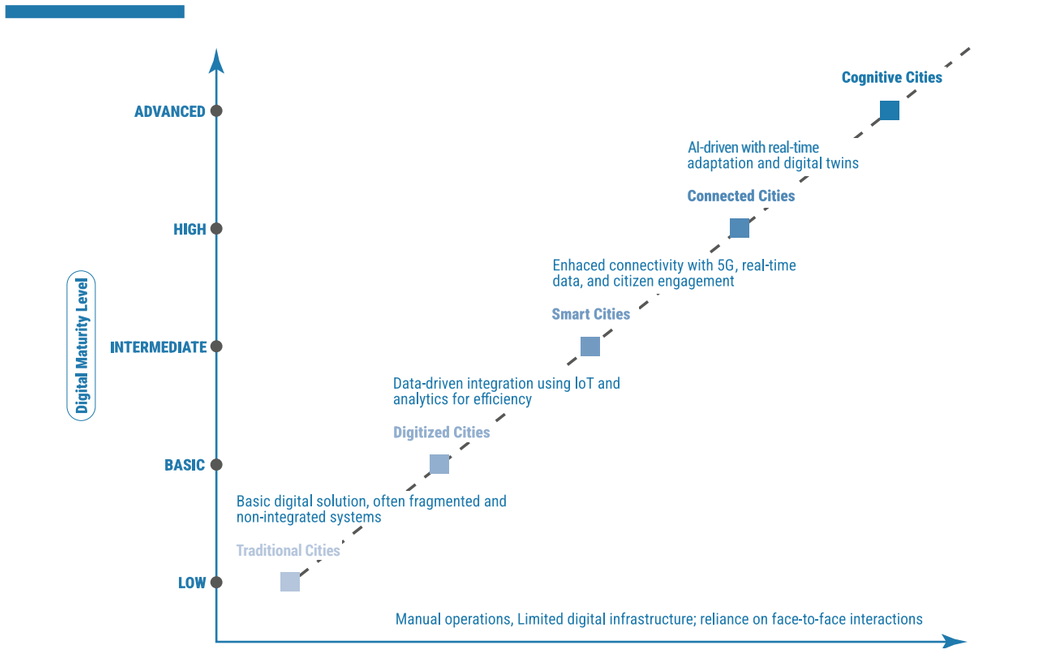



Figure 4. Stages of Digital Transformation of Cities *(Source: Authors)*

### Traditional cities: pre-digital, and manual operations

**Traditional cities are marked by a reliance on manual systems, often resulting in inefficiencies and challenges in service delivery.** In these cities, the processes are highly labor-intensive, with a significant dependency on human intervention for record-keeping, decision-making, and service management. The absence of digital tools in traditional cities **limits the speed, accessibility, and reliability of public services.** For example, registering births, deaths, or property transactions requires physical visits to municipal offices, which often results in long queues, delayed processing times, and limited access for residents living in remote areas.

**The physical infrastructure, such as filing cabinets and office spaces, becomes a bottleneck as records grow over time, making information retrieval cumbersome.** Additionally, communication is restricted to face-to-face interactions, telephony, or postal services, which further constrains the timely delivery of public notices and emergency information. Such cities may need help to respond effectively to crises or rapidly evolving demands due to their outdated administrative setups.

Rural cities in Southeast Asia or Sub-Saharan Africa illustrate these challenges. For instance, local governments in these areas often lack the resources or technological knowledge to shift from manual to digital systems. Many Arab countries, particularly those that have experienced recent conflicts,, especially in smaller cities and rural areas, which still rely on traditional, manual processes.

### Digitized cities: basic adoption of digital solutions

**The evolution from traditional to digitized cities marks a significant leap forward in terms of efficiency and public service delivery.** Digitized cities are characterized by the partial and often piecemeal implementation of digital technologies to streamline specific administrative tasks. The goal at this stage is to improve the efficiency of services such as tax collection, permit issuance, and public transport management by replacing manual records with digital ones.

**Despite this progress, digitized cities face challenges due to the fragmented nature of their digital infrastructure.** Systems and services often operate in silos, meaning that while some services are digitized, they do not necessarily communicate or integrate with each other. For instance, a city might digitize its tax payment system but lack the ability to connect it with property records or other related services. This results in inefficiencies and an inability to fully leverage the benefits of digital transformation.

### DIGITAL PORTALS IN MUMBAI, INDIA

Mumbai, India, provides a notable example of a city in this stage. The municipal government has established digital portals for various services, such as paying property taxes or booking public transport, yet these systems remain disconnected. As a result, citizens must still navigate between different digital platforms, and the lack of a centralized system limits the efficiency gains. For instance, the National Association of Software and Services Companies (NASSCOM) has highlighted the proliferation of public digital platforms in India, noting that while these platforms catalyze innovation, their fragmentation can limit efficiency gains (NASSCOM, 2021).

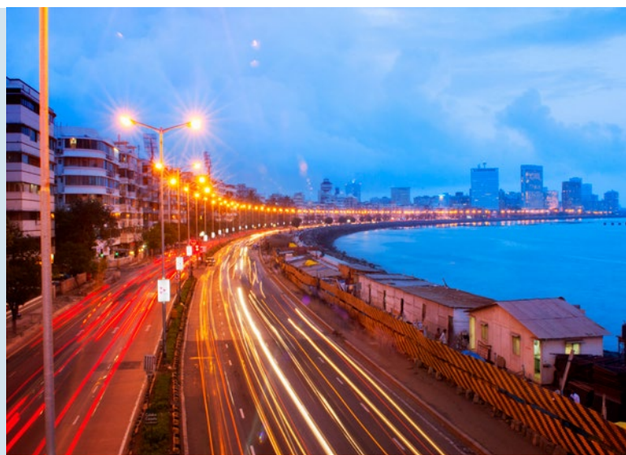


Figure 5. Mumbai, India

## Smart cities: integration and data-driven efficiency

**Smart sustainable city is defined as "an innovative city that uses ICTs and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects" (ITU, 2015; pg.3).** The aim is to use real-time data to enhance decision-making and improve overall efficiency.

**At the core of this transformation are foundational technologies that create the essential infrastructure for digital services (Zeqiri et al., 2025).** Key among these is the Internet of Things (IoT), which enables real-time data collection and monitoring of urban conditions, such as traffic flow, air quality, and public safety (Zanella et al., 2014). IoT infrastructure includes interconnected sensors and devices that provide city authorities with valuable insights, facilitating data-driven governance and proactive urban planning. The city can also use the well-known Global Positioning System (GPS) for a wide range of applications to improve its operational functioning.



Figure 6. Amsterdam, The Netherlands

### IOT FOR AIR QUALITY IN AMSTERDAM, THE NETHERLANDS

To illustrate, the city of Amsterdam employs the use of IoT sensors throughout its urban landscape, with the objective of maintaining a continuous monitoring of air quality. This is achieved through the collection of real-time data pertaining to the levels of pollution, the presence of particulate matter, and other forms of harmful emissions. The data is then subjected to analysis to provide actionable insights, thereby enabling city authorities to identify pollution hotspots, assess the effectiveness of existing regulations, and implement targeted interventions. These endeavors directly inform policy decisions aimed at improving public health outcomes, such as reducing respiratory illnesses, while also advancing environmental sustainability goals, including lowering carbon emissions and promoting green urban spaces. By leveraging the IoT technology, Amsterdam establishes a model for how smart city innovations can integrate environmental monitoring with proactive governance to create healthier and more sustainable urban environments (Restack, 2024).

**Also, smart traffic management systems utilize data collected from sensors and cameras to monitor and manage road congestion.** This data-driven approach allows cities to adjust traffic signals dynamically based on real-time conditions, reducing commute times and minimizing vehicle carbon emissions. Additionally, smart cities employ sensors to monitor environmental dimensions and optimize waste collection routes, thereby improving sustainability and quality of life.

The effectiveness of IoT depends on robust communication networks, such as high-speed broadband and 4G/5G connectivity, which ensure seamless data flow and support real-time urban management. **However, the successful deployment of these foundational technologies hinge on equitable access and reliable connectivity.** In cities with socio-economic disparities, digital divides can hinder the reach of IoT networks, particularly in underserved areas.



### SMART CITIES OF COPENHAGEN, DENMARK AND STOCKHOLM, SWEDEN

Copenhagen is a benchmark for smart city initiatives. The city's government has implemented an array of smart technologies, such as bike-sharing systems that respond to fluctuating demand and energy-efficient street lighting that adjusts based on pedestrian activity. These technologies are part of an integrated strategy to make Copenhagen carbon-neutral by 2025.

Also, Stockholm uses telemedicine services and wearable health devices to support elderly care, enabling healthcare providers to monitor patients remotely and reduce hospital visits. This approach promotes public health outcomes and supports active aging (Garric, A., 2024)

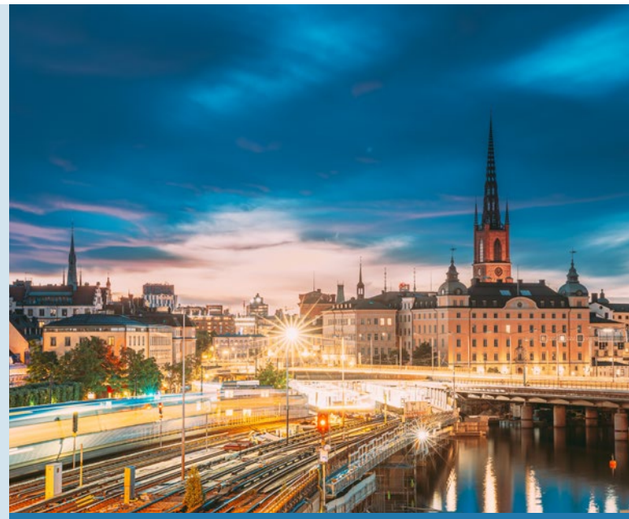


Figure 7. Stockholm, Sweden

### SEOUL'S 5G NETWORK, SOUTH KOREA

Seoul's comprehensive 5G network exemplifies efforts to bridge digital divides, creating an inclusive, fully connected urban environment that serves as a foundation for further digital advancements. The city has implemented various initiatives to enhance digital inclusion, such as the Digital Inclusion Action Plan, which aims to strengthen digital competence among citizens. Additionally, Seoul has deployed over 3,000 high-speed free Wi-Fi hotspots citywide to reduce the digital divide and lessen the burden of citizens' phone bills. These efforts contribute to a more equitable digital landscape, enabling all residents to benefit from technological advancements (Seoul Metropolitan Government, 2023).



Figure 8. Seoul South Korea

## Connected cities: enhanced connectivity and citizen engagement

**Connected cities build on the achievements of smart cities by emphasizing seamless communication, connectivity, and the integration of services across various sectors.** At this stage, the focus extends beyond the mere optimization of city management to actively engaging citizens and enhancing their experiences. Connectivity becomes a crucial aspect, with the deployment of advanced communication technologies such as 5G networks and public Wi-Fi.

**These cities aim to provide citizens with real-time access to public services and information.** For example, a connected city may offer a public transportation system where citizens can track buses and trains in real-time through mobile applications, receive alerts on delays, and access digital identity systems for secure transactions. Such integration fosters a more inclusive and participatory environment where citizens can voice their concerns, contribute to city planning, and engage with local authorities through digital platforms.

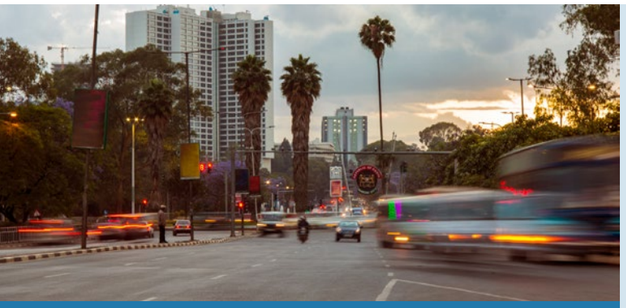


Figure 9. Nairobi, Kenya



Figure 10. Seoul, South Korea



Figure 11. Barcelona, Spain

## EXAMPLE OF DIFFERENT CITIES USING DIGITAL PLATFORMS

USHAHIDI APP IN NAIROBI: In Nairobi, Kenya, a mobile app called Ushahidi allows citizens to report real-time traffic congestion incidents, pollution, and public safety concerns. This crowdsourced data, gathered through individual mobile phones, helps the city identify and respond to pressing issues more effectively, creating a more resilient and responsive urban environment (Ushahidi, 2024).

MOBILE APPLICATIONS IN SEOUL: Additionally, in Seoul, South Korea, the city government promotes mobile applications that encourage citizens to report infrastructure problems, such as damaged sidewalks or malfunctioning streetlights, directly to city maintenance teams. This app leverages widespread smartphone ownership to enhance communication channels, allowing for more rapid and cost-effective municipal responses.

PLATFORM DECIDIM IN BARCELONA: In another example, Barcelona, Spain, uses a platform called Decidim, where residents can propose ideas, provide feedback on city projects, and participate in local governance directly through their mobile devices and computers. This citizen-led platform exemplifies how basic technologies can empower individuals to influence city planning and decision-making, fostering a collaborative relationship between citizens and city authorities (Barcelona City Council, 2024).

**By leveraging these citizen-owned devices, cities can implement basic, low-cost digital services that improve community engagement, foster better urban planning, and enable resilience in response to disruptions**. Moreover, such initiatives rely on technologies that are already common, ensuring broad participation without significant additional investment in city infrastructure. However, ensuring equitable access to these basic technologies remains challenging, as not all communities have the same access to mobile devices or internet connectivity. For cities with persistent digital divides, particularly gender digital divide, initiatives to improve affordable internet access and digital literacy programs become essential (Ben Youssef, 2024; Ben Youssef, 2021). As seen in Rio de Janeiro, public Wi-Fi stations have been established in underserved neighborhoods to bridge gaps in digital inclusion.

In these ways, basic technologies create opportunities for cities to leverage citizen-owned tools to improve service delivery, strengthen community ties, and build the foundational resilience required for more advanced stages of digital transformation.

### Cognitive cities: proactive and adaptive urban Intelligence

Cognitive cities represent the most sophisticated and technologically advanced stage of digital transformation. They aim to anticipate and adapt to emerging challenges using real-time data, AI, and advanced analytics. At this stage, cities leverage predictive capabilities to respond proactively rather than reactively to urban issues. Cognitive cities employ technologies like digital twins—virtual replicas of physical city infrastructure—to simulate various planning scenarios and identify optimal solutions.

AI-powered platforms in cognitive cities continuously learn from past events and adjust city operations accordingly. For instance, autonomous traffic management systems can analyze historical and real-time traffic data to predict congestion and adjust routes preemptively. In addition, AI algorithms can monitor energy consumption patterns and automatically optimize energy distribution to reduce waste and enhance sustainability.



## EXAMPLE OF USE OF AI BY DIFFERENT CITIES

AI FOR TRAFFIC: Helsinki, Finland, is a leading cognitive city that exemplifies this stage of development. The city uses AI to analyze traffic patterns, predict congestion, and optimize public transportation routes. Moreover, the use of digital twins enables Helsinki's planners to simulate the impact of new infrastructure projects on the urban landscape, allowing for informed decision-making that prioritizes efficiency and sustainability (City of Helsinki, 2024).

AI WATER METER IN NEW YORK: New York City, United States, for instance, employs an automated water meter reading system that utilizes AI and big data analytics to monitor water consumption patterns, detect leaks, and optimize distribution (Bibri & Krogstie, 2017).

AI-DRIVEN URBAN TRANSFORMATION IN DUBAI: Dubai, UAE, is at the forefront of leveraging AI to redefine urban living, enhance public services, and promote sustainability, positioning itself as a global leader in smart city innovation. Central to this transformation is a robust AI-powered infrastructure that integrates intelligent systems, such as adaptive traffic management and smart energy grids, to dynamically optimize city operations, improve efficiency, and enhance residents' everyday experiences. The government has also embraced AI to revolutionize public services, deploying AI-powered chatbots for efficient customer support and utilizing predictive analytics to streamline resource allocation, ensuring responsive and efficient administration. Additionally, sustainability is a critical pillar of Dubai's AI agenda. Advanced algorithms enable urban planners to optimize energy consumption, manage traffic flows, and minimize environmental impacts, contributing to a greener, more eco-friendly urban environment. Through this comprehensive and forward-thinking approach, Dubai exemplifies how AI can transform cities into adaptive, inclusive, and sustainable urban centers (GO GLOBE, 2024).



Figure 12. Helsinki, Finland



Figure 13. New York City, United States



Figure 14. Dubai, Uae

**GIS is also pivotal, offering spatial analysis and visualization for urban planning.** By combining GIS with big data, city planners can proactively manage land use, mitigate risks, and anticipate environmental challenges like floods. City planners can anticipate challenges, optimize investments, and bolster resilience by simulating various scenarios, such as natural disasters or infrastructure resilience (Boje et al., 2020).

**Nevertheless, enabling technologies introduce concerns around data security and privacy.** As cities handle increasing amounts of sensitive information, establishing robust cybersecurity and transparent data governance is essential to protect citizen data and foster public trust.

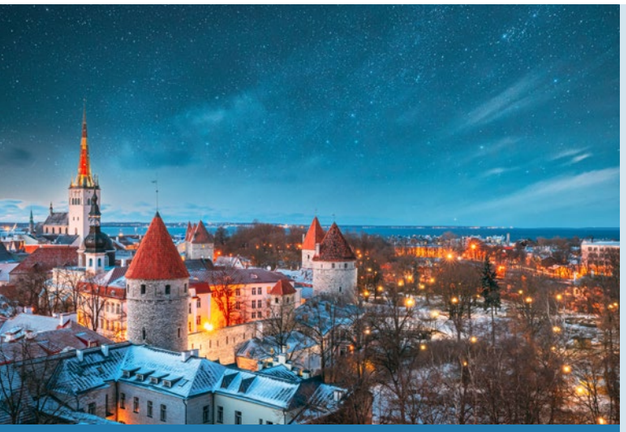


Figure 15. Tallinn, Estonia

## BLOCKCHAIN IN TALLINN, ESTONIA

Blockchain technologies, as seen in Tallinn, Estonia, further enhance transparency and security. Tallinn's blockchain-based digital identity system securely stores and verifies citizen data, facilitating transparent public services and strengthening citizen trust in digital governance. Estonia has established itself as a pioneer in digital governance by implementing blockchain technology to enhance transparency and security in public services. A cornerstone of this digital infrastructure is the KSI (Keyless Signature Infrastructure) blockchain, which ensures the integrity of data and systems across various sectors (e-Estonia, 2024).

## Conclusion: Striking a balance for successful digital transformation

**The progression from traditional cities to cognitive cities reflects an increasing level of digital maturity and integration.** Foundational technologies, such as IoT and communication networks, provide the basis for a city's infrastructure, while enabling technologies, like AI and big data analytics, enhance operational efficiency and decision-making. Advanced technologies, such as digital twins and blockchain, address specialized needs, while application-specific technologies target precise challenges in sectors like healthcare and governance.

