4. Local E-Government Development

4.1 Introduction

4.1.1 Sustainable cities

When world leaders adopted the 2030 Agenda for Sustainable Development, they committed to "transforming our world" for people, planet and prosperity. However, despite impressive engagement around the Sustainable Development Goals (SDGs), the world is not making adequate progress towards achieving them. Much more is required in terms of effort, investment and systemic change. Digital transformation has emerged as a powerful tool in the pursuit and realization of the SDGs, as highlighted in the *Global Sustainable Development Report 2023*.[1]

Local e-government, utilizing information and communications technology (ICT) to deliver and manage public services at the municipal level, is emerging as a powerful tool in advancing the 2030 Agenda. As local governments are the governing bodies closest to communities and are responsible for providing a wide range of essential services in areas such as housing, transportation, utilities, and public safety, their influence in driving progress for the SDGs is strong and far-reaching. Harnessing technology and digitalization, including artificial intelligence (AI), is a critical enabler of SDG localization, particularly to facilitate access to data, information, and government services using the Internet. Digitalization is also key to improving the effectiveness and accessibility of basic services for smart cities, health, and education and can play a vital role in fostering democracy and local participation.[2] With 65 per cent of SDG targets falling under local jurisdictions, localizing the Goals becomes imperative for effective implementation as highlighted in the "Inter-agency policy briefs on accelerating progress on the 2030 Agenda from local to global levels: The critical importance of SDG localization".[3]

Building on the foundation laid by successive assessments of city portals in United Nations E-Government Surveys since 2018, this chapter delves deeper into the transformative potential of local e-government for achieving the SDGs, with a specific focus on SDG 11 – making cities and human settlements inclusive, safe, resilient and sustainable. The chapter examines the evolution of city portals for the most populous cities in the respective 193 United Nations Member States over the past two years, utilizing data from the most recent Local Online Services Index (LOSI). The Secretary-General of the United Nations states that regions and cities are needed to build resilient infrastructure, create green jobs, promote diversity, and build strong social bonds within communities as the world looks to rescue the Sustainable Development Goals.[4] This imperative underscores the critical role of local e-government initiatives in fostering effective, accountable and inclusive urban development strategies that align with the principles of the SDGs.

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In this chapter:

The future of cities will be knowledge-based, driven largely by innovation, the widespread use of new technologies, and the digitization of virtually all facets of urban life.[5] Technology holds great promise for improving urban livelihoods, but there are also risks. The digital divide remains a persistent challenge; while encouraging progress has been made, disparities in digital access are still apparent. Worldwide, 81 per cent of urban dwellers used the Internet in 2023, compared with only 50 per cent of the population in rural areas. Data from the International Telecommunication Union (ITU) indicates a narrowing gap in Internet access between urban and rural areas, particularly in developing regions. However, disparities within cities persist, necessitating targeted strategies to address them. Bridging this gap is crucial for ensuring equitable access to vital public services and fostering inclusive participation in urban governance. International standards play a vital role in bridging the digital divide by promoting interoperability, ensuring equitable access to technology, and facilitating global cooperation.

There are several challenges beyond the digital divide that can undermine local e-government development. One of these is coordination between national and city governments on e-government initiatives. Often, there is a lack of alignment and collaboration between these levels of governance, leading to fragmented approaches and inefficiencies in the implementation of online strategies. Another critical concern is the capacity of public officials at the local level to effectively manage and oversee smart technology projects. Local governments frequently face a shortage of skilled personnel capable of making informed decisions about the adoption and management of relevant technologies. This gap often leads to outsourcing to private sector entities that may not fully understand the city's needs or priorities, potentially compromising the success and sustainability of projects.

As cities embrace AI and smart city technologies, there is a pressing need to safeguard people's rights, particularly with regard to privacy and security. The deployment of AI-driven systems and extensive data collection initiatives raises significant privacy concerns, necessitating robust regulations and safeguards to protect individuals. Steps should also be taken to mitigate other risks associated with technology adoption; developing and implementing legal, ethical, and operational frameworks to advance human rights in digital environments is essential. Adhering to international standards can play a crucial role in helping cities more effectively embrace AI and smart city technologies. These standards can help safeguard privacy and rights and enhance the deployment and interoperability of local e-government projects.

Funding remains a perennial challenge for local e-government projects. Financial resource limitations often hinder the implementation of comprehensive digital strategies, leaving many cities struggling to invest adequately in the infrastructure, human capital, and innovation necessary to realize their digital ambitions. Addressing these risks requires concerted efforts from policymakers, stakeholders, and communities to ensure that technology-driven urban development is both inclusive and sustainable.

4.1.2 City portal assessment

The ongoing evaluation of local government portals is crucial for improving e-government at the municipal level. As urbanization accelerates and more residents access the Internet, these portals need to adapt to accommodate a growing number of users. Overburdened systems causing wait times during periods of high demand can lead to frustration among residents. A well-functioning portal can enhance the liveability, workability and sustainability of a city by offering convenient access to services and strengthening the responsiveness of local government, ultimately leading to increased resident satisfaction.

City portals serve as indispensable tools in modern urban governance, providing centralized platforms for residents to access a plethora of essential services and information. These digital gateways streamline interactions between people and local authorities, enhancing efficiency, accountability

and inclusiveness. From 24-hour hotlines and emergency services such as vehicle towing to vital resources such as housing assistance, job listings, and access to health-care facilities, city portals cater to diverse needs within the community. They offer residents the opportunity to seamlessly navigate various aspects of city life, including practical matters such as street parking, waste disposal, permit applications, and recreational activities. By consolidating services and information into one accessible platform, city portals enhance civic engagement, streamline administrative processes, and foster a sense of community well-being.