**By effectively leveraging these stages and layers of technologies, cities can transform from being merely digitized to becoming truly cognitive—capable of self-learning, adaptive responses, and resilient planning.** Cognitive cities utilize AI and predictive analytics to anticipate and proactively respond to urban challenges, creating more sustainable and resilient urban ecosystems. However, achieving this vision requires addressing challenges related to privacy, security, and inclusivity. By embracing a holistic approach to digital transformation, cities can create interconnected, intelligent ecosystems that enhance citizen well-being, promote environmental sustainability, and foster resilient and adaptive urban planning.

CHAPTER 03

# STRATEGIES AND LEADERSHIP OF DIGITAL TRANSFORMATION

## KEY MESSAGES

01 **Variation in digital transformation strategies with a variety of priorities among Arab Cities.** Arab cities adopt diverse digital transformation strategies, ranging from formal plans to informal roadmaps, often aligned with national frameworks. Priorities vary by sector, including mobility, safety, healthcare, and citizen engagement.

02 **Varied leadership styles influencing digital transformation are observed in Arab cities. Most of these cities are facing challenges.** Leadership approaches significantly affect digital transformation. Technocratic styles focus on efficiency, entrepreneurial on innovation, and popular on inclusivity. Stability in leadership and institutionalized strategies ensure long-term success.

03 **Multi-stakeholder Involvement in strategy development is observed in Arab Cities.** Digital initiatives involve municipalities, private partners, and citizens. Roadmaps guide efforts, enhancing coordination and trust, while collaboration improves the effectiveness of digital transformation.

04 **A strong alignment with national agendas in most Arab cities is observed, while some cities are trying to customize their strategies to their local needs.** Most cities align strategies with national frameworks, optimizing resources and trust. Some customize approaches to address local needs and focus on specific sectors.

**Strategy and leadership play a pivotal role in the success of digital transformation efforts in Arab cities, requiring structured and adaptable approaches that align with city-wide development goals.** The findings reveal that successful initiatives rely on clear digital transformation strategies tailored to local needs, with varying levels of articulation across cities—some with fully developed strategies and others relying on internal roadmaps. The findings also explore how leadership styles, the alignment of digital strategies with national and regional agendas, and the capacity to adapt to evolving local needs collectively influence the digital transformation journey in Arab cities. Cities that effectively integrated these elements were better positioned to achieve sustainable and impactful transformation efforts. This chapter provides a comprehensive understanding of these strategies and leadership dynamics, and the critical factors that underpin their success.

## Big variation of digital transformation strategies among Arab cities

**Most interviewees emphasize the importance of adopting structured yet flexible approaches to effectively develop and implement digital transformation initiatives. However, there is a significant diversity in digital transformation strategies across Arab cities, with each adopting a distinct approach tailored to its specific context.** Most cities align their efforts with national digital strategies, leveraging the overarching framework provided by national governments to shape their local initiatives. Digital transformation at the municipal level requires more than just a collection of isolated projects or initiatives; it demands a coherent, well-articulated strategy aligned with the city's overarching vision. Such strategies often integrate aspects of governance to ensure interdepartmental collaboration and integrate the multiple sectors and diverse concerned stakeholders. They also usually focus on providing a seamless and unified approach to administrative modernization. However, considerable challenges remain in establishing clear guidelines and action plans to implement these strategies effectively. Sometimes, the existence of both formal (written and declared) and more informal (recognized but not formalized) strategies can lead to confusion, thus necessitating clear guidelines to maintain consistency and direction.

### Variety of priorities among the digital strategies pursued by Arab cities

**No universal model exists for digital transformation strategies. In this regard, Arab cities display a wide range of approaches, with some developing comprehensive strategies and plans while others relying on fragmented or ad hoc initiatives.** What is often referred to as a "strategy" at the municipal level is often a combination of initiative efforts and commitments rather than a detailed, stand-alone plan. In many cases, municipal strategies are not formalized in separate written documents, and in many cases, municipalities refer to national digital strategies when asked about their digital strategy. Municipalities hence might adopt and adapt these national frameworks to guide their local digital transformation efforts, aligning their initiatives with broader national goals. At the same time, local adaptation enables cities to address specific challenges and capitalize on relevant opportunities, ensuring their digital strategies remain effective and impactful.

**In cities that have articulated some form of a "digital strategy", there is usually an attempt to align these efforts with key sectors like mobility, public safety, healthcare, and citizen engagement.** However, these strategies often rely heavily on sectoral initiatives rather than formalized action plans. For example, cities facing traffic congestion focus heavily on smart mobility solutions, for example Casablanca, while those aiming to enhance citizen engagement prioritize digital literacy and open data initiatives.

## Multi-stakeholder Involvement in Digital Strategy Development

**According to literature on best practices in urban digital transformation strategies (Brunetti et al., 2020; Belaid et al., 2024), multi-stakeholder collaboration plays a critical role in prioritizing sectors and social groups effectively during strategy development.** Cities work with municipal departments, private sector partners, citizens, and community organizations to ensure strategies are comprehensive and inclusive. Stakeholder involvement fosters a deeper understanding of the needs of vulnerable groups, allowing the design of initiatives that address specific challenges and reduce digital exclusion. Engaging various stakeholders in this manner helps ensure that digital strategies remain both technically sound and socially relevant.

**The effectiveness of digital transformation strategies across Arab cities largely depends on how well these strategies are tailored to local needs, with a particular emphasis on involving various stakeholders.** Cities across the region are navigating complex urban landscapes, where a standardized, one-size-fits-all approach often falls short.

### Variety of approaches in the involvement of stakeholders in the elaboration of strategies

**Most interviewed municipal representatives indicate that there was a multitude of engagement of stakeholders, including municipal departments, private sector partners, and citizens, in the strategic planning process for digital transformation.** To them, this inclusive approach guarantees that digital strategies are both technically sound and socially relevant. Overall, the utilization of external expertise is seen to have enabled cities to remain apprised of the most recent developments in digital trends, facilitating the incorporation of these trends into their strategies in a manner that is both effective and responsive to evolving technological landscapes. In contrast to a top-down methodology, the solicitation of input from a multitude of municipal departments and the convening of public meetings for the purpose of obtaining citizen feedback on strategy is also seen in many cases to have engendered a collaborative environment and cultivated a sense of collective ownership among all stakeholders.

## AN AMBITIOUS STRATEGY: THE CASE OF RIYADH SMART CITY, SAUDI ARABIA

The digital transformation strategy for Riyadh is a comprehensive and ambitious plan that began in 2022, aimed at positioning the city among the top smart cities globally by 2025. This strategy emphasizes improving municipal services using advanced technologies, with a particular focus on areas like infrastructure, public services, and urban management. The implementation includes smart solutions for lighting, waste management, and the efficient use of digital infrastructure across the city. Over 60% of the strategic initiatives have already been implemented. Significant advancements are made in making services more accessible and efficient for all residents and visitors. and in integrating smart technology into public infrastructure and ensuring consistent fifth generation (5G) network coverage. Also, as sustainability and quality of life became key principles guiding Riyadh's development plans, digital tools and processes are increasingly used to ensure that implemented projects and technological solutions adhere to stringent environmental and health standards.

Moreover, Riyadh's digital strategy places a strong emphasis on citizen engagement and inclusivity. The city encourages residents to participate actively in decision-making processes, such as naming local parks based on public votes. This initiative ensures that residents feel a sense of ownership and connection to their local environment. Additionally, the strategy addresses the diverse needs of the city's population by simplifying digital services to accommodate individuals who may not be comfortable with advanced technology, such as the elderly. By designing intuitive digital interfaces and offering support where necessary, Riyadh aims to bridge the digital divide, ensuring that no one is left behind in its journey towards digital transformation. The city's efforts are guided by the belief that technology should serve everyone, thus creating an inclusive, innovative, and sustainable urban environment.



Figure 16. Riyadh, Saudi Arabia *(Image by Jad El Mourad)*



Figure 17. Muscat, Oman

## NATIONAL VISION GUIDING DIGITAL TRANSFORMATION IN MUSCAT, OMAN

Muscat's digital transformation journey aligns with Oman's Vision 2040, a strategic roadmap emphasizing technological innovation, sustainability, and service efficiency. At the forefront of this initiative is the Digital Transformation Index (DTI), managed by the Ministry of Transport, Communications, and Information Technology, which evaluates public sector digitalization progress semi-annually. Muscat city has set ambitious targets, aiming to enhance institutional development indicators and meet the requirements of Vision 2040. This transformation framework is evident in the city's digital transformation strategy, which involves identifying and re-engineering manual services to make them more efficient and accessible electronically. Muscat has integrated various public services with key authorities such as the Ministry of Commerce and civil status entities, creating a seamless data-sharing environment that improves service delivery and simplifies administrative procedures.

**Citizen involvement is identified as particularly crucial in aligning digital initiatives with public expectations and needs.** In some cities, like Hebron, Aden, Casablanca, Rabat there are organized public meetings, workshops, and surveys to gather feedback from residents. In other cities, like Irbid, Madaba, Hebron, Tripoli etc. there are platforms also where people can pose their questions and complaints. Engaging citizens in the planning process is seen by many municipal representatives to foster a sense of accountability and trust in digital transformation efforts.

### Importance of internal roadmaps as practical guidance

**Although many cities have established strategies, there are significant differences in how internal roadmaps are articulated and implemented.** In some cities, particularly in the GCC region, strategic plans have been clearly developed at the departmental level, supported by detailed internal roadmaps that provide structured guidance and specific goals. These internal roadmaps ensure coordination across municipal departments and align all efforts with the overarching digital vision.

By clearly defining each department's role, internal roadmaps not only offer practical guidance but also promote accountability, breaking down silos and encouraging cohesive efforts across the city. This coordinated approach helps prevent fragmented initiatives and makes digital transformation strategies more effective.

**Moreover, internal roadmaps provide flexibility and ensure resilience in the face of changing circumstances and leadership transitions.** This adaptability is crucial for responding to emerging challenges and technological advancements, enhancing the robustness of digital transformation initiatives. Internal roadmaps also help maintain continuity during leadership transitions by offering a consistent framework that keeps departments focused on long-term goals.

## Variation in the alignment of digital strategies with national and regional agendas

**Arab cities exhibit notable differences in aligning their municipal digital strategies with broader national and regional agendas.** Digital transformation involves multi-level collaboration requiring coherence between local, regional, and national policies. This alignment is considered essential for optimizing resources, enhancing public trust, and fostering collaborative initiatives. Some cities have integrated their efforts with larger frameworks to amplify their digital impact and contribute effectively to national and regional objectives.



## RAMALLAH RESILIENCE STRATEGY 2050: A VISION FOR A SMART AND SUSTAINABLE FUTURE

Ramallah Resilience Strategy 2050 is a long-term vision to transform Ramallah into a sustainable, resilient, and digital innovation model. The municipality has integrated digital governance to enhance services, improve transparency, and increase citizen participation. Key initiatives include expanding GIS for urban planning, implementing AI-driven municipal services, and fully digitalizing administrative processes. These efforts aim to make municipal services more accessible, efficient, and user-friendly, ensuring all residents benefit from technological advancements.

Sustainability is at the heart of the strategy, with digital tools optimizing resource management and environmental initiatives. The municipality has used GIS technology to improve waste collection, reducing fuel consumption and emissions. Schools have embraced paperless education and interactive learning tools, aligning education with sustainability goals. Future plans include integrating renewable energy solutions, expanding smart infrastructure, and optimizing urban services through digital transformation. These initiatives position Ramallah as a leader in green and smart city development.

The strategy also prioritizes community engagement by enhancing digital participation. Citizens access public meetings, submit feedback online, and contribute to city planning. Future priorities include expanding smart mobility, strengthening cybersecurity, and implementing e-signatures to streamline services, ensuring Ramallah becomes a pioneer in urban innovation.







Figure 18. Digital services in Ramallah, Palestine

### National alignment dependent on centralized governance and access to resources

**The alignment of municipal digital transformation strategies with national agendas is often shaped by the nature of governance, particularly centralization.** In several Arab states with centralized regimes, strategies are determined primarily at the national level. Some cities depend on national frameworks to access additional resources, technical support, and expertise from higher levels of government.

**National alignment also plays a crucial role in strengthening the skills and capabilities of municipal staff through collaborative programs.** Cities frequently partner with national agencies to facilitate training, capacity building, and knowledge exchange, which are pivotal in maintaining the momentum of digital transformation. These partnerships ensure that municipal staff are well-equipped with the technical expertise to implement advanced digital initiatives effectively. For instance, collaboration with national digital agencies enables staff to receive specialized training in areas such as cybersecurity, data management, and digital governance. This approach not only enhances technical capabilities but also fosters a shared understanding of national digital goals across different levels of governance, contributing to a more integrated and cohesive digital transformation effort.

### Public perception shaped by consistency between local and national strategies

**Consistency between municipal digital services and national policies plays a significant role in shaping public trust and perception.** Many interviewees believe that citizens are more inclined to trust local digital initiatives when these initiatives are integrated into larger, nationally recognized frameworks. This alignment fosters public confidence in the reliability and effectiveness of municipal services. Adherence to consistent standards helps create a unified

digital ecosystem that reinforces public trust and encourages greater engagement with digital services, ensuring a smoother adoption process and more robust public support.

## Regional alignment enables cross-city collaboration and resource sharing

**Aligning municipal strategies with national and regional agendas facilitates effective collaboration among neighboring cities on cross-city initiatives.** Regional collaboration is particularly beneficial for addressing shared challenges, such as transportation, public health, and environmental sustainability.



Figure 19. Medina, Saudi Arabia

### THE INCLUSIVENESS OF ALL IN DIGITAL SERVICES: CASE OF MEDINA, SAUDI ARABIA

The digital transformation initiative in Medina focuses on building an inclusive and smart city by leveraging technology to enhance municipal services and citizen experience. Central to this initiative is the deployment of smart city solutions powered by IoT devices distributed throughout the city. These devices collect and analyze data to support informed decision-making, improve public services, and ensure efficient urban management. By implementing smart monitoring systems and automating municipal services, the city aims to provide seamless access to licenses, permits, and inquiries through a unified digital platform. This approach reduces the need for physical visits to municipal offices and streamlines interactions between citizens and the administration.

Inclusiveness is a key element of this transformation. The municipality has prioritized accessibility by incorporating tailored features for individuals with disabilities on its digital platforms. These features are designed to facilitate easy navigation and interaction, ensuring that all citizens can benefit from the city's digital services. Additionally, the municipality has established an open data platform, promoted transparency and enabled public access to city data for research and civic engagement.

Moreover, Medina has embraced a proactive approach to customer experience management. A dedicated team analyzes the digital journey of users and gathers continuous feedback through surveys and direct meetings. This helps in refining digital solutions based on best practices and user expectations. The city is also exploring AI technologies with a cautious approach to data governance, aiming to leverage AI for analytics and decision-making while safeguarding sensitive information. Additionally, to enhance tourism, the city has developed the Ruh al-Medina app, offering virtual tours and comprehensive information for visitors.



**The development of shared digital infrastructure through regional alignment has proven to be a significant outcome.** Regional collaboration, as in the case of Zhgarta Lebanon, led to integrated digital platforms that improved service delivery. This regional integration promotes a cohesive development strategy, helping cities address challenges that extend beyond their individual jurisdictions.

## Digital strategies amid leadership changes

**Arab cities face the dual challenge of ensuring that digital strategies are both stable and adaptable, particularly when leadership changes occur.** Digital transformation initiatives often extend over several years, necessitating a long-term vision to sustain progress. Achieving this balance is seen by most interviewees as crucial to ensuring strategies withstand leadership transitions while remaining responsive to new challenges and opportunities. In many cities, strategies are institutionalized by embedding them within formal municipal plans and frameworks. Formalizing strategies and defining clear milestones help maintain continuity and consistency over time. This institutionalization protects the strategy from being completely overhauled with every leadership change, reflecting the structured nature of plans resilient to political shifts and administrative changes. This approach reflects the structured nature of plans resilient to political shifts and administrative changes.

**On the other hand, leadership styles significantly impact the success of digital transformation initiatives across Arab cities.** The effectiveness of these initiatives is influenced by how leaders engage with municipal departments, external stakeholders, and the broader public. Literature recognizes different municipal leadership styles, with the technocratic managerial, entrepreneurial, and popular being the most ubiquitous ones (Pierre, 2011) . Each style influences digital transformation in distinct ways. Technocratic-managerial leadership, focusing on internal efficiency and data-driven decisions, was observed as the most dominant style, while entrepreneurial and popular styles addressed specific local challenges and priorities.

### ONE-STOP SYSTEM: A NATIONAL INITIATIVE FOR STREAMLINED CITIZEN SERVICES IN ALEXANDRIA, EGYPT

The "One-Stop System" is a national initiative in Egypt, which represents a fundamental shift toward more efficient and centralized government services. Recognizing the burdens that fragmented service systems place on citizens, the center consolidates functions from multiple government entities—including the Ministry of Interior, Ministry of Justice, Social Insurance, and Commercial Registry—into a single access point. By housing over 126 services under one roof, Alexandria has reduced the time, effort, and costs associated with navigating bureaucratic processes. Notable services include issuing criminal records, managing civil status documents (such as birth, marriage, and death certificates), processing car and driver's licenses, handling passport requests, and executing real estate and family law-related transactions.

These integrated services have dramatically decreased the time citizens spend obtaining critical documents and services. By minimizing the need for citizens to visit multiple locations, the center has also reduced traffic congestion and alleviated the demand on other government offices across the city. This system is becoming a model for other Egyptian cities, with plans to replicate the approach nationwide to ensure that citizens across Egypt have streamlined, centralized access to essential government services.



Figure 20. Alexandria, Egypt

## Challenges of leadership succession and strategic continuity

**Leadership succession planning emerged as a key mechanism for maintaining the stability of digital strategies amid leadership changes.** Changes in leadership are inevitable, but proactive succession planning helps ensure smoother transitions and continuity of strategic goals. Succession planning is seen as a process involving not only the identification of potential future leaders but also their preparation through training and knowledge-sharing about the city's digital transformation goals. This preparation helps equip new leaders to carry forward the existing digital vision without derailing ongoing initiatives.

**Moreover, leadership succession planning provides an opportunity to cultivate a shared commitment to the city's digital vision.** By involving multiple stakeholders and fostering a collaborative leadership culture, cities establish a sense of collective ownership over digital transformation initiatives. This collective ownership strengthens the resilience of digital strategies, ensuring that they remain on course even when leadership changes occur. Succession planning also helps in embedding the digital strategy into the institutional fabric, making it less dependent on individual leaders. As a result, the continuity of strategic initiatives is safeguarded, allowing cities to maintain momentum in their transformation efforts regardless of shifts in leadership.

## Prevalence of technocratic-managerial leadership focusing on efficiency and data-driven decisions

**In many Arab cities, technocratic-managerial leadership dominates, emphasizing internal efficiency, data-driven decision-making, and systematic improvements in municipal performance.** Leaders adopting this style prioritize optimizing internal operations through digital tools, data analytics, and structured frameworks. This style underscores a strong reliance on data and technical systems for achieving systematic governance.

**The technocratic-managerial approach also involves standardizing procedures and implementing clear protocols within municipal departments.** Consistency and transparency to build trust and reduce bureaucratic inefficiencies is key for cities. This is often done through the establishment of robust monitoring and evaluation mechanisms. Cities frequently utilize real-time dashboards and performance indicators to assess and adjust digital initiatives. The emphasis on monitoring indicates a focus on operational efficiency and adaptation.