In addition to offering essential services and information, city portals can play a crucial role in promoting social inclusion and supporting vulnerable populations. In a number of cities, these platforms provide resources for refugee settlement and integration, offering information on settlement processes and opportunities for community engagement. Moreover, city portals serve as an avenue for residents to contribute to inclusion initiatives and support efforts to foster belonging and equality within the city. By harnessing the power of technology and information, city portals empower residents to actively participate in urban life, contribute to community well-being, and shape the future of their cities.

The United Nations Department of Economic and Social Affairs (UN DESA) first integrated local e-government assessment in the E-Government Survey in 2018; the pilot study was limited to 40 cities evaluated on the basis of 60 indicators. In the 2020 edition, coverage expanded to 100 cities and 80 indicators. The 2022 edition featured 86 indicators and assessed the most populous city in each of the 193 United Nations Member States to ensure the most extensive population coverage possible. The present edition, featuring 95 indicators, revisits the cities assessed in 2022 after a two-year interval. The 2024 edition thus represents the first Survey capable of providing insight into the progress of all 193 cities over time. The sections below provide a more detailed explanation of the methodology and present findings of the 2024 assessment by highlighting some city initiatives.

4.2 Current status of local online services

4.2.1 Methodology

The 2024 edition of the Local Online Services Index represents a notable advancement from its 2022 predecessor, featuring 95 indicators distributed across six distinct criteria: institutional framework (5), content provision (30), services provision (30), participation and engagement (10), e-government literacy (10), and technology (10). This expansion from the five criteria and 86 indicators of the 2022 edition reflects a deepened assessment framework; the introduction of the e-government literacy criterion emphasizes the critical role of digital literacy in engaging people with online government services. The Index now evaluates key features on government portals, mirroring global trends towards inclusive practices while still affirming the importance of technical standards and accessibility.

While the institutional framework dimension remains consistent with its 2022 counterpart, refinements in the content provision and services provision criteria ensure a more thorough evaluation of online information and services provided by government agencies. Despite a slight reduction in the number of indicators within the technology dimension, now totaling 10, the LOSI continues to prioritize essential technical aspects such as accessibility, functionality, and alignment with standards. Overall, the 2024 LOSI represents a nuanced evolution, aligning with global trends towards greater engagement and digital inclusion, building upon the foundations laid in the 2022 edition. Indicator results for 2024 and comparisons with 2022 results have been calculated considering all the examined cities (193) and not only those that had operational websites (151).

4.2.2 Current status of local e-government

The 2024 edition of the LOSI study is the second one to incorporate an assessment of e-government in the most populous city in each of the 193 Member States. Table 4.1 lists the cities in the very high LOSI category based on an analysis of 95 indicators (see Section 12. EGDI 2024 Datasets Table 13

in the Technical Appendix). Madrid and Tallinn are ranked first, providing nearly 93 per cent of the features assessed, followed by Riyadh, Copenhagen, Dubai, New York City, Istanbul, Berlin, Seoul and Singapore in the top ten. It should be noted that even the cities ranked eleventh to twentieth have more than 83 per cent of the features assessed. The rankings are provided as a proxy for measuring and tracking local e-government development and show that many cities are very close to each other in terms of providing online services.

Among the 42 cities in the very high LOSI group, 22 are in Europe, 11 are in Asia, 7 are in the Americas, and 2 are in Oceania. Notably, none of the most populated cities in African countries have attained a very high LOSI classification, consistent with findings from the 2022 edition. This pattern underscores a persistent disparity in online service maturity between regions, with European cities leading in the adoption of advanced online services infrastructure. While cities in Asia and the Americas also demonstrate strong performance in the LOSI rankings, the absence of African cities in the very high category highlights the need for targeted efforts to enhance digital government capabilities in that region.

Table 4.1 Cities in the very high LOSI category, 2024

City	Country	LOSI value	City	Country	LOSI value
Tallinn	Estonia	0.9271	Paris	France	0.8125
Madrid	Spain	0.9271	Reykjavik	Iceland	0.8125
Riyadh	Saudi Arabia	0.9167	Rome	Italy	0.8125
Copenhagen	Denmark	0.9063	Riga	Latvia	0.8125
Dubai	United Arab Emirates	0.9063	Zurich	Switzerland	0.8125
New York	United States of America	0.9063	Buenos Aires	Argentina	0.8021
Istanbul	Türkiye	0.8958	Zagreb	Croatia	0.8021
Berlin	Germany	0.8854	Almaty	Kazakhstan	0.8021
Seoul	Republic of Korea	0.8750	Auckland	New Zealand	0.8021
Singapore	Singapore	0.8750	Stockholm	Sweden	0.8021
London	United Kingdom of Great Britain and Northern Ireland	0.8750	Sofia	Bulgaria	0.7917
Shanghai	China	0.8646	Toronto	Canada	0.7917
Manama	Bahrain	0.8542	Doha	Qatar	0.7917
Tokyo	Japan	0.8542	Amsterdam	Netherlands (Kingdom of the)	0.7813
Kyiv	Ukraine	0.8542	Oslo	Norway	0.7813
Vienna	Austria	0.8438	Sydney	Australia	0.7708
Bogota	Colombia	0.8438	Warsaw	Poland	0.7708
Moscow	Russian Federation	0.8438	Vilnius	Lithuania	0.7604
Sao Paulo	Brazil	0.8333	Guayaquil	Ecuador	0.7500
Montevideo	Uruguay	0.8333	Tel Aviv	Israel	0.7500
Helsinki	Finland	0.8125	Luxembourg-Ville	Luxembourg	0.7500