## Role of entrepreneurial leadership in driving strategic innovation and collaboration

**While technocratic-managerial leadership is predominant, entrepreneurial leadership also plays a significant role in driving innovation and fostering strategic collaborations in various cities.** Leaders with an entrepreneurial style actively engage with key public and private stakeholders to establish a clear vision and build collaborative initiatives. This collaborative engagement with the private sector appears essential for advancing digital transformation.

**Entrepreneurial leaders are often characterized as visionaries seeking new growth opportunities and aligning digital projects with long-term development goals.** This style is crucial in cities where ambitious digital initiatives demand substantial external resources and multi-stakeholder collaboration. The approach leverages external expertise to expand digital capacities. Some cities have positioned themselves as hubs for innovation and investment through entrepreneurial leadership. There have been several efforts to attract technology companies, establish innovation hubs, and create business-friendly environments.

## Popular leadership fostering citizen engagement and promoting inclusivity

**Popular leadership, although less common, plays a prominent role in fostering citizen engagement and inclusivity within digital transformation efforts.** Leaders adopting this style prioritize direct interactions with the public, involving citizens in decision-making through open forums, consultations, and community meetings. This engagement emerges as crucial in cities that prioritize public trust and transparency.

### DIGITAL TRANSFORMATION FRAMEWORK AND STRATEGY IN CASABLANCA, MOROCCO

Casablanca's digital transformation efforts are built upon a strategic framework developed in collaboration with the Digital Transformation Agency and the General Directorate of Territorial Communities. This framework, in place since 2016, serves as a roadmap for streamlining governance, modernizing infrastructure, enhancing connectivity, and establishing comprehensive data management practices.

A central pillar of this framework is the Law on Simplifying Procedures, which emphasizes transparency, efficiency, and citizen engagement. By focusing on reducing bureaucratic processes and making services more accessible to the public, Casablanca aims to cultivate a responsive and proactive digital governance environment. This legal support empowers local authorities to deploy citizen-centered digital solutions, aligning with national digital transformation goals.

Under this framework, Casablanca has launched numerous digital initiatives, supported by a specialized unit (LADD) that oversees city-wide digitalization. The city has also invested in key infrastructure projects such as data centers and connectivity systems, which are essential for supporting digital services across various government functions. This approach ensures that all digital transformation projects align with both city-level and national goals, enabling coordinated implementation and maximizing the impact on the community.

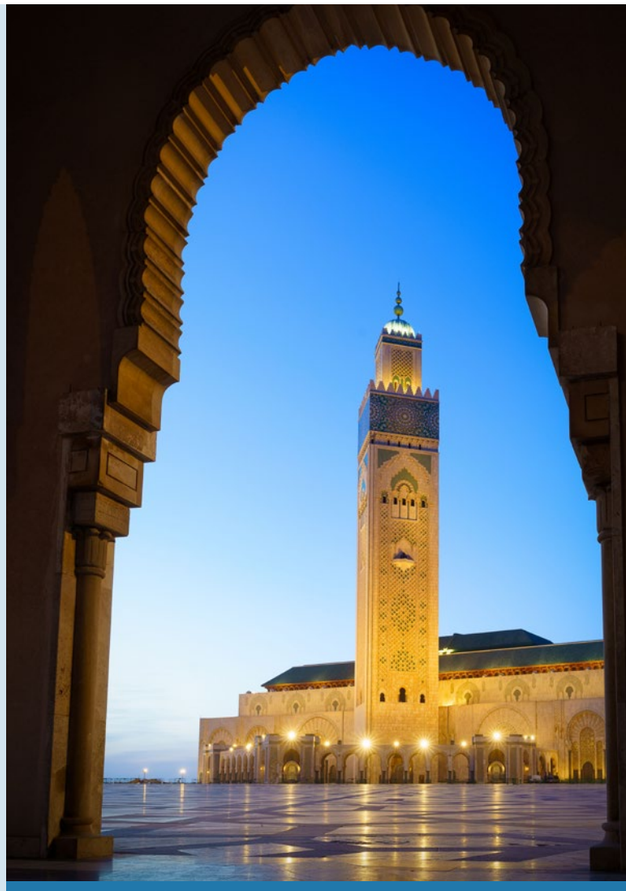


Figure 21. Casablanca, Morocco

**Direct engagement and inclusivity are particularly emphasized in contexts where gaining public support for digital initiatives is a priority.** Leaders indicated that communicating regularly with citizens aligns digital strategies with community aspirations. Addressing the needs of vulnerable groups is another notable feature of popular leadership. With certain cities multiplying efforts to make digital services accessible to all, including elderly residents and low-income communities.

## Conclusion

**This chapter reveals that Arab cities approach digital transformation with varied strategies tailored to address unique local challenges.** Digital priorities differ widely, with some cities focusing on mobility, public safety, healthcare, and citizen engagement. While formal strategies and internal roadmaps guide some cities, others align their efforts with broader national frameworks, integrating digital transformation within larger urban development goals. The effectiveness of these initiatives largely depends on structured, context-sensitive approaches that resonate with the specific needs of each city. Stability in leadership and succession planning enhances the continuity and resilience of these strategies, safeguarding against disruptions from leadership transitions and ensuring sustained progress.

**Leadership styles also play a crucial role in shaping digital transformation outcomes.** Technocratic, entrepreneurial, and popular leadership styles each influence how cities prioritize efficiency, innovation, or community engagement. Multi-stakeholder collaboration across municipal departments, private sector partners, and citizens strengthens these strategies, fostering inclusivity and building trust. Alignment with national and regional agendas provides cities with essential resources and technical guidance while enhancing public confidence. Together, these elements contribute to creating adaptive, sustainable, and locally relevant digital transformation models across Arab cities, paving the way for more cohesive and impactful urban governance.

# RECOMMENDATIONS

01 **Create dynamic and adaptive digital governance models.** Move beyond static strategies by creating adaptive digital governance models that evolve in response to technological advancements and emerging urban challenges. Establish real-time feedback loops with stakeholders, using AI and data analytics to continuously refine digital initiatives. This approach ensures that strategies remain agile and responsive, adapting to both leadership changes and the shifting needs of the urban population.

02 **Foster a culture of digital leadership innovation.** Build a culture of digital innovation across all leadership levels. Equip leaders with skills in emerging technologies, design thinking, innovation management, and digital storytelling to foster a forward-thinking and adaptable mindset. Create cross-functional teams and innovation labs to prototype solutions rapidly, ensuring sustained momentum for digital transformation beyond individual leadership tenures.

03 **Establish citizen-centric co-creation platforms.** Establish digital platforms that actively involve citizens in shaping urban digital strategies. Leverage tools like crowdsourcing, hackathons, and gamification to gather ideas and co-develop solutions tailored to local needs. This approach builds public ownership and fosters engagement while accelerating the implementation of initiatives that genuinely reflect community priorities.

04 **Develop hyper-local digital solutions with community partners.** Partner with community-based organizations and social enterprises to create hyper-local digital solutions targeting specific neighborhood challenges. Provide micro-grants and technical support to empower local communities to lead these initiatives. This ensures relevance and amplifies the impact of digital transformation efforts, particularly in addressing the needs of vulnerable populations.

05 **Design resilient digital pathways with predictive scenario planning.** Design flexible digital roadmaps using predictive scenario planning and data simulations. Anticipate potential challenges and opportunities to ensure initiatives remain adaptable and resilient in the face of uncertainty. Treat these roadmaps as evolving frameworks that are regularly updated to reflect changing conditions and stakeholder input, keeping digital transformation on track.

CHAPTER 04

# ORGANIZATIONAL CHANGE FOR DIGITAL TRANSFORMATION

## KEY MESSAGES

01 **Varied structures for coordinating digital transformation are observed in Arab Cities.** Arab cities employ diverse structures to oversee digital transformation, including IT departments, specialized committees, and leadership offices like mayoral offices. Leadership offices provide strategic alignment and resource efficiency, while IT departments and committees focus on executing projects, planning, and standardizing efforts to minimize interdepartmental conflicts.

02 **Digital Transformation is reshaping profoundly the organizational structure of Arab cities and cities,** leading to the creation of dedicated digital transformation units and cross-departmental teams. These structural changes enhance coordination, clarify roles, and improve collaboration to address the complexities of digital initiatives. However, the scope and significance of these shifts are often underestimated.

03 **Digital technologies are impacting municipal operations in all Arab cities and are more often subject to employee resistance to changes.** Technologies like GIS, digital archiving systems, and mobile platforms are transforming municipal operations but often encounter resistance from employees accustomed to traditional workflows. Tailored implementation strategies, alongside robust change management and training programs, are critical for overcoming these challenges and ensuring effective adoption.

04 **National regulatory frameworks influence and constrain the digital transformation strategies, while cross-departmental teams are helping to address complex digital challenges.** Cross-departmental teams play a pivotal role in navigating these challenges by fostering collaboration and integrating technical expertise with local insights. In GCC cities with advanced infrastructure, integrated systems enable efficient project tracking, real-time monitoring, and data-driven decision-making, supporting continuous improvement.

**Digital transformation is reshaping the organizational landscape of Arab cities, necessitating the development of specialized structures and strategic changes in response to emerging digital needs.** Cities are experimenting with various centralized models, including IT departments, leadership offices, and specialized committees, each serving as pivotal points for managing and aligning digital initiatives. The transformation to digital operations has prompted cities to restructure internally, forming dedicated units and cross-departmental teams to better address the complexity of digital projects. These adjustments support improved coordination and collaboration across departments, although the shift has revealed challenges, such as employee resistance and the varied effects of digital technologies on municipal processes. Furthermore, national regulations play a dual role, providing essential frameworks for digital projects while also constraining flexibility and innovation.

**Through case studies and key findings, this chapter illustrates how these organizational changes are enabling Arab cities to implement comprehensive digital strategies, integrate diverse technologies, and adapt to regulatory landscapes.** It delves into the organizational changes catalyzed by digital transformation efforts, examining the impact of these structures on the consistency, resource efficiency, and strategic alignment of municipal projects. The analysis highlights the ongoing need for adaptable structures, continuous training, and strategic resource allocation to ensure that digital transformation meets both local needs and national standards, driving sustainable progress in municipal governance.

## Varied centralized structures for coordination of digital transformation in Arab cities

**Arab cities have adopted a variety of centralized structures to coordinate digital transformation efforts effectively.** The structures differ from city to city, with some centralizing digital responsibilities within dedicated IT departments or specialized committees, while others place oversight within leadership offices, such as the mayor's office or a designated leadership body. This range of centralization approaches reflects the strategic choices made by each city, tailored to their unique administrative and operational contexts.

**Centralized structures serve as vital nexuses for digital strategy and implementation, enabling cities to harmonize digital initiatives with overarching municipal objectives while upholding uniformity across projects.** By consolidating oversight within IT departments or specialized committees, cities can streamline decision-making and project implementation, thereby reducing interdepartmental conflicts and redundancies. In cities that have established dedicated committees for digital transformation, all stakeholders are brought together under one framework, thereby facilitating coordination and enabling focused resource allocation. This structured approach has been demonstrated to be effective in the creation of a unified management system that facilitates the efficient execution of digital projects.

### IT departments or specialized committees predominantly manage digital projects

**In many cities, IT departments or specialized digital committees take on key management roles in coordinating digital projects.** These entities are not only responsible for overseeing the execution of digital projects but also play a strategic role in planning, resource allocation, and collaboration between various stakeholders. The establishment of a centralized unit within IT departments or specialized committees provides a clear chain of command, which eliminates confusion and promotes coordinated efforts across departments.

**The approach of having IT departments and specialized committees has facilitated project management and strengthened consistency and standardization across different initiatives.** This dual role of coordination and standardization helps to maintain the quality and coherence of digital initiatives. Specialized committees, which are often established to tackle cross-departmental digital challenges, have proven effective in maintaining a focus on strategic priorities. In these cases, committees act as dedicated management hubs, coordinating efforts and providing oversight for the complex processes involved in digital transformations.

### Leadership offices primarily oversee digital projects to align with municipal goals

**Leadership offices, such as the mayor's office or other senior municipal bodies, often assume central roles in overseeing digital projects.** This centralized leadership helps align digital initiatives with the city's broader strategic objectives. In several cities, the leadership office serves as the central authority responsible for directing digital projects, managing resources, and ensuring policy coherence. Direct involvement at the leadership level establishes a strong connection between digital projects and the city's long-term goals. Leadership offices not only provide strategic direction but also secure the political and administrative support needed to implement digital projects effectively.

**The role of leadership offices extends to facilitating agile decision-making and creating a unified vision for all departments.** This approach prevents conflicts and inconsistencies that may arise from fragmented management structures. Additionally, leadership involvement provides the authority and influence required to mobilize resources and coordinate efforts across different sectors. In this regard, Arab cities use different centralized structures to effectively manage digital transformations, leveraging specialized committees, IT departments, and leadership offices to achieve coordination and alignment with municipal strategies. These centralized structures enable cities to manage the complexities of digital transformation while maintaining a cohesive and strategic approach.

### ENHANCING CITIZEN ENGAGEMENT AND SATISFACTION THROUGH DIGITAL SERVICES IN MADABA, JORDAN

To foster stronger citizen engagement, Madaba city has expanded its IT department and digital service offerings, enabling residents to access a wide range of municipal services online. Citizens can make file complaints, and make payments through an online portal, eliminating the need for in-person visits and reducing waiting times at municipal offices. To encourage digital adoption, the city has implemented an incentive program that offers discounts on fees for citizens who make payments online. Despite initial reluctance from citizens unfamiliar with digital platforms, the city's IT team has actively engaged in community outreach, providing support and guidance on how to use the new systems. Citizens were taught how to download the municipal application, set up accounts, and navigate digital services, ensuring a smoother transformation. The city has also made efforts to address digital inclusivity by offering assistance for residents with limited digital literacy, helping them register and use the online system. Over time, the city has observed a growing acceptance and satisfaction with digital services, as citizens realize the convenience and efficiency of accessing municipal resources from home. As the citizens becomes increasingly accustomed to the digital platform, the city anticipates continued growth in digital engagement, which will contribute to greater transparency and trust in municipal governance.



Figure 22. Madaba, Jordan

## Diverse technological implementations impact coordination and efficiency in municipal operations

**The introduction of digital platforms, advanced tools, and streamlined processes has varied across cities, significantly impacting coordination, resource management, and efficiency. Technologies have reshaped the way cities share information, allocate resources, and manage projects, with each city experiencing different levels of integration and success in their digital transformation efforts.** Interviewees consistently described how these technological advancements have influenced operational practices in different contexts, highlighting the uneven adoption of digital strategies and tools across Arab cities.

### Digital platforms reveal differences in data sharing and transparency

**The adoption of digital platforms has led to varying levels of success in data sharing and transparency across municipal departments.** In several cities, integrated digital platforms enabled real-time data sharing, facilitating more collaborative approaches to municipal challenges. This integration contrasts with cases where fragmented systems or limited adoption of digital platforms created gaps in communication and decision-making. This flow also contributed to stronger internal accountability.

**Despite these advancements, the varied success in adopting integrated digital platforms has exposed differences in transparency and collaboration among cities.** Some cities have struggled with inconsistent data flows, limited interdepartmental communication, and a lack of standardized platforms. These inconsistencies can hinder effective decision-making and slow down project execution, impacting service delivery to citizens. The uneven adoption also reflects disparities in resource allocation and technical capacity, as some cities lack the infrastructure needed to support fully integrated systems. This variation emphasizes the importance of digital platforms as essential drivers of transparency and accountability while underscoring the need for consistent implementation to fully realize their benefits.



Figure 23. Casablanca, Morocco

## DIGITAL TRANSFORMATION PLATFORMS IN THE CITY OF CASABLANCA, MOROCCO: A MODEL FOR PROXIMITY MANAGEMENT AND INTERACTION WITH CITIZENS

The city of Casablanca has been at the forefront of digital transformation initiatives in Morocco, aiming to enhance public services and improve citizen engagement through various innovative platforms. Central to this transformation is the ***Digital Reception Desk***, which was launched at the national level to streamline administrative tasks and citizen interactions. Another key initiative is the complaint platform, which, although initiated before the Covid-19 pandemic, saw accelerated implementation during the crisis. These platforms reflect Casablanca's strategic approach to integrating digital solutions into the daily management of public services, enhancing transparency, and ensuring more efficient coordination between departments in service delivery.

Casablanca's digital transformation strategy extends beyond administrative services to specialized platforms catering to health and community needs. Examples include platforms for managing drug distribution, particularly for essential medications like diabetes drugs, and overseeing patient transport services at the provincial level. The city has also established platforms to manage health ceremony offices and mortuary services. One of the standout initiatives is the ***Casa In*** platform, which serves as a comprehensive digital ecosystem designed to manage change and foster community partnerships. This platform emphasizes institutional collaboration and the gradual roll-out of digital services in partnership with civil society associations, particularly in managing local services such as playgrounds for youth and meeting rooms for community consultations.

A critical element of Casablanca's strategy is the involvement of civil society and the emphasis on sustainability. The city's platforms, such as ***Casa In***, enable direct engagement with citizens through a personalized "citizen's account" that provides exclusive access to services. To support this approach, the city has invested in training its employees, ensuring that those responsible for managing digital services are equipped with the necessary skills. This not only ensures the sustainability of digital projects but also fosters a culture of continuous improvement through active listening to citizens and associations. By combining technology with community involvement, Casablanca is creating a resilient model of proximity management that prioritizes citizen needs and enhances municipal services.



## IMPACT OF DIGITAL TRANSFORMATION ON MUNICIPAL OPERATIONS AND GOVERNANCE IN IRBID, JORDAN

The digitization of Irbid city's operations has not only enhanced the accessibility of citizen services but also fundamentally transformed internal workflows, resulting in improved governance and operational efficiency. By integrating digital systems across departments, the city has reduced its reliance on paper-based procedures, creating a streamlined workflow that minimizes delays and enables real-time tracking of service requests. This transformation ensures that citizen requests are no longer dependent on the availability of specific staff members, allowing for continuity in service provision even in cases of absenteeism. Digital processes allow for immediate status updates, reducing the need for follow-ups and expediting service delivery, which has been particularly valuable for services with high public demand.

Additionally, Irbid's adoption of Geographic Information Systems (GIS) has greatly enhanced the city's urban planning capabilities. The GIS system allows Irbid to monitor and manage resources, map out zoning and land use, and enforce compliance with municipal regulations. For instance, GIS data enables the city to identify unauthorized land use or construction violations in real-time, reducing regulatory breaches. Furthermore, digital tools enable Irbid to address pressing urban challenges, such as waste management, emergency response, and transportation planning, by providing accurate data that facilitates informed decision-making. By centralizing these functions into a unified digital system, Irbid city is equipped to handle urban complexities more effectively and provide better oversight and resource management. This integrated approach positions Irbid to be more adaptive and responsive to its citizens' needs, ensuring that digital transformation directly contributes to improved urban governance and service quality.



Figure 24. Irbid, Jordan

### Digital tools highlight disparities in joint actions and resource optimization

**The use of digital tools across cities has highlighted disparities in how joint actions are coordinated and resources are optimized.** In cities with fully integrated centralized digital systems, departments have effectively synchronized their efforts, reduced overlapping responsibilities, and streamlined project execution. In these cases, the centralized nature of digital tools has facilitated more strategic planning and efficient utilization of municipal resources, enhancing overall effectiveness.

**However, not all cities experienced the same level of success. In cities with partial or fragmented adoption of digital tools, redundancies, and inefficiencies persisted due to limited communication and coordination mechanisms.** This variation has created differences in how cities manage resources and address cross-departmental projects. In contrast to cities with well-integrated systems, participants from other cities pointed to continued challenges in aligning departmental efforts and maximizing resources. The effective use of digital tools, therefore, reveals differing levels of resource optimization and collaboration.

### Streamlined digital processes exhibit differences in follow-up and management capacity

**The extent to which cities have adopted streamlined digital processes has varied widely, impacting their capacity for follow-up and efficient management.** In cities where digital systems are integrated into monitoring and evaluation processes, there is significantly improved project tracking and management efficiency.

**Despite these advancements, the varied success in adopting integrated digital platforms has exposed differences in transparency and collaboration among cities.** These inconsistencies can hinder effective decision-making and slow down project execution, impacting service delivery to citizens. The uneven adoption also reflects disparities in resource allocation and technical capacity, as some cities lack the infrastructure needed to support fully integrated systems. This variation emphasizes the importance of digital platforms as essential drivers of transparency and accountability while underscoring the need for consistent implementation to fully realize their benefits.

## Organizational restructuring reflects varied approaches to addressing digital transformation challenges

**Arab cities have undertaken different forms of organizational restructuring in response to the demands of digital transformation.** This restructuring commonly involves creating new units and cross-departmental teams to better address the complexities of digital initiatives. Interviewees consistently described how these structural changes were essential for enhancing coordination, clarifying responsibilities, and fostering collaboration, highlighting diverse strategies employed to support digital governance.

### Creation of dedicated digital transformation units centralizes coordination

**In numerous cities, the restructuring efforts included establishing dedicated digital transformation units overseeing all digital projects and initiatives.** The formation of these units provided a centralized structure for coordinating digital efforts, clarifying responsibilities, and aligning initiatives with municipal goals. These units became focal points for digital transformation, consolidating efforts under a single entity to ensure consistency and coherence. The specialized units were given clear mandates to manage digital strategies and implement digital initiatives in line with broader municipal objectives. Having specialized units not only improved planning and resource allocation but also facilitated better communication across departments. This organizational shift helped cities streamline decision-making processes and achieve greater alignment in their digital strategies.

**These units also played a critical role in long-term planning and setting strategic digital roadmaps.** Establishing these units allows for more focused and sustained efforts in digital transformation. This centralized structure provided continuity in planning and implementation, ensuring that digital initiatives remained aligned with the city's strategic vision.

### Cross-departmental teams reveal collaborative responses to complex challenges

**The restructuring efforts in various cities also included the formation of cross-departmental teams to address specific digital initiatives, especially those requiring multidisciplinary expertise.** These teams brought together experts from different fields to collaborate on projects that crossed traditional departmental boundaries. By pooling expertise and resources, these teams were able to address urban challenges more comprehensively and develop more innovative solutions.

**The cross-departmental teams were designed to be flexible and adaptive, allowing cities to respond to dynamic challenges with integrated approaches.** Participants noted that these teams facilitated the combination of technical knowledge and on-the-ground insights, leading to more effective project implementation. Moreover, the creation of cross-departmental teams supported continuous collaboration and adaptation. The teams provided a space for regular interaction and information exchange, enabling them to refine their strategies based on new insights and developments. This collaborative and adaptive structure reflected a commitment to ongoing improvement in digital transformation efforts.

## Resistance and varied impacts shape organizational change in digital transformation

**The digital transformation process has brought various challenges to cities, most notably resistance to change among employees.** Additionally, implementing different digital technologies has led to varying impacts on municipal operations, requiring distinct responses. National regulations also play a critical role in shaping digital strategies but occasionally constrain innovation. These dynamics reflect the complexities cities face in managing digital transformations.

### Employee resistance creates challenges in adopting new digital systems

**Resistance to adopting new digital systems among municipal employees emerged as a significant challenge.** Many employees, accustomed to traditional workflows, expressed hesitance or discomfort with transitioning to new digital processes. This resistance often stemmed from a reluctance to shift away from established practices, emphasizing the need for clear communication and targeted training to ease the transformation.

**The resistance to change was not only a matter of individual hesitation but also reflected broader cultural and structural issues within organizations.** Employees' long-standing reliance on traditional methods created inertia that was difficult to overcome. This situation highlighted the importance of addressing both cultural and structural barriers in managing organizational change.

### Varied impacts of digital technologies complicate implementation

**The introduction of different digital technologies led to varied impacts on municipal operations, creating distinct challenges that required tailored implementation approaches.** Technologies such as digital archiving systems, Geographic Information Systems (GIS), and mobile platforms each brought unique changes to organizational processes. These varied impacts demonstrated the complexity of integrating multiple digital tools within municipal frameworks.

**These technological impacts were not limited to technical adjustments but extended to shifts in responsibilities and workflows.** Digital archiving, for example, required the establishment of new data management protocols, while GIS transformed spatial planning and inter-departmental coordination. Each technology introduced distinct challenges, from reorganizing data systems to enhancing collaboration across departments, requiring cities to adapt their strategies to accommodate each tool. This diversity of impacts highlights the complexities cities face in crafting cohesive and adaptable digital strategies.

## Regulatory frameworks influence and constrain digital initiatives

**National regulations emerged as both influential and restrictive in shaping municipal digital initiatives.** On one hand, regulatory frameworks provided cities with essential guidelines and standards for digital projects. On the other hand, stringent regulations sometimes limit flexibility and stifle innovation. This duality underscored the complexities of aligning digital initiatives with national frameworks while maintaining room for adaptation.

**The influence of national regulations extended to various dimensions of digital governance, including data security, privacy standards, and public service delivery.** Leaders acknowledged that compliance with these standards was crucial for maintaining legitimacy and reliability in digital projects. However, participants also highlighted the rigidity of certain regulations, which posed challenges in adapting digital solutions



Figure 25. Mogadishu, Somalia

### INNOVATIVE DIGITAL PAYMENT SYSTEMS IN MOGADISHU, SOMALIA

Mogadishu Municipality has implemented a groundbreaking practice by adopting digital payment systems via mobile phones, transforming how financial transactions are conducted in the city. The system, known as "EVC Plus," enables citizens to pay taxes, fees, and other municipal services directly through their mobile devices, eliminating the need for cash-based transactions and intermediaries.

This approach has delivered multiple benefits. First, it has significantly increased financial transparency, reducing opportunities for corruption and mismanagement by ensuring that funds are directly deposited into government accounts. Second, the system has enhanced efficiency, allowing payments to be processed instantly and streamlining financial workflows. Third, the platform's accessibility has promoted widespread adoption among residents, fostering inclusivity and making digital services available to a broader population.

Mogadishu's innovative use of mobile payment technology aligns with its broader digital transformation goals. It highlights how leveraging digital tools can modernize municipal services and improve transparency, efficiency, and citizen engagement. Mogadishu's experience provides valuable insights for cities seeking scalable and effective solutions to enhance urban service delivery.



Figure 26. Tripoli, Libya

## BREAKING BARRIERS: OVERCOMING RESISTANCE TO DIGITAL CHANGE IN TRIPOLI, LIBYA

In Tripoli, resistance to digital transformation presents a significant challenge, rooted largely in cultural preferences and the unfamiliarity of many citizens and municipal employees with digital systems. Older citizens often prefer face-to-face interactions and physical paperwork, viewing these traditional methods as more reliable and personal than digital interfaces. This cultural attachment creates hesitancy to adopt new online services, particularly in a society where trust in digital transactions is still developing. Similarly, many long-serving employees at the city are unaccustomed to digital systems, making the transformation daunting. This reluctance to change is compounded by a lack of familiarity with digital tools, leading employees to favor established manual processes over digital alternatives.

To address this resistance, the city has implemented several measures aimed at easing the transformation and building trust in digital processes. Recognizing that effective training is essential, the city has launched a training program to help employees build digital literacy and comfort with new systems, with plans to continue these initiatives through 2025. Additionally, the city has coordinated with the Ministry of Local Government, which has provided resources and shared digital systems such as an employee management platform and a digital mail system. By introducing these digital tools gradually, the city hopes to foster familiarity and reduce apprehension, allowing employees to adapt to the digital shift with greater confidence and support.

On the citizens' front, Tripoli has established a citizen service center, or "single window," which enables citizens to submit complaints and applications online, offering an alternative to in-person services. A dedicated hotline further serves as a transitional tool, allowing citizens to communicate with the city through familiar methods while adjusting to digital options. These efforts are bolstered by an emphasis on building trust in digital processes, with the city actively working to ensure that citizen requests are addressed reliably, whether submitted online or via phone. By focusing on gradual exposure, structured support, and trust-building, Tripoli's approach to digital transformation seeks to reduce resistance and create a more receptive environment for digital services in the city.

## COORDINATION WITH NATIONAL POLICIES AND LEGAL FRAMEWORKS IN ZGHARTA, LEBANON

Zgharta's journey toward digital governance reflects the broader challenges Lebanese cities face due to inconsistencies between national and local policies, particularly regarding outdated legislation. Lebanon's municipal laws, which predate the digital era, lack the provisions necessary to support comprehensive e-governance, creating obstacles for cities attempting to implement digital solutions. For instance, while the city aims to modernize financial management, it remains bound by traditional public finance laws requiring budgets to be submitted in a standard format. This format, incompatible with the detailed and analytical budgeting essential for effective digital management, forces Zgharta to adapt its digital systems to meet legal requirements, limiting the city's ability to fully leverage the benefits of digital governance.

In response to these limitations, Zgharta has implemented a dual accounting approach, maintaining two separate systems to reconcile digital records with the rigid national format. This approach allows the city to meet local needs for detailed financial oversight while simultaneously adhering to national standards. By manually translating their digital records into the format required by the central government, Zgharta can continue its digital transformation without violating existing laws. However, this workaround is labor-intensive and highlights the need for legislative reforms that would allow cities greater flexibility in adopting digital tools. Zgharta's commitment to dual-system management underscores the adaptability required of cities that are striving for digital transformation within restrictive legal frameworks.

Additionally, Zgharta collaborates with progressive voices at the national level to advocate for legislative support for local e-governance. A young member of parliament, heading the parliamentary committee on digital governance, has been working closely with the city to propose amendments that would facilitate digital transformation. By regularly providing feedback and simulation scenarios to this committee, Zgharta is actively contributing to a future legislative environment more conducive to e-governance. This cooperation reflects the city's pro-active role in pushing for reforms, recognizing that successful digital governance requires alignment not only within local systems but also with national legal frameworks. Through these efforts, Zgharta exemplifies the importance of local-national coordination to overcome regulatory barriers and advance digital governance across Lebanese cities.



Figure 27. Zgharta, Lebanon *(Image by Mar Sharb)*



Figure 28. Nouakchott, Mauritania

## DIGITAL SERVICES FOR ENHANCED MUNICIPAL OPERATIONS IN NOUAKCHOTT, MAURITANIA

Nouakchott has launched various applications and platforms to streamline municipal services and enhance public accessibility. and improve accountability ***The "HEWIYETI"*** app allows citizens to perform tasks such as applying for passports or updating student information directly from their mobile devices, simplifying previously paper-intensive processes. This app reflects Nouakchott's commitment to making services more citizen-centric, reducing the need for physical visits to municipal offices and thereby cutting down wait times and improving administrative efficiency.

Moreover, Nouakchott is exploring applications in other areas, such as banking services and secure digital identification, to enable broader participation in digital transactions. The shift towards digital services has also improved transparency and accountability within municipal operations, offering citizens greater visibility into municipal decisions and actions. As Nouakchott continues to develop its digital infrastructure, more services are expected to move online, reflecting the city's goal to make public administration more responsive and accessible.

to local needs. Moreover, the regulatory landscape influenced how cities allocated resources and prioritized projects. Meeting national guidelines often requires significant investments in infrastructure and personnel training. This impact on resource management highlighted the need for alignment between municipal and national digital strategies to navigate regulatory constraints effectively.

## Conclusion

**This chapter examines how digital transformation is reshaping organizational structures in Arab cities, leading to a diverse array of management models and processes.** The findings indicate that Arab cities are implementing centralized structures, such as IT departments, leadership offices, and specialized committees, to oversee digital initiatives and ensure alignment with broader city goals. While IT departments or specialized committees often focus on executing and standardizing digital projects, leadership offices provide strategic oversight to facilitate consistency and resource efficiency. These organizational frameworks help reduce interdepartmental conflicts, streamline project execution, and maintain coherence across digital initiatives. However, the restructuring process is in its nascent stages, with cities gradually adapting to digital transformation's demands on their organizational frameworks.

**The integration of digital technologies has presented both opportunities and challenges.** On the one hand, technologies like GIS and mobile platforms enhance operational transparency, improving resource allocation and fostering interdepartmental collaboration. On the other hand, employee resistance and varied impacts across departments highlight the need for tailored implementation and robust change management programs. Furthermore, national regulations guide but can also limit the flexibility of municipal digital strategies, necessitating a balance between compliance and adaptability. These findings underscore that while some Arab cities are pioneering new models of digital governance, a more nuanced approach that integrates organizational change with technological innovation and regulatory alignment is crucial for long-term digital success.



# RECOMMENDATIONS

01 **Create centralized management units for digital oversight.** Establish specialized units, such as digital transformation offices, to manage city-wide digital initiatives. These units ensure alignment with strategic goals, optimize resource use, and reduce departmental conflicts. By centralizing oversight, cities can standardize processes and maintain consistency across all projects, fostering a more cohesive approach to digital transformation.

02 **Form cross-departmental collaboration teams that can help in knowledge management.** Digital transformation often requires expertise from various municipal departments. Creating cross-functional teams with representatives from areas like GIS, IT, and urban planning enables collaborative problem-solving and comprehensive solutions for challenges such as real-time traffic management and resource allocation. These teams enhance knowledge sharing and foster integrated approaches to complex initiatives.

03 **Implement robust employee training and change management programs.** To mitigate this, cities should invest in targeted change management and training programs that upskill employees in relevant digital tools, such as ERP and GIS systems. Training sessions and support structures can ease transitions and empower employees to adapt to new responsibilities, fostering an environment where digital innovation is embraced rather than resisted.

04 **Promote citizen engagement through incentives for digital service use.** Enhancing citizen participation in digital services strengthens transformation efforts. Offering incentives, such as discounts for online service payments, can drive adoption, while user-friendly applications with transparent service tracking build trust. This dual approach fosters accountability and encourages active citizen involvement in digital platforms.

05 **Collaborate with national authorities for regulatory flexibility.** Cities must navigate national regulations while fostering digital innovation. Maintaining open communication with national ministries, such as those managing the digital economy, allows cities to adapt regulatory frameworks to local needs. This partnership ensures compliance while enabling tailored strategies that align with both municipal priorities and national objectives.

CHAPTER 05

# SKILLS FOR DIGITAL TRANSFORMATION

## KEY MESSAGES

01 **Digital skills gaps persist in municipal staff in Arab Cities. There are diverse competency needs across multiple administrative levels.** These gaps affect the success of digital initiatives, as cities struggle to find and retain personnel capable of managing advanced technologies. While technical staff require expertise in system integration and digital operations, mid-level managers need skills in data-driven decision-making, and senior leaders must have strategic digital governance knowledge.

02 **Recruitment strategies to address digital skills shortages are shifting in Arab cities, by an increased reliance on external consultants and specialists.** This approach addresses immediate needs, especially in areas requiring niche expertise. However, cities are also investing in long-term solutions by recruiting professionals with programming, data analysis, and cybersecurity skills. Collaborations with local universities aim to tap into emerging talent pools and foster digital competencies among graduates.

03 **Arab cities are engaged in tailored training programs for different municipal levels to challenge digital literacy and communication skills.** Senior management programs emphasize strategic digital governance and planning, while technical staff training focuses on cybersecurity, system integration, and digital service delivery. Collaboration with international partners has introduced employees to global best practices, equipping them with valuable technical skills and insights.

04 **Exposure to international success stories and innovative practices has been instrumental in inspiring Arab cities to adapt global approaches to local challenges.** Exchange programs and ongoing cooperation with international organizations have fostered creativity and the development of customized digital solutions. These relationships not only encourage innovation but also establish long-term channels for continuous knowledge sharing, enabling cities to remain informed about emerging trends and advancements in digital governance.

**The rapid digital transformation of Arab cities is fundamentally altering their operations, resource management, and citizen engagement.** However, the prevalent digital skills shortage among municipal staff is a significant obstacle to these advancements. As cities increasingly adopt data-driven technologies and aim for integrated digital solutions, the demand for specialized competencies has surged. Addressing these skill gaps is complex, as cities require a diverse array of digital competencies across all levels of administration. Technical staff need expertise in areas like data analytics, GIS, cybersecurity, and digital project management. At the same time, mid-level managers and decision-makers must develop skills in data-informed decision-making and digital strategy. This layered demand for digital proficiency underscores the need for cities to invest not only in recruiting skilled talent but also in enhancing digital literacy and capabilities among existing staff.

**To mitigate these challenges, cities are exploring various strategies, including revising recruitment priorities to attract digitally skilled employees, engaging external consultants for specialized projects, and collaborating with universities to build a local talent pipeline.** Additionally, international cooperation has emerged as a significant avenue for cities to enhance digital competencies, providing access to specialized training programs, global best practices, and insights into effective digital transformation strategies. This chapter highlights the importance of these efforts, emphasizing the need for a sustained commitment to building digital skills and fostering a culture of continuous learning. As Arab cities pursue ambitious digital goals, bridging the digital skills gap will be essential to ensure that digital transformation efforts are inclusive, effective, and aligned with the broader objectives of municipal governance.

## Digital skills gaps present a persistent challenge for municipal transformation

**The shortage of specialized digital skills within municipal administrations in Arab cities presents a significant barrier to effective digital transformation.** As digital initiatives grow in complexity, cities face increasing pressure to develop expertise in areas such as data analytics, cybersecurity, GIS, and project management. These skills are not only vital for the technical execution of projects but also for fostering interdepartmental collaboration and engaging with citizens. This section examines the range of digital competencies required across different levels of municipal administration, the challenges in attracting and retaining skilled talent, and the critical role of public engagement skills among front-line staff. Together, these findings underscore the urgency for cities to address digital skills gaps to build a foundation for sustainable, inclusive digital governance.

### Widespread shortages in specialized digital skills

**Arab cities face significant shortages in specialized digital skills, particularly in areas such as data analytics, cybersecurity, GIS, and digital project management.** This lack of expertise has become a recurring obstacle in implementing and managing digital projects efficiently. The findings suggest that the shortage of technical skills is not limited to smaller or under-resourced cities but extends to more developed urban areas facing rapid digitalization.

**Cities are encountering difficulties filling key positions with qualified individuals capable of handling the demands of advanced digital systems.** The growing reliance on sophisticated digital tools and data-driven processes has underscored the urgency to address these skill gaps. The situation is further compounded by the competition for skilled digital talent with the private sector, which often offers more attractive opportunities to individuals with specialized knowledge in high-demand areas like cybersecurity and digital project management.