Among the 193 cities surveyed, 151 now have an online presence, signifying a moderate uptick from the 146 city portals assessed in 2022. The 2024 assessment reveals that 42 cities lack evaluated portals, down from 47 in the previous evaluation cycle. Figure 4.1 illustrates the progress achieved in local e-government development, with the number of cities in the very high and high categories having increased from 75 in 2022 to 81 in 2024. This rise indicates higher rates of implementation of LOSI features over the past two years and improvements in government services provision. The number of cities in the middle category decreased from 45 to 40, while those in the low category increased from 26 to 30; the uptick in the latter is largely attributable to the introduction of five new city portals since the 2022 assessment.

Figure 4.1 Comparison of LOSI levels for 2022 and 2024

(Number of cities per category)

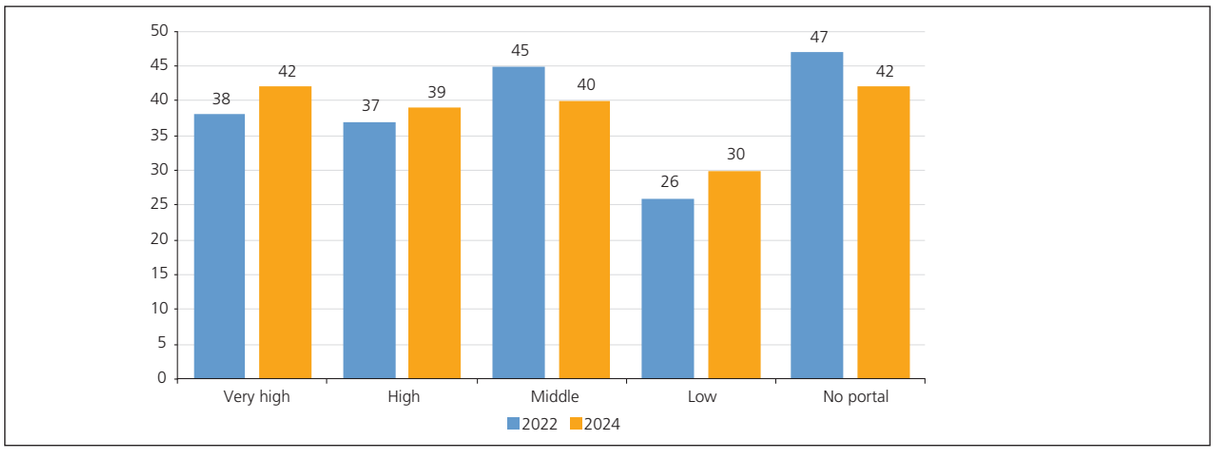
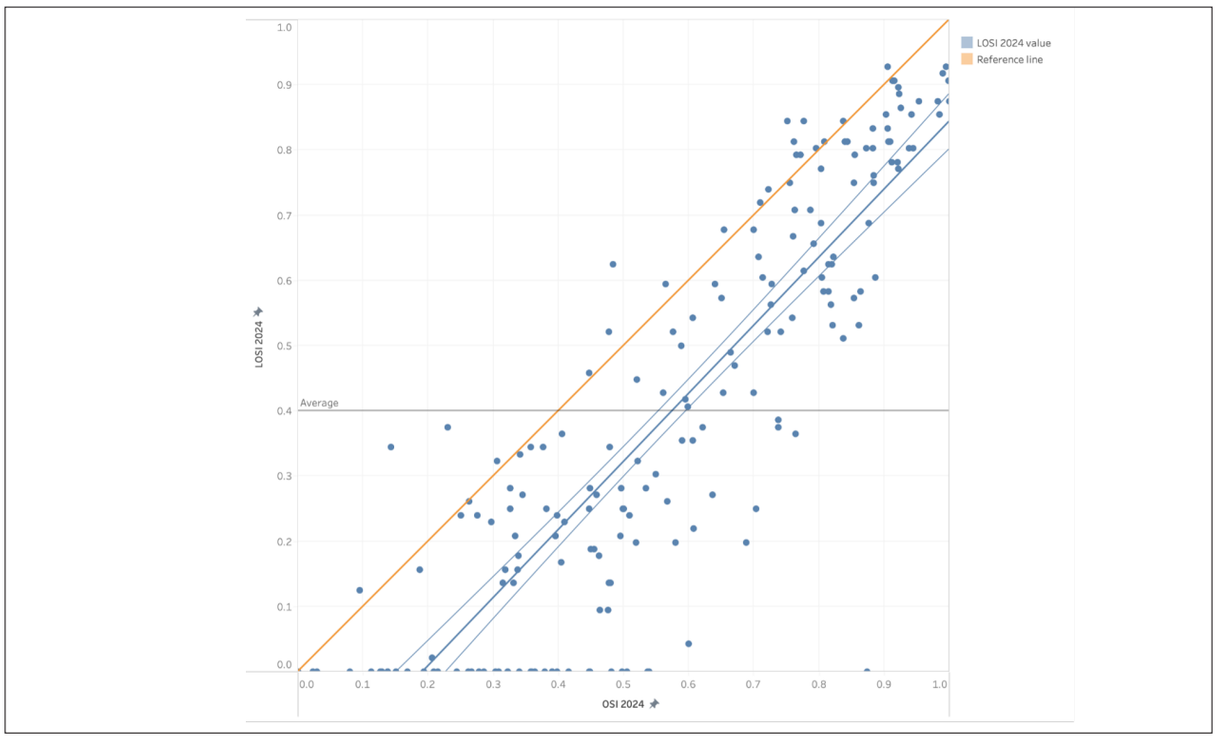


Figure 4.2 LOSI and OSI levels for 2024: convergence and divergence



Note: The line in orange is the line crossing the middle. The line in blue is the trend line (or also known as regression line) I shows how much a point change in the X axis accounts for the change in y axis. The light blue lines above and below the thick line is the confidence interval (meaning the margin of error of the prediction of the regression line).