**The lack of clarity in municipal organizational charts represents a significant obstacle, as do the outdated job descriptions of existing posts, which may have their roots in the Municipal Laws.** For example, in numerous municipalities, the recruitment of an expert in GIS is a challenging endeavor, as the municipality is unable to justify the position within the existing job description.

### Diverse digital competencies required at multiple levels

**Cities reported a lack of digital competencies across different levels of administration, from technical staff to mid-level managers and decision-makers.** Technical staff are expected to possess advanced expertise in maintaining and integrating digital systems, managing cybersecurity threats, and utilizing complex tools like GIS. However, cities also face the challenge of equipping mid-level managers with competencies in data-driven decision-making, digital project management, and strategic implementation. This differentiation in skill requirements reflects the multi-layered nature of digital transformation, which demands both technical proficiency and managerial competence. However, the lack of digital literacy and operational knowledge among their administrative staff ensures that digital initiatives are not confined to technical departments but are integrated across all facets of governance.

**The multi-level approach to digital competencies underscores the strategic importance of having a digitally aware leadership that can guide municipal policies and planning. Without these competencies, the adoption of digital tools and solutions remains isolated to technical units, lacking the necessary integration into broader municipal strategies.** This gap affects the alignment of digital projects with city-wide goals, particularly in areas that require cross-departmental collaboration, such as urban planning, public safety, and citizen engagement.

### Lack of skills for public engagement and digital tools

**There is a lack of skills for digital and public engagement skills among front-line staff who interact directly with citizens.** As cities transition towards digital platforms for public services, employees in these roles are expected to be proficient in using digital tools and have strong communication skills to guide and support residents. However, this shift towards enhancing public-facing skills is still absent for digital transformation, which needs to go beyond internal capabilities to include citizen interaction and outreach.

**Due to this lack of skills, cities increasingly focus on enhancing digital literacy among front-line staff, recognizing that citizens are essential participants in the digital transformation process.** The success of e-governance and digital services largely depends on the public's trust and comfort with these platforms. Consequently, municipal staff who interact directly with citizens are now expected to be well-versed in using digital tools to communicate effectively, resolve issues, and offer guidance to residents unfamiliar with digital processes.

### INTERNAL DIGITAL TRANSFORMATION AND EMPLOYEE TRAINING IN MADABA, JORDAN

A critical component of Madaba's digital transformation has been the training and upskilling of municipal employees to effectively use new digital tools and systems. Recognizing that digital tools are only as effective as the people using them, Madaba invested in training programs to ensure that staff, particularly engineers and administrative personnel, could adapt to and maximize the benefits of digital systems. Employees received extensive hands-on training, specifically in the use of GIS for street naming, property numbering, and monitoring. Over several weeks, staff mastered software functionalities and were deployed into the field to apply what they learned. This approach allowed employees to familiarize themselves with technology while contributing to real-world tasks that benefit the community.

In addition to field operations, the city digitized essential processes, such as professions licensing, complaint filing, and electronic payment systems. Through the new digital complaint system, citizens can submit complaints online, track their progress, and receive updates from the respective department, all without needing to visit municipal offices. This shift has reduced paperwork and enhanced workflow within the city, enabling faster response times and accountability. Madaba's "single-window system," linked to the Ministry of Finance, consolidates these digital services, allowing citizens to manage requests and make payments online, significantly reducing their dependence on in-person interactions. All this led to an alleviation of certain types of work municipal employees used to do, but it also brought new activities that require different sets of skills and continuous training.



Figure 29. Madaba, Jordan (*Image by Marco D'Abramo - unsplash.com*)

**Furthermore, there is a noticeable emphasis on inclusivity in the approach to digital transformation within municipal administrations.** This approach extends beyond technical training, as cities aim to engage a broad spectrum of citizen groups, including those with lower levels of digital literacy. By equipping staff with strong communication and public engagement skills, cities are actively working to lower barriers to digital adoption, striving to ensure that essential services are accessible to all residents.

## Shifts in recruitment and external talent drive digital initiatives

**In Arab cities, digital transformation is reshaping recruitment strategies and heightening reliance on external expertise, driven by the urgent need to bridge digital skills gaps and meet the demands of modern digital governance.** Cities are adopting varied approaches to address these challenges, focusing on hiring staff with specialized digital skills, engaging external consultants for complex projects, and forming partnerships with academic institutions to create diverse talent pipelines. These shifts reflect a dynamic adaptation within municipal HR practices, emphasizing flexibility and strategic alignment with the broader digital transformation goals.



Figure 30. Baghdad, Iraq

### EMPLOYEE TRAINING AND DIGITAL SKILL DEVELOPMENT IN BAGHDAD CITY, IRAQ

To effectively transition from manual to digital operations, Baghdad's city implemented a structured, department-specific training framework to build digital skills among employees. This included specialized programs for complex services, such as permit issuance and revenue collection, where staff received tailored guidance on digital workflows. IT personnel were deployed on-site to provide real-time support, ensuring employees adapted smoothly to new systems without significant disruptions. This hands-on assistance helped address initial concerns and facilitated a more seamless integration of digital tools into daily tasks.

The city fostered a culture of continuous learning, offering ongoing workshops and a digital training platform accessible remotely. This platform allowed employees to complete courses at their own pace, supporting flexible and consistent upskilling. By also establishing feedback channels, the city enabled staff to report challenges and request further training, which helped keep them aligned with the latest technological developments and system updates. Additionally, "digital champions" were appointed within departments to assist peers and promote internal support, enhancing overall buy-in for the transformation.

Through regular assessments and data-driven feedback, Baghdad's city monitored training effectiveness and addressed any remaining skill gaps. These evaluations enabled targeted follow-up sessions, ensuring high competency across the workforce. By strategically investing in digital skills and addressing literacy gaps, the city not only strengthened its service efficiency but also built a resilient workforce capable of adapting to future technological advancements, ultimately improving service delivery and citizen engagement.

### Recruitment strategies prioritize digital expertise

**In response to the persistent skills shortages, many cities are placing a heightened emphasis on recruiting candidates with strong digital backgrounds.** Some cities are trying to attract professionals with technical skills in programming, data analysis, cybersecurity, GIS, and digital project management. This trend points to an ongoing shift in recruitment priorities to meet the technical demands of digital projects and build internal capacities within municipal teams.

**The emphasis on hiring professionals with digital expertise highlights a strategic pivot within municipal human resource practices.** Cities are increasingly aware of the need to develop a workforce capable of implementing and managing sophisticated digital solutions. Cities are prioritizing recruits who can adapt to evolving digital environments and contribute effectively to cross-departmental projects. This approach reflects the growing complexity of digital transformation efforts, which often require technical proficiency and collaborative skills to integrate digital solutions across various municipal functions, from public safety and transportation to citizen services and urban planning.

**In addition to technical competencies, cities are also seeking recruits who bring innovative perspectives and the ability to work within dynamic teams.** Digital transformation initiatives demand not only specialized skills but also a proactive and adaptable mindset, enabling municipal administrations to respond effectively to emerging digital challenges. This focus on adaptability and collaboration is becoming increasingly relevant as cities navigate complex digital projects that involve multiple stakeholders and require coordinated efforts across different departments.

### External consultants and specialists address complex digital needs

**Arab cities are frequently turning to external consultants and specialists to address complex digital needs, particularly for projects requiring niche skills or advanced technological knowledge.** This reliance on external expertise is particularly prominent in areas such as smart infrastructure development, advanced data analytics, cybersecurity, and digital service integration.

**The engagement of external consultants reflects a strategic decision by cities to bridge critical skill gaps and sustain the momentum of digital projects.** Cities often face challenges in recruiting and retaining highly specialized staff due to budgetary constraints and competition from the private sector. External consultants provide a practical solution, allowing cities to meet immediate needs while internal capacity-building efforts are underway. The findings also indicate that the use of external expertise is not viewed as a permanent solution but rather as a temporary measure to fill specific gaps and support complex initiatives.

**Beyond addressing immediate technical needs, engaging external consultants exposes municipal staff to global best practices and innovative approaches.** In some cities, external experts have brought new methodologies, technologies, and strategic insights that have enriched municipal projects. This exposure facilitated knowledge transfer, enabling municipal teams to learn from external experiences and apply these lessons to their local context. The findings underscore the dynamic interplay between external support and internal capacity-building as cities strive to develop the necessary competencies to sustain digital transformation independently in the long term.

### Collaborations with universities expand recruitment options

**Some Arab cities are actively collaborating with local universities to tap into emerging talent pools and promote digital skills development.** These collaborations often take the form of internships, joint research projects, and digital skills initiatives, providing students with opportunities to contribute to municipal digital projects while gaining practical experience. These university collaborations are expanding beyond traditional internships to include deeper partnerships, such as the co-design of digital solutions and joint research initiatives. These collaborations serve as a mutually beneficial arrangement, providing cities with access to tech-savvy individuals and offering universities opportunities to connect students with real-world challenges. By engaging with academic institutions, cities not only address their immediate staffing needs but also contribute to the broader development of a digitally skilled workforce.

**The integration of students into municipal projects is fostering a culture of continuous learning and innovation within municipal governance.** The findings reveal that these collaborations enable cities to stay attuned to emerging technologies and innovative approaches, benefiting from students' fresh perspectives and digital knowledge. Additionally, the partnerships provide cities with a pipeline of promising young professionals who can transition into full-time roles within municipal teams upon graduation, addressing long-term talent development needs. These university partnerships extend beyond recruitment, encompassing the development of tailored digital training programs and the co-creation of innovative solutions to municipal challenges. By engaging universities in this capacity, cities gain access to academic expertise, emerging research, and state-of-the-art technologies, enriching their digital transformation strategies and enhancing their capacity to tackle evolving challenges.

## International cooperation broadens digital competencies in Arab cities

**International cooperation has emerged as a key factor in enhancing digital competencies and capabilities across Arab cities.** Cities have expanded their knowledge base and acquired new skills to address complex digital challenges through partnerships with international organizations, participation in specialized training programs, and exposure to successful digital transformation practices in other cities. These cooperative efforts have provided access to technical expertise, innovative methodologies, and global best practices, allowing cities to better align their digital initiatives with evolving global standards.

### Access to international training programs strengthens municipal skills

**Arab cities have gained valuable support from international organizations and development agencies, which have facilitated access to specialized training programs focused on various aspects of digital transformation.** These training opportunities have been crucial in developing technical capabilities and strategic skills, enabling municipal employees to stay abreast of advancements in smart city technologies, cybersecurity protocols, and digital infrastructure management.

These specialized training programs have provided municipal employees with the opportunity to learn from international experts, gaining in-depth knowledge and hands-on experience in critical areas such as GIS, data analytics, digital services management, and advanced project planning. The findings suggest that access to this type of training has contributed significantly to building municipal expertise in managing and implementing digital projects. It has enabled cities to address skill gaps and enhance their ability to navigate the complexities of digital transformation.

**International cooperation often resulted in training programs aligned with global standards and industry benchmarks.** Municipal employees not only acquired technical skills but also gained insights into best practices for maintaining and improving digital services. These programs offered exposure to standardized methodologies, technical protocols, and regulatory frameworks, helping municipal teams align their operations with international norms and best practices.

### Tailored training programs address different municipal levels

**Another key aspect of international cooperation has been the development of tailored training programs designed to meet the specific needs of different levels within municipal administrations.** These programs were carefully structured to target both senior management and technical staff, addressing the distinct skill sets required for each role.

**The tailored nature of these programs reflects a comprehensive approach to skill development, acknowledging the diverse competencies required at various levels within municipal structures.** The training tracks for senior officials emphasized digital leadership, strategic visioning, and the integration of digital solutions into municipal policies. Simultaneously, technical staff participated in training programs focused on developing practical skills in system integration, data management, GIS applications, cybersecurity measures, and digital service delivery. Therefore, it is highly important to equip technical staff with the expertise to handle the day-to-day maintenance and management of digital systems. By adopting a differentiated training approach, cities were able to build a workforce that was both technically proficient and strategically capable, fostering a more cohesive and responsive digital ecosystem.

**Moreover, the tailored training programs extended beyond technical and strategic skills to include project management, change management, and interdepartmental collaboration techniques.** The incorporation of such skills was aimed at improving coordination among municipal departments, promoting a holistic approach to digital project implementation, and ensuring that all levels of administration were adequately prepared to support digital initiatives.

### Exposure to global good practices fosters innovative approaches

**International cooperation has not only facilitated technical training but also exposed municipal employees to successful digital initiatives and innovative practices from around the world.** The international exchange programs enabled municipal staff to visit smart cities in other regions, where they observed how these cities tackled digital challenges and implemented advanced solutions. This exposure to global best practices provided municipal employees with valuable insights into the practical application of digital technologies in urban governance. These exchanges broadened the perspectives of municipal staff, encouraging them to think creatively about how to address local challenges using digital solutions. The opportunity to witness firsthand how other cities integrated smart infrastructure, digital services, and citizen engagement platforms inspired municipal teams to explore and adapt these approaches to their specific contexts.

**The findings indicate that the benefits of international exposure extended beyond simple knowledge acquisition.** The exchange programs fostered a culture of continuous improvement and innovation within municipal administrations. Employees returned from these visits with new ideas, methodologies, and strategic frameworks that could be adapted to their local contexts. For instance, municipal teams were inspired by the integration of smart mobility systems, e-governance platforms, and public safety technologies they encountered in other cities. These initiatives were then customized to address local needs and priorities, leading to the development of localized solutions that reflected both global standards and local realities.

### WORKFORCE DEVELOPMENT AND ADAPTATION TO DIGITAL SYSTEMS IN RIYADH, SAUDI ARABIA

The city of Riyadh has prioritized workforce development as part of its digital transformation initiative, emphasizing the need for employees to acquire skills that align with modern digital service delivery. To achieve this, Riyadh implemented a range of training programs focusing on both foundational digital literacy and specialized skills in areas like data analytics, digital customer service, and smart city management. Additionally, new roles such as digital experience designers and specialists in smart city technologies were created, aiming to enhance both the city's internal operations and its service offerings to residents. By addressing skill gaps and introducing these specialized roles, Riyadh has positioned its workforce to operate efficiently within an increasingly digital framework.

Training efforts have been bolstered by hands-on sessions and workshops, with IT support readily available to assist employees as they navigate new systems. The city has invested in training that covers everything from the basics of new digital tools to more complex applications that support urban planning and service coordination. These programs are designed not only to familiarize employees with current technologies but also to provide them with the adaptive skills needed to keep up with future advancements. Regular feedback and continuous learning opportunities are integral parts of this strategy, allowing employees to refine their skills and remain agile in response to updates and changes within digital systems.

Furthermore, Riyadh has introduced advanced mobile applications and integrated back-end systems to facilitate seamless communication between departments and ensure prompt service delivery to residents. This digital-first approach has fostered a more responsive workforce, capable of meeting the evolving expectations of a digitally connected population. By embedding technology into both administrative processes and public services, the city of Riyadh has not only improved operational efficiency but also established a robust framework for ongoing workforce adaptability and professional growth.

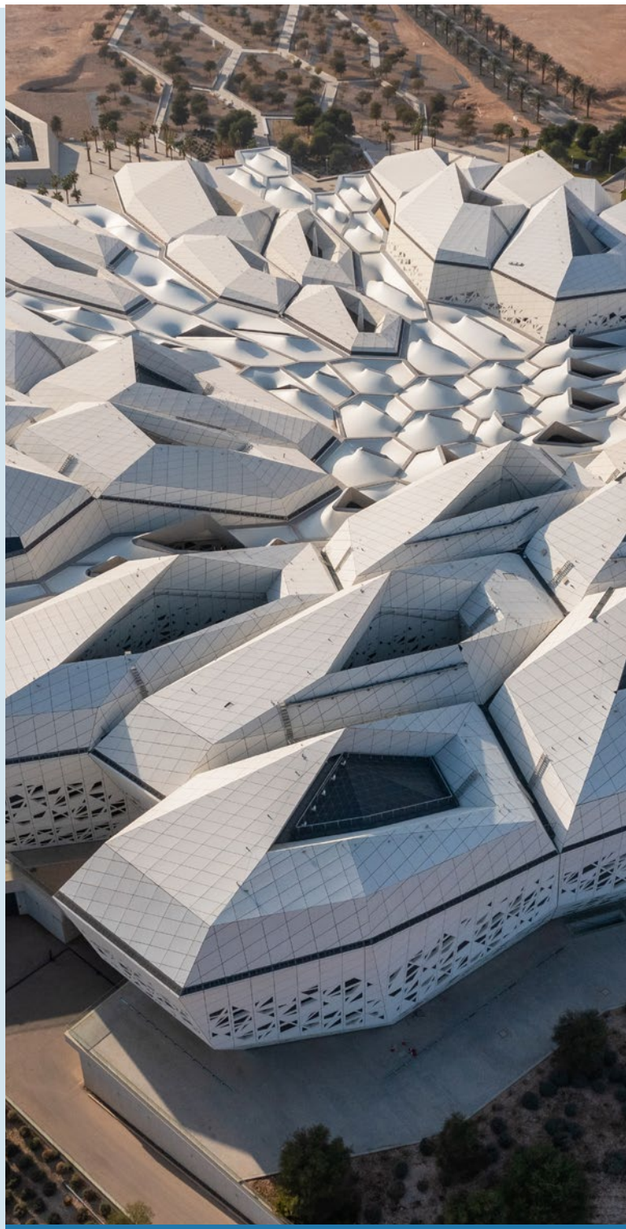


Figure 31. Riyadh, Saudi Arabia (*Image by Ali Al-Suhaibani*)

## Conclusion

**This chapter underscores the crucial role that digital skills play in the transformation efforts of Arab cities, highlighting a persistent gap in specialized competencies across all levels of municipal administration.** From technical skills in data analytics, cybersecurity, and GIS to managerial capabilities in digital project management and data-driven decision-making, cities face challenges filling roles with qualified candidates. This skill shortage is compounded by competition from the private sector, making it difficult for cities to retain digitally skilled talent. To address these gaps, Arab cities are increasingly prioritizing the recruitment of digitally proficient staff, relying on external consultants to meet immediate needs, and collaborating with local universities to tap into emerging talent pools. These collaborations not only provide students with practical experience but also help to develop a steady pipeline of digitally skilled professionals for municipal positions.

**Additionally, the chapter highlights how training programs, especially those developed in cooperation with international partners, play a pivotal role in building digital capacities at all administrative levels.** Tailored training for senior management emphasizes digital governance and strategic planning, while technical staff benefit from focused programs on cybersecurity, digital service delivery, and system integration. Exposure to global best practices through international exchange programs has introduced municipal employees to innovative approaches and effective digital solutions from other cities, fostering an environment of continuous learning and adaptation. As Arab cities continue to invest in developing digital skills, these efforts are essential to ensure that digital transformation is both sustainable and responsive to the evolving demands of urban governance.



# RECOMMENDATIONS

01 **Develop municipal digital skills training programs.** Invest in ongoing training to build technical expertise among staff at all levels. Examples like the free GIS training provided by Greater Amman Municipality showcase the importance of sharing knowledge across municipalities. Cities should partner with tech companies and training platforms to ensure programs remain up to date with emerging technologies, focusing on areas such as data analytics, cybersecurity, GIS, and digital project management.