Figure 4.2 shows that there is a strong relationship between the LOSI and the Online Services Index (OSI) of the E-Government Development Index (EGDI). The adjusted R-squared value of 0.75 indicates that OSI values can explain about 75 per cent of the differences in LOSI values. This means that the OSI is a strong predictor of the LOSI. Most of the blue dots, representing LOSI-OSI data points, are on the right side of the yellow reference line, which indicates that national portals are performing better than city portals in terms of online services provision.

Table 4.2 illustrates the relationship between LOSI levels for the 151 city portals assessed and OSI levels for the respective national portals evaluated in 2024; 77 of the cities are ranked at LOSI levels that correspond to their respective national levels (green-shaded cells), while 70 cities are ranked at LOSI levels lower than their respective countries' OSI levels (red-shaded cells). It is noteworthy that four city portals are ranked at levels higher than their countries' OSI levels (blue-shaded cells); La Vella and Monaco City are at the high LOSI level, while their respective national portals are at the middle OSI level, and Havana and Kabul are at the middle LOSI level, while their respective country portals are at the low OSI level. All cities categorized as having a very high LOSI level also have national portals at a very high level. The findings for 2024 are consistent with those from previous Surveys, indicating that most national portals continue to perform better than city portals.

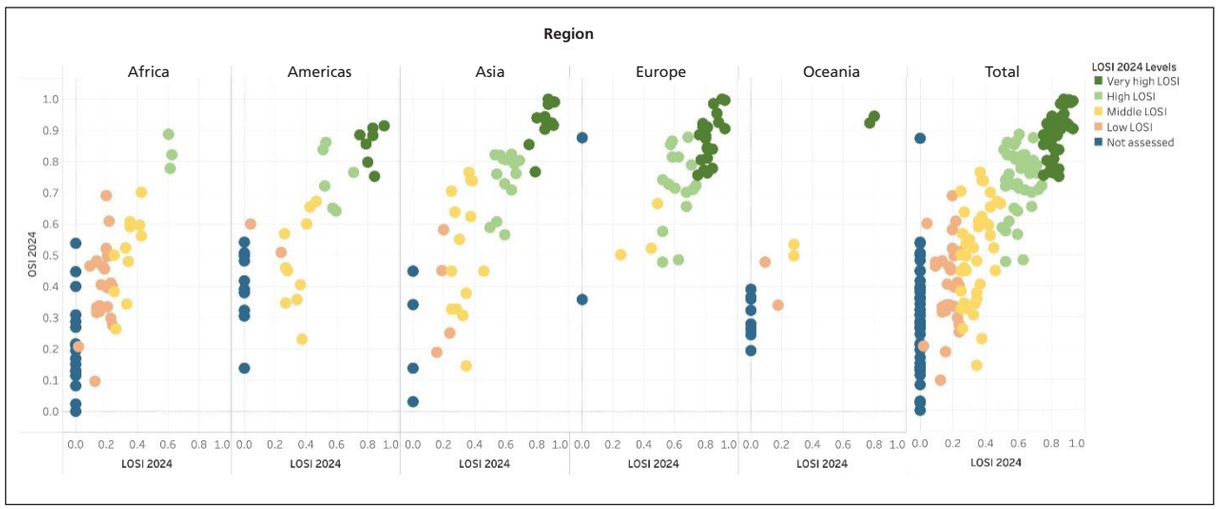
Table 4.2 LOSI and OSI levels for 2024: convergence and divergence

(Number of cities)

	Very high OSI 2024	High OSI 2024	Middle OSI 2024	Low OSI 2024
Very high LOSI 2024	42	None	None	None
High LOSI 2024	21	16	2	None
Middle LOSI 2024	1	20	17	2
Low LOSI 2024	None	6	22	2

In regional terms, Europe leads with an average LOSI value of 0.803, reflecting relative uniformity in digital services delivery across its cities (see figure 4.3). Malta and San Marino lack city portal assessments; it is not uncommon for the residents of smaller countries to rely more heavily, or even exclusively, on national portals. Asia has an average LOSI value of 0.688, with significant variance indicating disparities in digital infrastructure and technological advancement. Within this region, Beirut, Pyongyang, Dili and Sana'a lack evaluated city portals. Africa and the Americas also have numerous cities without portals. In Oceania, it is no surprise that Auckland and Sydney are standout performers; however, many small island developing States (SIDS) rely on national portals, which explains the absence of assessed city portals in certain parts of the region.

Figure 4.3 LOSI regional variations, 2024



Small island developing States and other countries small in size and population

The 37 SIDS spread across the globe face special challenges, including geographical isolation, limited resources, and heightened vulnerability to environmental and economic fluctuations. Only 15 of these countries have dedicated city portals, with the remaining 22 relying on national portals. In the LOSI 2024 rankings, Singapore excels with a value of 0.8750, and Santo Domingo and Havana are making significant progress with respective values of 0.5938 and 0.3750. Despite geographical constraints, the city of Malé in Maldives also has a LOSI value 0.3750, demonstrating resilience in terms of digital advancement.

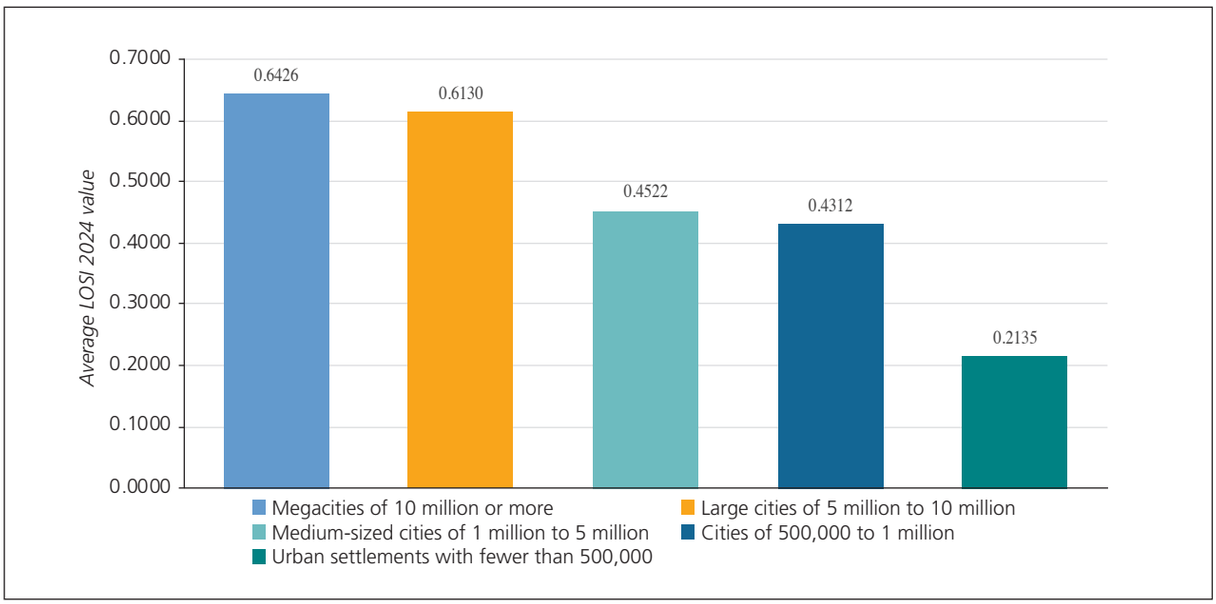
In SIDS and other small countries, it often makes sense for the entire population to utilize a central portal. Some of these States, including Qatar and Singapore, approached UN DESA with the preparatory survey – the Local Government Questionnaire (LGQ) – and requested that the national portal be assessed in lieu of the city portal. In some cases, a city in these countries is assessed, such as La Vella in Andorra and Monaco City in Monaco. The LGQ can provide some understanding of how e-government coordination between the national and local levels works in a country, aiding in the decision of which portal to assess. By participating in the LGQ, SIDS and other relatively small countries can gain insights into their e-government practices at the local level. This participation can lead to improved e-government strategies, enhanced services delivery, and better alignment between national and local digital initiatives. UN DESA has already extended invitations through appropriate channels and is currently working with SIDS and other countries small in size and population to participate in the LGQ process to enhance the understanding and effectiveness of e-government practices at the local level.

The impact of population size

For both the 2022 and 2024 Surveys, LOSI results for cities were analysed in relation to their population size. In 2024, 13 of the cities assessed were megacities with populations of 10 million or more, 19 were large cities with populations of 5 million to 10 million, 66 were medium-sized cities with populations of 1 million to 5 million, 33 had populations between 500,000 and 1 million, and 62 were urban settlements with populations of less than 500,000. The current findings are consistent with previous findings showing that cities with larger populations tend to have higher average LOSI values. A graphical representation of these trends is provided in figure 4.4, illustrating average LOSI values for various population-size categories.

The success of large cities in achieving higher LOSI values underscores their enhanced potential for economic prosperity and employment opportunities, benefiting residents and local governments alike. Strong LOSI performance can be attributed to several factors, including the relative abundance of resources and talent in larger cities, as well as the heightened demand for online services in densely populated areas. Budgetary support is key to local e-government development; with increasing population comes greater tax revenue, facilitating investment in improved public services and infrastructure. The larger population base also provides fertile ground for the implementation of smart city initiatives, with abundant resources and diverse talent pools being leveraged to drive innovation and sustainable urban development. Harnessing the potential of population growth in urban areas can serve as a catalyst for advancing digital transformation and fostering inclusive, resilient, and sustainable cities for all residents. Addressing the digital divide between cities of different population sizes will require strategic resource allocation and ongoing digital innovation to enhance public services delivery in all types of urban environments.