02 **Create incentives for digital talent retention.** To compete with the private sector, cities should offer incentives such as career progression, competitive salaries, and professional development stipends to retain skilled staff. Periodic staff satisfaction surveys can help refine retention strategies and reduce reliance on external consultants.

03 **Foster university partnerships for skill development.** Collaborate with local universities to establish internships, apprenticeships, and joint research programs. These partnerships provide students with hands-on experience in municipal digital projects while creating a pipeline of trained professionals ready for digital roles upon graduation.

04 **Establish cross-departmental digital transformation units.** Create units or task forces that bring together expertise from multiple departments to address complex digital projects. These units improve coordination and support the seamless integration of digital solutions across the organization.

05 **Introduce a national digital skills certification framework.** Standardize digital competencies across cities by establishing a national certification framework. This ensures municipal employees meet minimum standards in key areas like data security, project management, and digital engagement, fostering consistent skills development.

06 **Promote international exchange programs for knowledge sharing.** Partner with international organizations to create exchange programs where municipal staff can learn from global digital transformation initiatives. These programs inspire innovation, build advanced skills, and help cities leverage international funding for inclusive participation.

07 **Establish a centralized resource hub for digital best practices.** Create a national or regional hub where cities can access resources, case studies, and guidelines for digital transformation. This hub would facilitate knowledge-sharing, provide frameworks for initiatives, and accelerate digital maturity by enabling cities to learn from each other's successes.

CHAPTER 06

# FUNDING DIGITAL TRANSFORMATION

## KEY MESSAGES

01 **Digital transformation has improved cost control in Arab cities by enhancing transparency, reducing corruption risks, and optimizing resource use through real-time tracking systems.** However, it also imposes financial pressures due to high initial investments in digital infrastructure and ongoing costs for training, maintenance, and system upgrades. Balancing these benefits and costs remains a challenge for sustainable financial management.

02 **High-profile projects like smart infrastructure for mobility or public safety often secure substantial government and international funding, aligning with national goals.** In contrast, smaller internal projects, such as e-governance or digital archiving, frequently rely on limited local budgets, leading to delays and uneven progress. These disparities hinder the creation of cohesive digital ecosystems.

03 **While initial funding for digital investments (CAPEX) is often prioritized, securing long-term operational funding (OPEX) remains a challenge.** Insufficient OPEX allocations for upgrades, staffing, and maintenance strain municipal resources, jeopardizing the sustainability and efficiency of digital systems.

04 **Reliance on national and international funding advances digital projects but limits municipal autonomy.** Cities must often align strategies with broader agendas or use specific technologies mandated by funders, increasing dependence on external vendors and constraining flexibility in future technological decisions.

*Image by Paula Nagi Rezkallah*

**The Arab Cities are increasingly adopting digital solutions to streamline operations, improve service delivery, and boost transparency.** However, the financial requirements for such transformations are considerable and multifaceted. Digital initiatives not only demand upfront investments in infrastructure but also require sustained financial commitments to cover training, system maintenance, and continuous technological upgrades. These financial challenges are compounded by the varied funding mechanisms and dependencies on external sources, highlighting the intricate balance that cities must strike between securing resources and maintaining control over their digital agendas.

**Cities utilize a range of funding strategies, including national government grants, international loans, and local budgets.** While national and international support can provide crucial initial funding, they often come with conditions that impact cities' autonomy and flexibility. This reliance on external funding sources, combined with short-term budgeting practices, presents difficulties in achieving long-term, cohesive digital strategies. Additionally, the dual reality of balancing cost efficiencies gained from digital solutions with the financial burden of ongoing expenses—such as operational costs and system maintenance—further underscores the complexity of financing digital transformation. This chapter offers insights into how Arab cities navigate these financial constraints, exploring both the benefits and limitations of current funding approaches in sustaining and scaling their digital transformation efforts.

## Digitalization reveals diverse impacts on cost control and financial management

**Digitalization has significantly impacted cost control and financial management in Arab cities, but the extent of these impacts varies depending on the cities' financial capabilities and level of technological integration.** The adoption of digital systems has been particularly influential in enhancing transparency and efficiency, especially in areas such as public procurement. **However, cities are simultaneously dealing with substantial financial challenges related to the initial investments required for these digital transformations.** This dual impact of digitalization underscores the complex relationship between technological advancements and municipal financial constraints.

### Digital systems bring efficiency to public procurement processes

**In many cities, the integration of digital systems has transformed public procurement processes, leading to improvements in efficiency, transparency, and accountability.** The digital platforms have standardized procedures, facilitated real-time expenditure tracking, and reduced the risks of mismanagement and corruption. This real-time visibility into procurement activities has helped cities minimize financial discrepancies and ensure that expenditures remain aligned with approved budgets.

**In addition to improving transparency, digital procurement systems have enabled cities to centralize and streamline workflows, which has helped eliminate redundancies and optimize resource allocation.** Digital tools provide accurate and comprehensive data on ongoing projects, allowing municipal leaders to make more informed decisions about resource distribution. In some cases, cities have made procurement data publicly accessible through online platforms, allowing citizens to track municipal spending and report irregularities. This emphasis on transparency has not only built public trust but also encouraged greater civic engagement in municipal governance.

### Financial challenges arise from initial digitalization investments

**While digital systems have brought notable efficiency gains, cities face considerable financial hurdles in the initial stages of digital transformation.** Establishing the necessary digital infrastructure and acquiring appropriate technologies require substantial capital investments, which can strain municipal budgets. This sentiment was echoed by other officials who cited difficulties in obtaining funding for digital projects amid competing budget priorities**.** The costs of transitioning to digital systems extend beyond mere technology acquisition, including training programs to ensure that staff can effectively operate and maintain these new systems. These training expenses, combined with the costs of system upgrades and maintenance, present ongoing financial challenges for cities seeking to sustain their digital initiatives.

**Furthermore, the findings highlight the discrepancy between capital expenditures (CAPEX) and operational expenditures (OPEX).** While some cities have successfully secured funding for initial capital investments, they struggle to cover ongoing costs such as technical support, software updates, and system maintenance. This gap in funding poses a significant threat to the sustainability of digital initiatives. This financial uncertainty complicates cities' efforts to maintain efficient and reliable digital systems over time.

### Sustainability of digital investments remains an ongoing concern

**Financial sustainability is a recurring challenge in digital transformation efforts.** Cities have expressed concerns about the long-term viability of their digital projects due to fluctuating budget allocations and limited financial resources. In addition to budgetary limitations, several cities are grappling with the complexity of managing multiple digital platforms and ensuring they remain compatible and up to date. This complexity increases operational costs, making it more challenging for cities to maintain digital systems without adequate financial support.

**There is a reliance on external funding from national governments and international development agencies.** While external support has been instrumental in launching several digital projects, it has also created dependencies that limit cities' financial autonomy. This dependency on external funding sources reflects a broader issue of constrained financial flexibility in municipal digital transformation efforts.

### EXPANSION OF DIGITAL SERVICES: BUILDING AND PROPERTY TAX SYSTEM IN TUNIS, TUNISIA

The city of Tunis implemented a digital property tax system to improve revenue collection and enhance accessibility for citizens. This system connects municipal offices across the city, allowing residents to pay their property taxes at any municipal branch, thus simplifying the process. By automating payments and centralizing data, the city reduced manual errors and increased efficiency, making revenue collection more reliable. This digital shift aimed to build trust by increasing transparency, with all tax payments recorded in a secure, centralized database that citizens could access easily.

The digital system's impact on municipal operations has been significant, resulting in a more consistent revenue flow and streamlined administrative tasks. With the new system, municipal staff are trained to support citizens, providing a user-friendly experience that reflects the city's commitment to modernizing its services. This project showcases the potential for digital infrastructure to improve government transparency and efficiency, establishing Tunis as a model for other cities seeking sustainable, technology-driven solutions.

Since its implementation, the property tax system in Tunis has led to notable improvements in both municipal revenue and citizen satisfaction. By simplifying the tax payment process, the city has seen a more consistent flow of revenue, which has been vital for funding local services and projects. Additionally, the transparency and accessibility of the system have fostered a stronger sense of accountability within municipal operations.



Figure 32. Tunis, Tunisia

## Varied funding approaches shape digital transformation efforts

**Arab cities are navigating diverse funding approaches to drive their digital transformation initiatives.** Cities are employing a range of financial strategies, combining resources from national government grants, international loans, and local budgets to support their digital transformations. However, the funding landscape is shaped by disparities between different types of digital projects, reflecting a broader complexity in securing and sustaining financial support for both large-scale smart infrastructure and smaller-scale digital systems.

## Differences in funding for smart infrastructure and internal digital systems

**There is a distinct contrast in how funding is secured for large-scale smart infrastructure projects versus internal municipal digital systems in Arab cities.** Smart infrastructure projects, such as urban mobility solutions and digital public services, typically receive greater financial backing through national government grants and international development loans. This trend is driven by the perceived importance of such projects in enhancing urban development and aligning with broader national agendas.

**In contrast, smaller-scale projects aimed at internal digital transformations, like e-governance platforms, digital archiving, and internal data management systems, face more significant challenges in obtaining financial support.** Cities often rely on limited local budgets to finance these initiatives, making it difficult to secure adequate funding amidst competing budgetary priorities. This situation highlights a notable gap in funding accessibility based on the type and scope of digital projects, reflecting the broader complexities cities face in aligning their financial resources with their digital priorities. Moreover, cities often experience challenges securing sustained funding for smaller internal systems critical to everyday municipal operations.

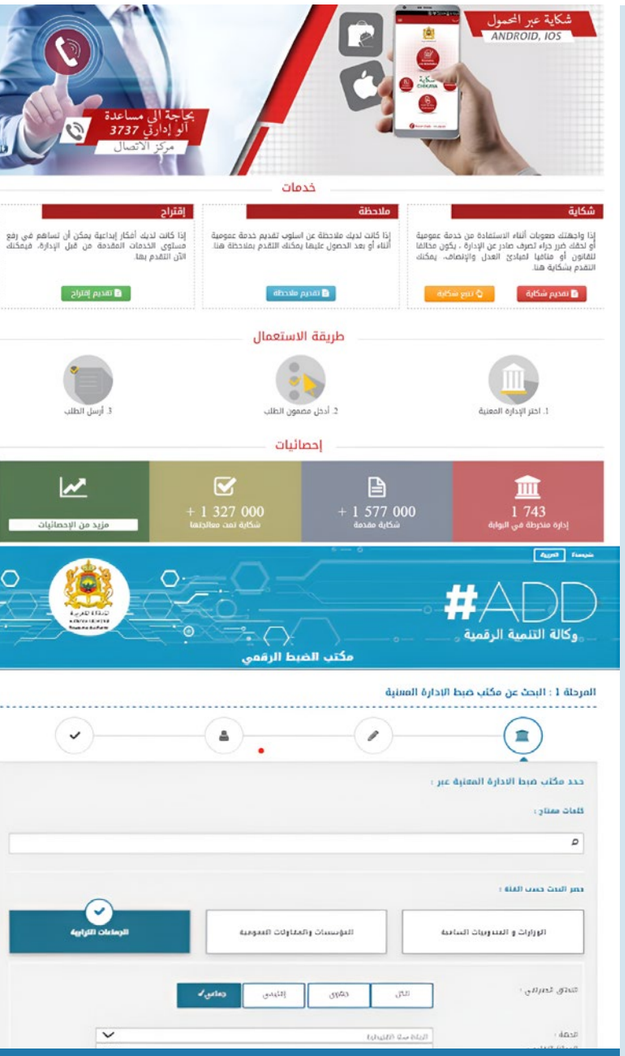



Figure 33. Digital services websites in Rabat, Morocco

## BUDGETING FOR DIGITAL TRANSFORMATION AND INFRASTRUCTURE IN RABAT, MOROCCO

Rabat's approach to digital transformation is built on a carefully crafted IT master plan, designed to guide the city over a six-year period. This plan is central to Rabat's strategy, as it identifies specific digital infrastructure needs, establishes a timeline for digital upgrades, and aligns budgeting priorities with broader municipal goals. By mapping out these requirements in advance, the city has created a structured approach to resource allocation that ensures that digital projects receive consistent funding, even amidst potential financial constraints.

The IT master plan serves as a comprehensive roadmap for Rabat's transformation journey, detailing the technological upgrades and digital platforms essential for modernizing municipal services. This includes platforms for integrated expenditure management, digital civil status services, and efficient complaint processing. Each digital initiative is evaluated based on its expected impact on administrative efficiency and public transparency, with budget allocations adjusted accordingly. For example, the master plan emphasizes the need for a centralized system for tracking financial data, which enables the city to monitor expenditures in real-time, reducing errors and fostering accountability.

This proactive budgeting strategy allows Rabat to avoid overspending and ensures that funding is allocated in line with strategic priorities. Additionally, by adopting a long-term perspective, the city can spread costs over several years, which mitigates financial strain and allows for incremental implementation. The IT master plan also integrates regular assessments to adapt the budget based on the evolving needs of the city, ensuring that the infrastructure remains resilient and responsive to new technological and administrative demands. This structured financial approach reflects Rabat's commitment to a sustainable digital transformation that strengthens its administrative framework while prudently managing costs.



For instance, while smart mobility and public safety projects received financial backing, initiatives like digital record-keeping and e-service expansion frequently relied on local resources or ad hoc funding, which led to delays and inconsistent progress.

## Operational expenditures present ongoing sustainability concerns

**The sustainability of digital initiatives emerged as a recurring concern, particularly in the context of ongoing operational expenditures (OPEX).** Cities reported a clear emphasis on securing capital expenditures (CAPEX) for initial investments, often through government and international funding. However, interviewees described substantial challenges in maintaining these digital systems due to inadequate provisions for ongoing expenses such as system maintenance, technical support, software updates, and continuous staff training. This scenario reflects a broader issue where the initial focus on infrastructure development does not adequately address the need for long-term financial planning to sustain these systems.

**Cities face persistent difficulty in covering operational costs, which are essential for keeping digital systems functional and up to date.** Participants described how the financial limitations

## FUNDING SUPPORT FOR DIGITAL TRANSFORMATION IN BIZERTE, TUNISIA

Bizerte city has leveraged both national and international funding to advance its digital projects, addressing critical gaps in administrative efficiency and citizen engagement. A key example of this funding strategy is the "Citizen Space" initiative, which was financed by German international development corporation GIZ. This project was designed to simplify administrative processes, making it easier for citizens to access municipal services without lengthy procedures or in-person requirements. The initiative's primary goal was to centralize and digitalize services, improving overall accessibility and responsiveness to community needs.

However, the city faces challenges in securing steady funding streams to maintain and expand such initiatives. This reality underscores the importance of international collaborations to supplement local budgets, as Bizerte often relies on foreign partnerships to sustain its digital transformation projects. For instance, GIZ's support exemplifies how international backing can propel forward-looking projects but also highlights that additional, consistent funding sources are essential for long-term success.

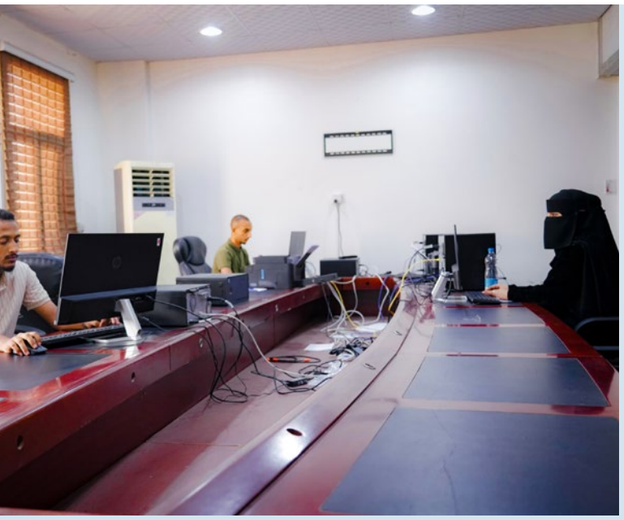
In addition to digitalization efforts in administrative services, Bizerte has focused on infrastructure upgrades with financial support from entities such as the African Development Bank (AfDB) and the French Development Agency (AFD). These funds have facilitated improvements in public lighting systems, aiming to enhance energy efficiency and reduce operational costs. These infrastructure enhancements not only benefit the city's sustainability goals but also reflect a broader reliance on international support for achieving comprehensive digital and infrastructural upgrades.



Figure 34. Bizerte, Tunisia

on OPEX resulted in recurring technical issues, inefficiencies, and interrupted service delivery. These operational challenges are compounded by limited flexibility in municipal budgets, which often prioritize immediate infrastructure investments over long-term financial planning for digital systems. This emphasis on capital funding without corresponding provisions for operational costs creates an imbalance that threatens the sustainability of digital projects. This lack of sustained financial support has led to situations where digital services deteriorate or become outdated due to insufficient maintenance and technical upgrades.

**The challenges of securing OPEX funding are exacerbated by the rigidity of funding structures.** Grants and loans are typically earmarked for specific projects or infrastructure developments, leaving cities with limited discretion to allocate resources toward the ongoing expenses necessary to sustain digital initiatives. This inflexible approach to funding often restricts cities' ability to adapt to changing needs and maintain the effectiveness of their digital systems over time.



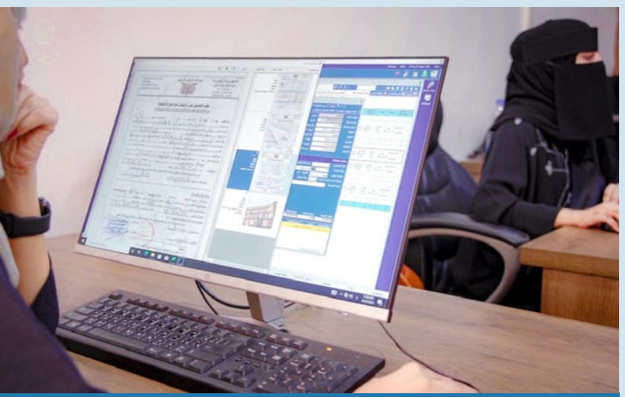


Figure 35. Trained personnel for delivering digital services in Aden, Yemen

## DIGITAL TRANSFORMATION AND REVENUE DEVELOPMENT CENTER IN ADEN, YEMEN

In the face of Yemen's challenging socio-political environment, Aden has taken significant strides in digital transformation aimed at enhancing administrative efficiency and revenue management. A pivotal element in this transformation is the establishment of the Revenue Development Center, a dedicated hub designed to overhaul and modernize revenue collection and licensing processes. Launched under the guidance of the Governor of Aden, this center seeks to digitize traditionally paper-based procedures, thereby minimizing the risk of corruption, streamlining workflows, and promoting financial transparency. Through the implementation of automated systems, the center reduces dependency on manual cash transactions and enables a transparent, traceable digital record of all financial activities, marking a foundational shift towards a more accountable governance structure.

The impact of this digital initiative has been substantial. Revenue collection has increased by an impressive 300%, a notable feat given the adverse conditions posed by ongoing conflict and instability. This increase in revenue not only reinforces the city's financial foundation but also enables a more reliable allocation of resources toward critical infrastructure projects. Improved revenue management has opened doors for local investment in essential urban infrastructure, fostering sustainable development efforts within Aden. By creating a transparent financial framework, the Revenue Development Center is not only addressing immediate administrative needs but also building a long-term, resilient financial system that supports Aden's aspirations for growth and stability amidst Yemen's complex socio-political landscape.