Figure 4.4 Average LOSI 2024 values by population size



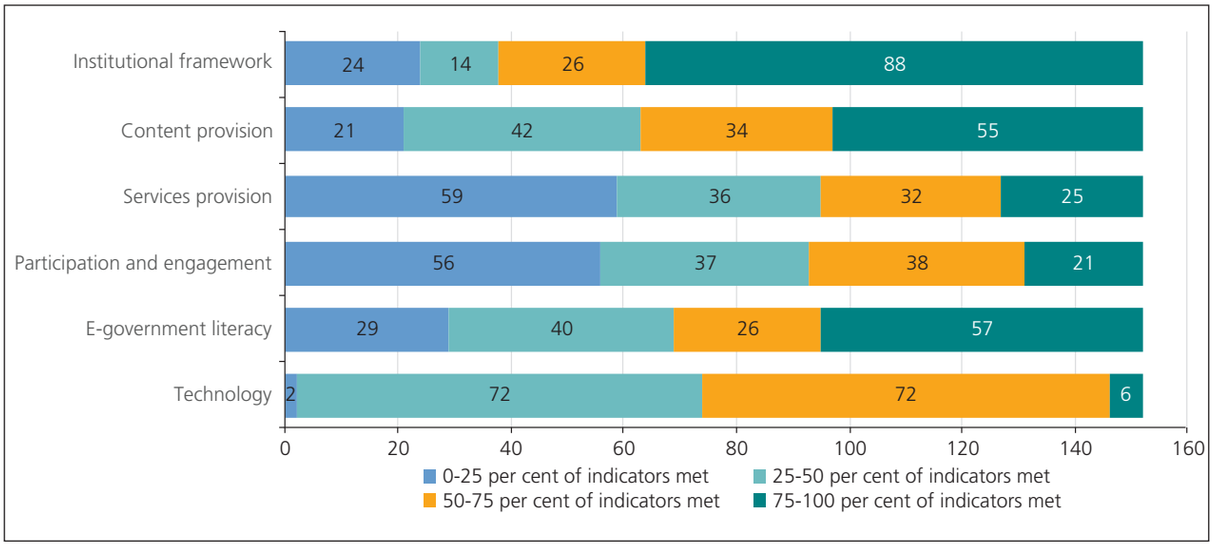
Implementation of LOSI indicators in city portals

The 2024 LOSI includes six distinct criteria – institutional framework, content provision, services provision, participation and engagement, e-government literacy, and technology – with a total of 95 indicators. This expanded framework embodies a comprehensive approach to assessing local online services, encompassing traditional aspects such as content and technology as well as new dimensions such as e-government literacy; the added criterion underscores the growing recognition of digital skills as essential for citizen engagement with online government services. Some new LOSI indicators have been added and others have been reorganized to achieve better alignment with OSI indicators for the 2024 Survey.

Similar to the 2022 findings, the highest level of compliance is observed for the institutional framework criterion, with the majority of cities meeting indicators such as providing contact information and offering a clear representation of the organizational structure (see figure 4.5). The second-highest compliance rates are for the newly introduced e-government literacy criterion, which features indicators such as the availability of search features, free Internet access provisions, and the presence of privacy policies on municipal government portals. Compliance with content provision indicators is also relatively high owing to the efforts made by municipalities to provide wide-ranging content centred around local priorities such as health, environment and education; relevant indicators address the provision of information and resources related to these target areas. As in 2022, the lowest level of compliance is observed for the technology criterion due to factors relating to alignment with display, markup validation, and accessibility standards and to the lack of advanced search options in city portals.

While many cities meet all indicators for the institutional framework criterion, Madrid, London, New York and Tokyo stand out as the only cities meeting all indicators relating to content provision. Excellent compliance rates have also been achieved by Riyadh for services provision, by Seoul for participation and engagement, and by Dubai for technology. These achievements underscore the varying degrees of success cities have in meeting the diverse requirements of local e-government.

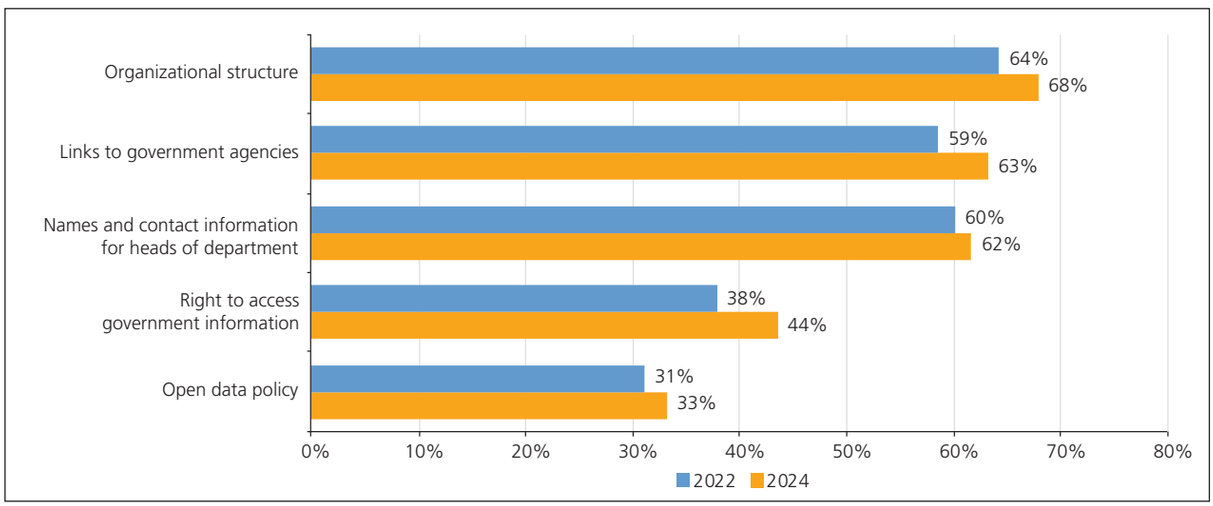
Figure 4.5 Implementation of LOSI indicators in city e-government portals
(Number of cities)



Institutional framework

Echoing trends observed in 2022, the institutional framework indicators most commonly met are typically those that are straightforward and easily implemented (see figure 4.6). These include providing clear information on the organizational structure of the municipality (68 per cent), offering name and contact details for department heads (62 per cent), and providing links to other government agencies (63 per cent). The 2024 LOSI also reflects marginal increases in the number of city portals that provide information on people's right to access information and details about open data policies. Organizational structures clarify roles and responsibilities within local governments, promoting transparency and accountability. Listing the names and titles of department heads makes it easier for residents to communicate directly with public officials about their concerns. Links to government agencies, as seen on the Singapore Government Directory page, help residents find services quickly. Overall, these indicators are essential for effective, accountable and inclusive local governance.

Figure 4.6 Implementation of institutional framework indicators in city portals



There is significant variability among cities in the availability of information regarding people's right to access government information. Some cities provide comprehensive information, while others have little to no information available. Many cities reference specific laws or regulations that govern access to government information, such as acts that address freedom of information or access to information. For example, Berlin,[6] Toronto[7] and New York City[8] have legislation in place to ensure transparency and access to government information, and the relevant legal provisions can be found on the respective city portals. Providing government information directly on the website and listing outside sources from which additional information may be obtained can reduce user requests for information and are considered good practice. New York City, for instance, provides access to government reports and data through various platforms; these include the NYC Government Publications Portal for reports and publications issued by City agencies (accessible through the official nyc.gov website), the NYC Open Data portal for open data sets, and NYC311 for neighbourhood information and request-status checks. Several cities, including Guayaquil,[9] Lima[10] and Panama City,[11] have dedicated transparency portals or sections on their websites where people can access government information. The Organic Law on Transparency and Access to Public Information in Guayaquil obliges all public sector institutions to disseminate minimum updated information of a mandatory nature through the institutional website. In some cases, cities do not provide information on the right to access government information directly on their websites but provide links to national sources or legislation. While some cities, such as Toronto, charge a minimal fee for processing government information requests, most cities offer this service at no cost to consumers.

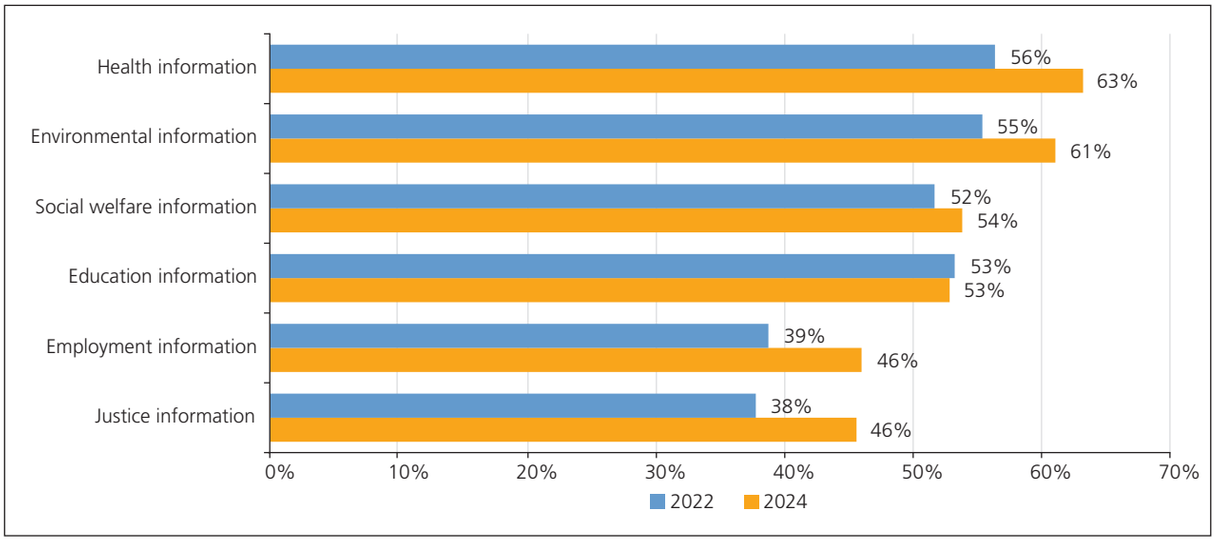
Content provision

Figure 4.7 shows rates of compliance with content provision indicators for specific sectors in 2022 and 2024. The LOSI 2024 content criterion results reveal a clear trend: a growing number of city portals are prioritizing information that addresses residents' most pressing needs. Health-related information remains prominent, likely due to ongoing public health concerns. The increase from 55 to 61 per cent in the availability of environment-related content is indicative of a growing emphasis on sustainability and the role of cities in achieving the SDGs. The provision of social welfare and education information has changed little from 2022. However, the availability of employment information has increased from 39 to 46 per cent and justice-related information from 38 to 46 per cent. These trends reaffirm the commitment of city portals to cater to the diverse needs of residents, aligning with municipal strategies aimed at enhancing engagement and empowerment. Significant progress has been made in content provision, but there is still room for growth; not even two thirds of the city portals assessed provide health or environmental information, just over half offer social welfare and education information, and even fewer give users access to information relating to the employment and justice sectors.

The 30 content provision indicators assessed cover a wide spectrum. They range from addressing everyday needs, such as providing information on services offered and contact details, to ensuring accessibility and assistance provision through features such as help desk support and information relevant to vulnerable groups. Some content indicators focus on advancing sustainability efforts through the provision of data on environmental matters, air pollution policies, road safety information, and emergency preparedness initiatives. The LOSI also evaluates the integration of the latest technologies into governance practices, including the provision of open data, indications of smart city initiatives, and the use of emergent technologies. The transparency and accountability of government procurement processes are examined as well.