## Budgeting and regulatory constraints complicate municipal digital transformations

**Arab cities are grappling with structural challenges that complicate their digital transition efforts, primarily due to short-term budgeting practices and regulatory constraints.** These limitations significantly impact how cities plan, fund, and prioritize their digital initiatives. As cities pursue digital transformation, they encounter conflicts between their long-term strategic goals and the short-term nature of their financial and regulatory frameworks. This duality reflects a broader struggle in navigating complex budgetary environments while balancing emerging digital needs.

### Short-term budgeting structures conflict with long-term digital projects

**One of the most persistent challenges in Arab cities is the conflict between short-term budgeting structures and the long-term nature of digital transformation projects.** Municipal budgeting practices often emphasize annual or short-term plans to meet immediate goals or respond to urgent demands. However, this approach creates difficulties in securing sustained financial investment for multi-year digital projects, which require consistency and a long-term vision to be effective. Several interviewees shared their experiences of navigating these conflicting timelines. This practice of annual budget approvals creates financial instability and disrupts the continuity of digital projects, leading to frequent interruptions or delays in implementation. Municipal officials often find themselves in a cycle of reapplying for funding each year, which limits their ability to execute a cohesive and long-term digital strategy.

**The short-term budgeting cycles also contribute to uncertainties in project planning and implementation.** In many cases, digital initiatives that were expected to continue across multiple years had to be scaled down or postponed due to unforeseen budget reallocations. This lack of alignment between financial planning and digital strategy not only undermines project consistency but also hampers cities' ability to maintain momentum in their digital transformations.

### Digital initiatives face competition from traditional sectors for limited budgets

**Budget constraints and competing priorities in traditional sectors like infrastructure, education, and healthcare present additional hurdles for digital initiatives.** Digital projects frequently find themselves lower on the municipal budget agenda, competing against long standing sectors that are seen as essential to urban development and social welfare. As a result, digital initiatives are often overshadowed by more established spending priorities, which restricts their funding and limits the scope of their development. These dynamic underscores a broader reluctance to shift resources away from established sectors and invest in digital transformation, which is often perceived as a less immediate priority compared to more traditional areas of municipal spending.

**This competition for resources results in digital projects being either underfunded or deprioritized in favor of other pressing needs.** In times of financial strain, digital initiatives were among the first to experience budget cuts. This view reflects a persistent gap in how digital transformation is perceived within municipal planning, where its value is not fully recognized relative to other critical sectors. Moreover, these budgetary constraints have practical implications for implementing digital projects. In some cases, projects are divided into smaller, more incremental phases to align with short-term budget cycles, which prolongs their completion and reduces their overall impact. This incremental planning, while necessary under current budget conditions, often limits cities' ability to pursue comprehensive and cohesive digital transformations.

## External dependencies impact municipal autonomy and technological flexibility

**External dependencies significantly shape the digital transformation landscape in Arab cities, affecting both municipal autonomy and technological choices.** Many cities continue to rely heavily on national governments and international funding bodies for financial support, which, while essential for advancing digital projects, raises concerns about autonomy, flexibility, and long-term sustainability. This reliance creates a complex dynamic where external influences play a critical role in shaping digital strategies and technological frameworks.

### Cities' reliance on national governments limits autonomous decision-making

**The reliance on national government funding emerged as a recurrent theme across various cities, impacting their capacity to make autonomous decisions in digital governance.** In many cases, national governments act as the primary financial backers of municipal digital initiatives, determining budget allocations and influencing project prioritization. While this support is often indispensable, it also constrains cities' ability to tailor their digital strategies to align with specific local needs and priorities. This situation illustrates the challenge of achieving municipal independence in digital governance when financial support is centralized at the national level. As national policies and agendas

often take precedence, cities find themselves navigating external priorities that may not always align with their local objectives or immediate requirements.

**This financial dependency extends beyond budgetary control to strategic alignment, as cities often need to adjust their digital projects to fit within broader national frameworks.** In some instances, this alignment is seen as beneficial, providing consistency and coherence across different levels of government. However, participants from several cities expressed concerns that their ability to independently prioritize and adapt projects was hindered by this reliance on centralized funding. This dynamic highlight the ongoing tension between national policy directives and the autonomy of local governments in managing digital transformation.

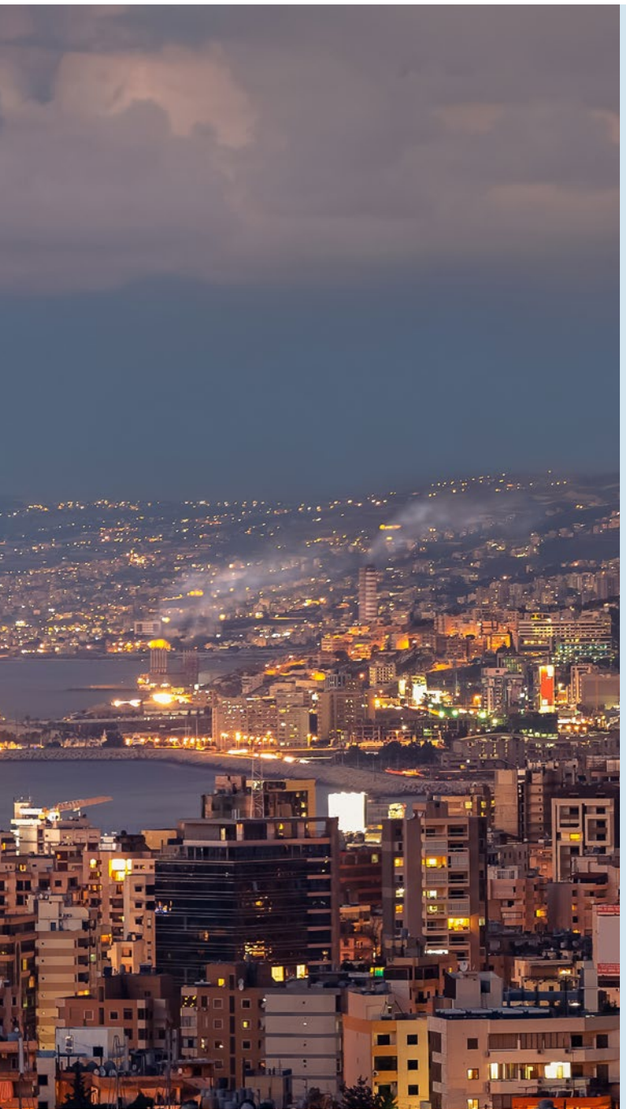


Figure 36. Beirut, Lebanon

## BUDGETARY CONSTRAINTS AND DUAL ACCOUNTING SYSTEMS IN ZGHARTA AND OTHER LEBANESE CITIES

In Lebanon, cities such as Zgharta encounter significant challenges due to stringent budget regulations imposed by national public finance laws. These regulations demand rigorous compliance, with strict controls over municipal budgeting processes and expenditures, leaving limited room for flexibility in financial management. These stringent requirements can stifle cities' ability to address local needs dynamically, as they must often adhere to national-level policies and restrictions that may not align with their specific operational demands or immediate challenges.

To navigate these constraints, some cities have adopted a dual accounting system. This approach entails the creation and maintenance of two distinct accounting frameworks. The first is an internal analytical system that provides detailed tracking of expenses, allowing municipal leaders to closely monitor spending patterns and make data-driven adjustments to address financial priorities effectively. This internal system offers cities the tools to gain granular insights into their financial health, ensuring transparency and enabling more strategic resource allocation.

The second system is a simplified version designed to meet government reporting requirements. This streamlined format facilitates compliance with national reporting standards, reducing the administrative burden of constantly aligning detailed internal accounts with the simplified, often rigid, formats mandated by the government. Although maintaining two systems demands additional resources and operational effort, this dual approach grants cities a better capacity to manage and control their expenditures. It allows them to satisfy legal obligations while retaining a level of financial oversight tailored to their unique local context, ultimately balancing regulatory compliance with operational autonomy.



### Prescribed technologies in international funding create dependency concerns

**The findings also reveal concerns about technological dependency arising from international funding arrangements.** Many cities receive loans, grants, or technical assistance from international development agencies and financial institutions. However, these funding agreements often come with stipulations that prescribe the use of specific technologies, service providers, or consultants, which can limit cities' flexibility in adopting locally relevant solutions. There are also cases where externally funded projects introduced technologies that were not always the most suitable or sustainable in their local contexts. Such situations underscore the complexity of balancing international funding requirements with local technological adaptability.

**The reliance on externally prescribed technologies also presents risks related to cost and control. Cities often face higher costs for maintenance and upgrades when they are bound to external service providers, making it challenging to switch to alternative technologies in the future.** This lack of flexibility in managing technological choices has long-term implications for both financial sustainability and technological independence.

## Conclusion

**This chapter emphasizes the complex financial landscape facing Arab cities in their digital transformation efforts.** The findings reveal that while digitalization has brought significant improvements to cost control, transparency, and efficiency, especially in areas like public procurement, cities are also grappling with substantial financial challenges. Initial investments in digital infrastructure are costly, requiring technology acquisition and ongoing training, maintenance, and upgrades, all of which can strain limited municipal budgets. Moreover, there is a stark contrast between funding availability for large-scale smart infrastructure projects, which often align with national agendas and receive external support, and smaller-scale internal digital initiatives that rely on municipal funds and are more susceptible to budgetary constraints. This disparity, coupled with the financial pressures of covering operational expenses (OPEX) after initial capital investments (CAPEX), complicates the sustainability of digital systems over the long term.

**Furthermore, external dependencies on national governments and international funding agencies introduce challenges to municipal autonomy and technological flexibility.** While this support enables cities to access much-needed resources, it often limits their control over decision-making, prioritization, and the choice of technologies. For example, external funding may require the use of specific service providers, creating potential dependency risks and raising the costs of future updates and maintenance. Additionally, short-term budgeting structures conflict with the long-term nature of digital projects, adding further complexities to financial planning and undermining the continuity needed for comprehensive digital strategies. Collectively, these factors underscore the need for cities to adopt more adaptable funding approaches, balance immediate financial needs with long-term sustainability, and pursue strategies that mitigate dependency on external resources while fostering local autonomy in digital transformation efforts.



# RECOMMENDATIONS

**01** **Develop multi-year budgeting frameworks for digital projects for both CAPEX and OPEX.** Cities should adopt multi-year financial planning to align with the long-term nature of digital projects. This reduces disruptions caused by annual budget cycles, ensuring consistent investments in technology and resources. Flexible budget cycles provide a clear roadmap for both CAPEX and OPEX, supporting maintenance and updates. Addressing the integration of these frameworks into rigid municipal budgeting systems is key to their success.

**02** **Increase local funding capacity through public-private partnerships (PPPs).** Cities can increase funding capacity through PPPs, gaining access to advanced technology, expertise, and management support. These partnerships lower implementation costs and create opportunities for local businesses to participate, fostering community investment and reducing reliance on external funding sources.

**03** **Establish dedicated digital transformation funds at the national level.** National governments should create dedicated funds for municipal digital projects, prioritizing both alignment with national agendas and local needs. These funds provide cities with consistent financial support, reducing dependence on short-term budgets. Municipalities should advocate for these funds by demonstrating their alignment with national priorities and collaborating with government bodies to establish them.

**04** **Implement performance-based funding mechanisms.** Cities can adopt performance-based funding, linking financial support to achieving specific digital milestones. This model incentivizes efficient management by tying future funding to measurable outcomes like improved citizen engagement, cost savings, or operational efficiency, ensuring the sustainability of successful projects.

**05** **Prioritize funding allocation for operational expenditures (OPEX).** Cities should allocate more resources to operational expenditures, such as maintenance, software updates, and technical support, to sustain digital systems over time. Including OPEX in financial planning prevents service degradation and ensures initial investments deliver long-term benefits. Overcoming political challenges, which often deprioritize OPEX in favor of visible CAPEX projects, is critical.

**06** **Advocate for flexible international funding arrangements.** Cities should negotiate for flexibility in international funding agreements, allowing the selection of technologies and service providers that fit local needs. This reduces dependency on external providers, enhances sustainability, and ensures solutions are tailored to the city's unique operational context.

CHAPTER 07

# COLLABORATION, ENGAGEMENT AND INCLUSIVITY IN DIGITAL TRANSFORMATION

## KEY MESSAGES

01 **Arab cities employ diverse collaboration models to advance digital transformation, combining public-private partnerships with coordination between municipal and national agencies.** Public-private partnerships bring technological expertise, innovation, and efficiency, enabling the deployment of advanced solutions in critical sectors like transportation and infrastructure. This dual approach helps cities address resource constraints and navigate the complexities of implementing large-scale digital projects effectively.

02 **Economic challenges and technological needs significantly shape the structure of partnerships in Arab cities.** Co-investment and revenue-sharing models with private partners are commonly used to mitigate budgetary pressures while fostering joint ownership of digital initiatives. Collaborations with technology firms allow cities to develop customized solutions tailored to specific local needs, such as waste management systems or citizen engagement applications, demonstrating the importance of adaptable technologies in addressing unique urban challenges.

03 **Digital tools are redefining how citizens engage with municipal governance, creating direct, transparent communication channels through portals, mobile apps, and virtual forums.** However, digital literacy disparities present challenges, particularly among vulnerable populations. To bridge these gaps, cities are introducing targeted training programs to equip residents with the necessary skills to navigate digital platforms. This inclusive approach strengthens community trust and ensures that digital services reflect the needs of a broad and diverse population.

04 **Efforts to address digital inequalities are central to achieving a fair and inclusive digital transformation.** Arab cities are implementing targeted programs to enhance digital literacy among vulnerable communities, providing training and resources to ensure equitable access to digital services. By designing accessible and user-friendly platforms, cities accommodate diverse demographic needs, including individuals with disabilities.

**Digital transformation in Arab cities is unfolding with a focus on inclusivity, collaboration, and adaptability to ensure that technological advances serve all citizens equitably.** The journey toward a "just digital transformation" involves complex partnerships across public and private sectors and different levels of government, enabling cities to overcome resource constraints and leverage specialized expertise. This is aligned with the strategy "leaving no one behind", meaning that digital services should be inclusive. As cities work to align local projects with broader regional and national frameworks, they foster efficiency, consistency, and enhanced service delivery, making technology a core element in responsive governance.

**Beyond the technical aspects, digitalization in Arab cities redefines citizen engagement, making it more interactive, accessible, and accountable.** However, for this transformation to be truly equitable, cities recognize the importance of addressing digital literacy gaps and overcoming socioeconomic barriers that can hinder participation. Targeted initiatives such as digital literacy programs, community engagement platforms, and inclusive service design help bridge these divides, ensuring that all residents can benefit from and participate in digital governance. This chapter shows how through these combined efforts, Arab cities are building a foundation for a more inclusive, transparent, and resilient future where digital tools are accessible to all, regardless of background, gender, age or ability.

## Diverse collaboration models shape digital transformation in Arab cities

**Various collaboration models between public institutions, private entities, and different levels of government have become critical in driving digital transformation efforts across Arab cities.** These collaborative approaches are essential for overcoming resource limitations, accessing specialized expertise, and aligning local digital initiatives with broader regional and national strategies. By leveraging diverse partnerships, cities have enhanced the efficiency, sustainability, and impact of their digital transformation projects.

### Public-public and private-public cooperation enhance efficiency and resource consolidation

**The cooperation between public institutions and private entities is a significant factor in advancing digital projects across several cities.** Such collaborations provide cities with access to specialized expertise, technological solutions, and innovative practices that may not be available within municipal administrations. For instance, partnerships with private technology firms have enabled cities to implement advanced digital solutions more efficiently, particularly in sectors like urban mobility, public safety, and digital infrastructure development. This collaboration illustrates how cities benefit from private sector involvement, allowing for faster deployment and greater innovation.

**The role of public-public cooperation also emerged as a key element in advancing digital initiatives.** Collaboration between cities and national or regional agencies provided a platform for aligning local strategies with overarching policy frameworks. The public-public cooperation extended beyond traditional governance frameworks, sometimes involving joint projects between cities or with public sector entities focused on specific sectors like transport, health, or public safety. This model of resource consolidation through inter-agency collaboration was essential in projects that required coordination across multiple jurisdictions or administrative boundaries.

### Intergovernmental collaboration strengthens digital project alignment

**In addition to public-private partnerships, intergovernmental collaboration was consistently identified as a crucial factor in the successful implementation of digital projects.** The coordination between different levels of government helped ensure that municipal strategies aligned with broader regional and national policies. This alignment was not only critical for maintaining policy consistency but also for securing the technical and financial support needed to advance digital initiatives. This collaboration allowed cities to integrate their digital projects within a larger policy framework, creating a cohesive environment for planning and implementation. By aligning local and national strategies, cities could benefit from a shared vision and coordinated action, which facilitated smoother project execution and greater impact.

**Interviewees also discussed the operational and financial benefits of intergovernmental collaboration.** In numerous instances, national governments furnished cities with technical assistance, regulatory guidance, and financial resources to facilitate the implementation of digital transformation projects. Such assistance enabled cities to surmount resource limitations and gain access to expertise in domains where local capabilities were constrained. Furthermore, intergovernmental collaboration facilitated the alignment of municipal digital initiatives with national development plans and regulatory frameworks, in addition to securing funding and technical support. Interviewees observed that this alignment reduced bureaucratic obstacles, facilitated the integration of new digital technologies, and ensured compliance with national regulations. This alignment fostered a more conducive policy environment for digital projects, thereby enabling cities to navigate administrative challenges with greater efficacy.

### EFFICIENCY-DRIVEN AUTOMATION IN MUNICIPAL PROCESSES THROUGH PUBLIC-PRIVATE COLLABORATION IN MANAMA, BAHRAIN

In Manama, digital transformation initiatives go beyond public-facing services, embedding efficiency and collaboration within municipal operations through robust public-private partnerships. One significant advancement is the "Records" program, which automates the issuance of commercial licenses, a process traditionally requiring extensive coordination among multiple government departments such as the Ministry of Industry and Trade and the Labor Market Regulatory Authority. By streamlining these procedures through automation, the program has minimized bureaucratic delays, reduced redundancies, and provided a more transparent, accessible framework for business licensing, thereby supporting faster, data-driven decision-making.

Furthermore, the digitalization of building permits represents a model of effective public-private collaboration in service delivery. Private offices are authorized to handle applications, conducting detailed audits and issuing preliminary approvals through a centralized electronic platform. Manama oversees these transactions with a final quality check, ensuring that high compliance standards are maintained. This collaboration has significantly expedited the permitting process, with private entities managing application reviews and assessments while the city focuses on maintaining regulatory oversight and quality. This model not only enhances service efficiency and reduces processing times but also fosters a cooperative framework where private expertise complements public oversight, elevating service quality for residents and businesses alike.



Figure 37. Manama, Bahrain *(Image by Leo Koolhoven)*

## Economic and technological factors shape cooperation strategies

**Economic constraints and technological demands play a pivotal role in shaping the strategies for collaboration between public institutions and private entities in Arab cities.** The variations in financial conditions and the need for tailored technological solutions have led to the adoption of diverse and context-specific cooperation models. This approach has enabled cities to maintain progress on their digital transformation journeys despite economic limitations or specific technological requirements.

### Economic constraints influence public-private partnership models

**Economic constraints significantly influence how public-private partnerships are structured.** In cities facing limited budgets, the development of innovative collaboration models became essential to sustain digital transformation efforts. Interviewees indicated that co-investment and revenue-sharing models were frequently employed to strike a balance between resource availability and project needs. This approach helped ease financial pressures on cities and allowed private companies to advance digital initiatives actively. By encouraging private sector investment, cities managed to push forward key projects like digital infrastructure development, smart city services, and public utility digitalization, even in the face of fiscal limitations.




Figure 38. A digital application in Sharjah, UAE

## PARTNERSHIPS AND INTERINSTITUTIONAL COORDINATION IN SHARJAH, UAE

The city of Sharjah has developed a robust framework of partnerships with both governmental and private entities, aimed at driving digital transformation and creating a seamless public service delivery system. These partnerships are formalized through agreements that promote electronic connectivity across institutions, fostering a collaborative ecosystem where data can be exchanged and digital processes streamlined. This interinstitutional cooperation not only facilitates more efficient coordination among various stakeholders but also enables Sharjah to deliver integrated, citizen-centric services.

A key component of these partnerships is the establishment of digital platforms that allow for real-time information sharing and process alignment across sectors. By leveraging these connections, the city enhances its capacity to manage and address complex urban challenges, from infrastructure development to public health and safety. For instance, electronic linkages with other governmental bodies enable the city to synchronize regulatory procedures, minimizing redundancy and accelerating service delivery. These platforms also support transparency and accountability, as they allow different agencies to access and track data related to service requests, urban planning, and regulatory compliance.

This collaborative model is crucial for Sharjah's strategic goals in urban governance, as it brings together resources and expertise from diverse sectors, building a resilient infrastructure that can adapt to the city's growing needs. Through these partnerships, the city has improved its responsiveness to citizen demands and enhanced operational efficiency, setting a foundation for sustainable digital transformation. Moreover, by involving private sector players in the digital ecosystem, Sharjah benefits from innovative technological solutions that further enrich its service offerings, ultimately contributing to a more connected and accessible urban environment for all residents.

**The partnership models are adaptable, with specific terms and arrangements varying based on local economic conditions and project scopes.** In some cases, cities prioritized essential services or critical infrastructure projects for co-investment, focusing on areas with immediate public benefit, which helped ensure that limited resources were utilized effectively, with both public and private stakeholders benefiting from the collaboration.

### Technological collaboration enables the development of tailored digital solutions

**Technological collaboration between cities and private sector firms emerged as a key factor in enabling the creation of customized digital solutions tailored to the specific needs and contexts of Arab cities.** This collaborative approach allowed cities to access technological expertise and innovation, which were often beyond the internal capabilities of municipal administrations. The flexibility to design and implement localized solutions was particularly valuable in sectors like urban waste management, smart transportation, and public health, where standardized, off-the-shelf technologies often fell short of addressing specific municipal needs. The involvement of private tech firms not only provided access to specialized knowledge but also fostered innovation, allowing cities to explore new and effective ways of delivering public services.

**Technological collaborations were not limited to large-scale digital infrastructure projects.** In many cases, cities collaborated with tech companies on smaller-scale projects that were impactful yet required a high degree of customization. This example illustrates the versatility of technological collaborations in addressing diverse municipal priorities, from waste management to citizen engagement.



## DIGITAL SYSTEMS AND COMMUNITY ENGAGEMENT FOR IMPROVED CIVIC PARTICIPATION IN SFAX, TUNISIA

Sfax city has implemented innovative digital systems that not only streamline administrative tasks but also facilitate active citizen participation. The city launched a digital platform allowing residents to submit complaints, report issues, and suggest local projects through a user-friendly interface. This system includes geolocation features that enable citizens to mark specific areas on an interactive map, making it easier for municipal teams to assess and address issues efficiently. During the COVID-19 pandemic, this platform proved especially valuable, providing a safe and direct way for citizens to interact with the city without visiting offices.

Through this approach, Sfax has empowered its citizens by integrating their feedback into decision-making processes. The city compiles monthly reports based on citizen interactions and shares them with the municipal council to inform policy adjustments. This model not only fosters civic engagement but also strengthens trust in the city's commitment to transparency and responsiveness. By involving citizens directly in the governance process, Sfax has successfully nurtured a collaborative environment that aligns with its digital transformation goals.

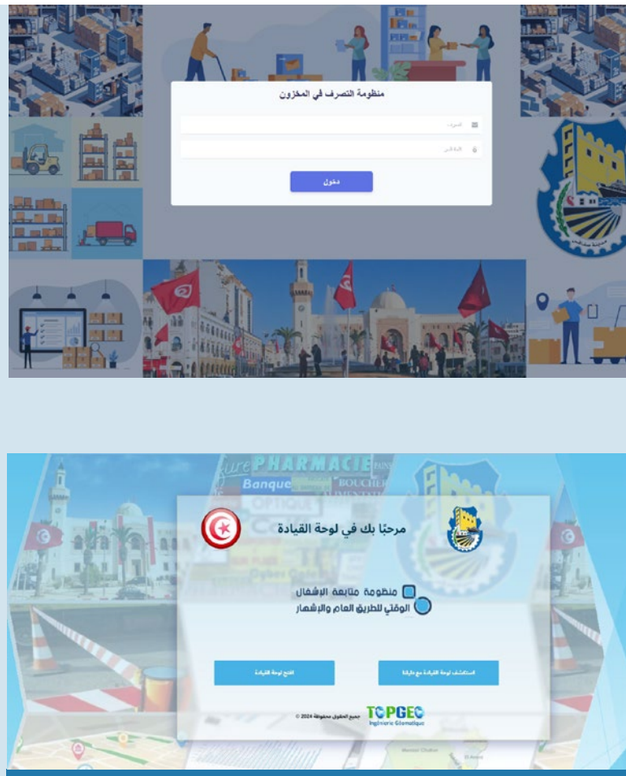



Figure 39. Digital services websites in Sfax, Tunisia

### Digitalization redefines citizen participation in municipal governance

**Digitalization has fundamentally transformed how citizens engage with municipal governance across Arab cities.** The integration of digital tools has not only facilitated direct interaction between residents and city authorities but has also enhanced transparency and accountability. However, these advancements have brought to light challenges such as digital literacy disparities, which cities are addressing through targeted programs to promote inclusivity and effective participation.

### Digital tools facilitate direct citizen participation

**Digitalization efforts have introduced various platforms and applications that allow residents to interact more directly with city authorities, creating new avenues for participation.** Through online portals, mobile apps, and digital feedback channels, citizens can now provide real-time input, report issues, and track the progress of their concerns. These tools have made communication with local governments more transparent and responsive, fostering a sense of

inclusion and trust. By offering accessible and transparent channels, these digital tools not only enable citizens to actively participate in governance but also hold local administrations accountable for their actions and decisions. This approach has been particularly impactful in sectors such as public safety, waste management, and urban planning, where timely citizen feedback plays a crucial role in improving service delivery and addressing local issues.

**In addition, some cities have also utilized digital platforms to facilitate broader public engagement initiatives, such as virtual town halls, online surveys, and community forums.** This approach demonstrates the potential of digital tools to democratize municipal governance by making public participation more inclusive and convenient.

## Digital literacy remains essential for effective public engagement

**While digital tools have enhanced public participation, digital literacy among residents is a prerequisite for successful engagement.** The findings indicate that disparities in digital literacy have created barriers for certain segments of the population, particularly older adults, low-income families, and vulnerable communities. To address these challenges, many cities have implemented digital literacy programs to equip residents with the necessary skills to navigate and utilize digital platforms effectively. These initiatives are designed to bridge the digital divide and promote inclusivity by providing training in basic digital skills, such as using online portals, accessing information, and submitting requests. cities have recognized that building a digitally competent population is essential not only for the adoption of e-services but also for fostering meaningful public engagement and community participation.

**Arab cities are taking diverse approaches to digital literacy, ranging from in-person workshops and community-based training sessions to online tutorials and digital ambassadors' programs.** These comprehensive efforts underscore the commitment to ensuring that all residents, regardless of their digital proficiency, have equal opportunities to engage with municipal governance.

# Digital inclusion efforts address inequalities and the digital divide

**Arab cities are increasingly focused on achieving a "just" digital transformation by addressing digital inequalities and ensuring inclusive public services.** Digital inclusion efforts are centered on targeted programs to bridge the digital divide and accessibility measures that cater to the diverse needs of citizens. These efforts are crucial in creating a more equitable digital environment that leaves no one behind, especially as digital transformation becomes integral to municipal governance and public services.

## Digital literacy programs target vulnerable communities to bridge the divide

**The importance of targeted digital literacy programs as a strategy to bridge the digital divide among vulnerable communities.** These programs aim to reach low-income families, elderly citizens, and other vulnerable groups often excluded from digital services due to lacking skills or resources. This approach reflects a proactive stance towards digital inclusion, addressing not only skill gaps but also the material barriers that prevent vulnerable citizens from engaging with digital services. In some cities, these programs are supplemented with additional community-based initiatives to provide ongoing support and training, ensuring that residents continue to build their digital competencies over time.

**Digital literacy programs are tailored to address the specific needs of different communities.** For example, cities have organized specialized training sessions for elderly citizens, focusing on essential digital skills that enable them to navigate online services and access information. These targeted programs are vital for reducing digital exclusion and fostering a more inclusive digital landscape.

## Inclusive and accessible services prioritize designing for diverse citizen needs

**In addition to digital literacy initiatives, cities prioritize the design of inclusive and accessible digital services that accommodate the diverse needs of all citizens.** Achieving a "just" digital transformation involves more than just providing access—it requires creating services that are user-friendly and responsive to the specific challenges faced by different demographic groups, including people with disabilities. By incorporating accessibility features such as voice commands, easy navigation, and multilingual support, cities are working towards creating a digital environment that reflects the diverse demographics of their populations.

**Some cities even involve these social groups in the design process to ensure that digital tools respond to their specific needs.**



Figure 40. Medina, Saudi Arabia *(Image by Haris Diakic)*

### E-GOVERNMENT SERVICES AND CITIZEN ENGAGEMENT IN MEDINA, SAUDI ARABIA

Medina's digital transformation journey aligns closely with Saudi Arabia's e-government initiatives, particularly through the comprehensive "Balady" platform. Through Balady, residents and businesses can access most municipal services, such as licensing and permitting, entirely online. These services are automated to provide seamless interaction between the city and citizens, eliminating the need for in-person visits and allowing users to track their applications electronically. Additionally, the platform enables real-time communication with citizens, allowing for efficient complaint resolution and follow-up.

The city has also integrated electronic reporting systems that facilitate a structured approach to gathering feedback and handling citizen inquiries. This emphasis on e-government services reflects Medina's goal of improving accessibility, responsiveness, and transparency in municipal operations. Through these initiatives, Medina not only simplifies administrative processes but also strengthens its connection with the community, ensuring that public services evolve in line with citizens' needs and expectations.

### ENHANCING COMMUNITY PARTICIPATION AND CIVIC TRUST THROUGH DIGITAL INITIATIVES IN HEBRON, PALESTINE

Hebron city recognizes the importance of community participation in its digital transformation efforts and has focused on building citizens' trust in digital systems. Initially, many residents were hesitant to use electronic services, preferring to visit municipal offices in person. To address this, the city conducted awareness workshops targeting various community groups, including women and youth, to educate them on the benefits of digital services. These workshops highlighted how electronic systems streamline processes, reduce waiting times, and make it easier for citizens to access essential services from their homes.

Over time, the city has observed a positive shift in citizen engagement, with increasing numbers of residents opting for online platforms to submit requests, make payments, and access services. Hebron's focus on enhancing citizen trust through digital initiatives has fostered a stronger partnership between the community and the city. The city also uses digital data to gather insights into citizen needs, enabling it to adjust services and policies in response to community feedback. This collaborative approach has strengthened civic trust and encouraged a more active and engaged citizenry.



Figure 41. Hebron, Palestine

## Conclusion

This chapter shows how Arab cities work towards building diverse collaboration models, promoting inclusive citizen engagement, and actively addressing digital inequalities. Through a variety of partnerships with private entities, national agencies, and intergovernmental bodies, cities are pooling resources, sharing technological expertise, and aligning local initiatives with national policies. These partnerships, ranging from co-investment arrangements to customized technological solutions, enable cities to overcome economic and technical constraints, advancing digital initiatives across sectors such as transportation, public safety, and infrastructure. Furthermore, the inclusion of citizen engagement platforms, virtual town halls, and mobile apps has redefined how residents interact with their local governments, enhancing transparency, accountability, and accessibility in municipal governance. Yet, challenges remain, particularly in terms of digital literacy gaps that can inhibit effective participation, prompting cities to invest in targeted training programs that empower all citizens to engage actively with digital tools.

In striving for digital inclusivity, Arab cities are implementing initiatives that address the digital divide, focusing on vulnerable communities and ensuring that municipal services cater to the diverse needs of residents, including those with disabilities. Digital literacy programs, often delivered in partnership with local community organizations, equip vulnerable groups with the skills needed to use digital platforms effectively, fostering broader participation and ensuring equitable access to public services. Moreover, cities are increasingly designing accessible and user-friendly platforms, integrating features like multilingual support and easy navigation to make digital services more inclusive. These collective efforts represent a holistic approach to digital transformation, where technology is utilized not only as a tool for efficiency but also to promote social equity, bridging disparities, and empowering citizens in the digital landscape.

# RECOMMENDATIONS

**01** **Establish dynamic public-private partnerships to sustain digital transformation.** Cities should create dynamic PPPs to address resource constraints and drive innovation by leveraging private sector expertise in co-investment and revenue-sharing models. These partnerships enable access to advanced technologies, such as smart infrastructure and data analytics, while reducing financial pressures. To ensure success, cities must define shared objectives, establish evaluation mechanisms, and implement mutual accountability frameworks. Potential risks, such as unequal benefit distribution and over-reliance on private partners, should be carefully managed.

**02** **Promote intergovernmental alignment and shared digital standards.** To ensure consistency across national and local digital initiatives, cities should collaborate closely with regional and national authorities. Developing standardized digital frameworks, clear regulatory guidelines, and centralized support systems can streamline project implementation and align municipal efforts with national goals. Practical coordination mechanisms, such as regular intergovernmental forums and shared resource platforms, are essential to foster collaboration and efficiency.

**03** **Develop and implement targeted digital literacy programs for vulnerable communities.** Cities must address the digital divide by implementing targeted digital literacy initiatives for low-income groups, elderly residents, women and individuals with disabilities. Collaborating with community organizations, they can provide workshops, tutorials, and peer support programs tailored to specific needs. Mobile stations for digital services can play a role in this regard by enhancing accessibility and engagement across diverse communities.

**04** **Design inclusive digital platforms with accessibility as a core priority.** Accessibility should be integral to the design of digital services. Features like voice commands, intuitive navigation, and multilingual options can enhance usability for all residents, including those with disabilities. Continuous feedback from diverse user groups ensures platforms remain inclusive and responsive to evolving needs, fostering a sense of belonging in digital governance.

**05** **Utilize community co-creation to foster a sense of digital ownership.** Establishing co-creation platforms empowers citizens to contribute to the development of digital services through forums, workshops, and feedback channels. This participatory approach ensures services are relevant, accessible, and aligned with community needs. It also builds public trust and engagement, fostering a sense of ownership and collaboration in the city's digital transformation.

**06** **Implement public engagement and digital literacy programs.** Prioritizing the training of frontline staff in communication and digital engagement skills ensures they can effectively assist the public in accessing e-services. This effort reduces the digital divide, and fosters trust between citizens and municipal institutions, enhancing the overall success of digital transformation.

# CONCLUSIONS

This report provides an in-depth examination of the digital transformation journey in Arab cities, exploring various strategic pillars, technological layers, governance structures, and challenges that influence their pathways toward becoming digitally integrated urban ecosystems. The report delves, across five chapters, into the complex interplay between leadership, technological infrastructure, organizational change, stakeholder engagement, and local adaptation strategies, revealing a nuanced landscape of digital progress and constraints in the region.

Arab cities face various challenges, from infrastructure limitations to governance constraints, which shape their digital transformation approaches. The report underscores that a strategic, multi-layered approach is essential for these cities to navigate from traditional, manual urban management systems toward advanced cognitive cities. Foundational technologies like IoT and high-speed networks form the bedrock of this transformation, enabling real-time data collection and resource optimization. However, cybersecurity, privacy, and inclusivity issues arise as cities adopt more advanced technologies—such as artificial intelligence (AI), digital twins, and blockchain, requiring robust regulatory frameworks and adaptive governance models.

A significant observation across the report is the importance of infrastructure and foundational technologies in supporting digital transformation. Many Arab cities have made strides in establishing the basic technological backbone needed to support digitized services and interconnected urban systems.

Organizational change within municipal structures is also identified as a critical factor. The adoption of digital technologies has reshaped the internal dynamics of many Arab cities, prompting the formation of specialized digital units, cross-departmental teams, and new workflows to enhance coordination and efficiency. However, resistance to change remains a common barrier, especially among staff accustomed to traditional processes. This report highlights the need for continuous training and change management to build a digitally literate workforce that can support sustained digital innovation.

Financial resources are another pillar influencing the success of digital initiatives. The high costs associated with implementing IoT, AI, and other advanced technologies necessitate well-defined funding strategies. Public-private partnerships (PPPs) are increasingly leveraged in Arab cities to bridge financial gaps, but the report identifies a need for innovative funding models that can sustainably support digital projects. Cities like Amman and Riyadh, which have successfully attracted private sector investment, serve as examples for others aiming to enhance their financial resilience.

Stakeholder engagement plays an integral role in aligning digital initiatives with community needs and fostering public trust. The report demonstrates that cities with inclusive planning processes, which involve municipal departments, private partners, and citizens, tend to develop digital solutions that are more socially relevant and widely accepted. Citizen-centric platforms, public forums, and co-creation models are examples of how cities can integrate community voices into their digital strategies, ensuring that digital services are accessible, user-friendly, and designed to meet diverse needs.

Moreover, aligning municipal digital strategies with national and regional agendas has proven beneficial for many Arab cities, providing them with additional resources, expertise, and a cohesive framework for digital transformation. Cities that integrate their digital plans with broader national goals gain support for infrastructure development, training, and technical guidance, reinforcing local initiatives. This alignment is especially important for smaller cities and those facing resource constraints, as it allows them to leverage national and regional support to build foundational digital capabilities.

A range of interconnected challenges and opportunities marks the digital transformation of Arab cities. Success in this journey depends on a balanced approach that integrates strategic infrastructure development, robust financial planning, inclusive governance, adaptive organizational structures, and meaningful stakeholder engagement. By addressing these diverse facets of digital transformation, Arab cities can create resilient, inclusive, and technologically advanced urban environments that improve quality of life, promote sustainability, and enhance governance. With ongoing commitment and coordinated efforts, these cities can position themselves as leaders in urban digital innovation, setting an example for sustainable and inclusive growth in the region and beyond.



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