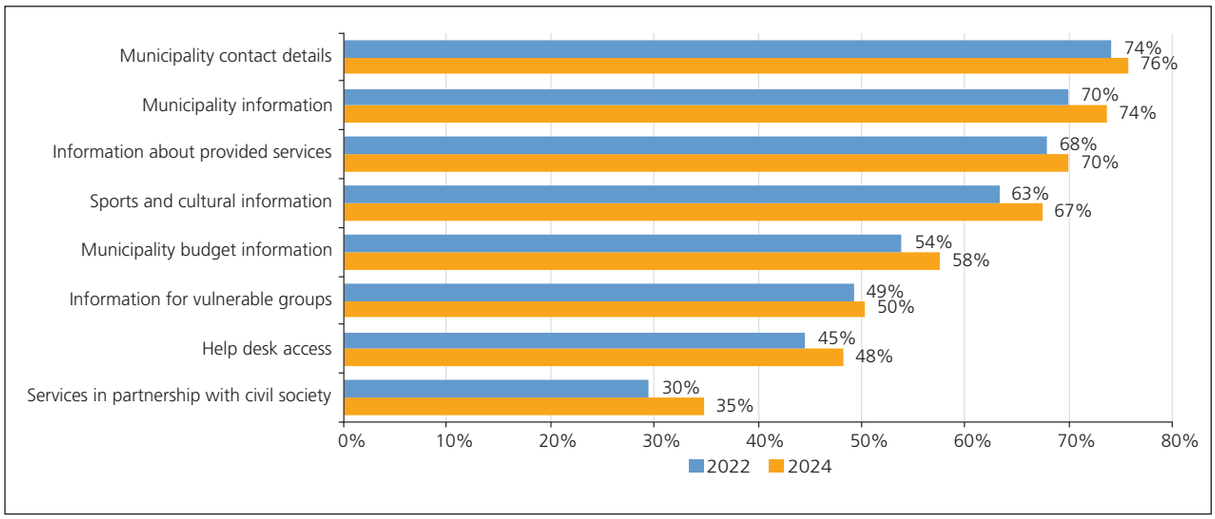
Figure 4.8 highlights essential indicators within the "addressing everyday needs" category. The 2024 LOSI findings are similar to those for 2022, showing that most assessed portals provide crucial features such as municipality contact details, general municipality information, and details about available online services. However, information tailored to vulnerable groups is available in only half

Figure 4.7 Implementation of content provision indicators in city portals: sectoral information



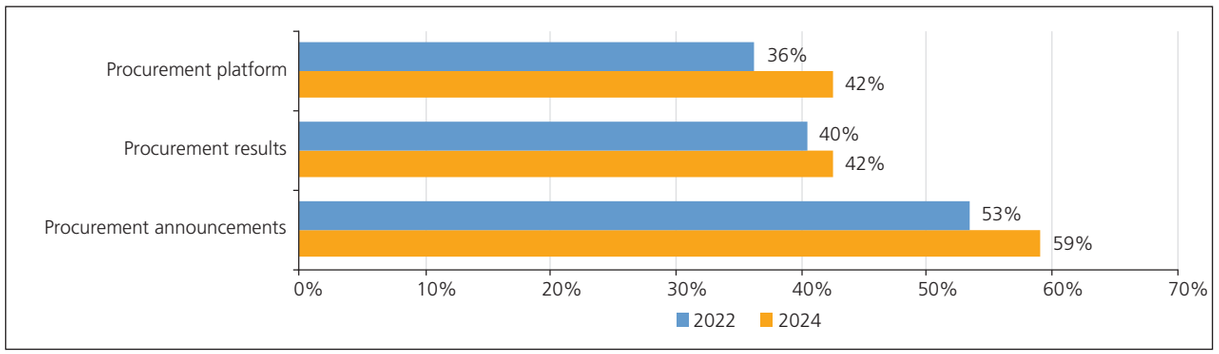
of the assessed portals, signaling an area in need of improvement. The availability of municipality budget information has improved but remains suboptimal at just under 58 per cent. More than two thirds of the city portals assessed now provide access to sports and cultural information and resources. The Government of Singapore[12] offers a range of online services to support immigrants, fostering community integration and cultural acclimatization. The portal includes resources such as Your *Neighbourly Welcome Guide*, which offers new residents insights into local culture and encourages community bonding by sharing stories from established residents. The suite of available programmes includes home visits, community learning activities, and the Singapore Citizenship Journey, culminating in a formal citizenship ceremony. Additionally, the portal features forums for residents to share opinions and facilitates annual meetings, allowing new immigrants to actively contribute to and benefit from community activities.

Figure 4.8 Implementation of content provision indicators in city portals: addressing everyday needs



The 2024 analysis related to public procurement reveals that 59 per cent of the city portals assessed share procurement announcements – a notable increase from 53 per cent in 2022. There has been a more modest rise, from 40 to 42 per cent, in the publication of procurement results. The adoption of e-procurement platforms has seen significant growth, rising from 36 per cent in 2022 to 42 per cent in 2024. Those cities that utilize national portals are awarded a point here as long as they link to a procurement portal with clear guidelines. For example, the Dublin city portal, in its Doing Business with the Council section,[13] clearly explains public procurement guidelines and provides a link to the national portal (etenders.gov.ie). Conversely, the Tokyo e-procurement portal[14] serves as a centralized platform for managing procurement processes electronically, facilitating transparent and efficient procurement activities for the city's government agencies and vendors.

Figure 4.9 Procurement information on city portals



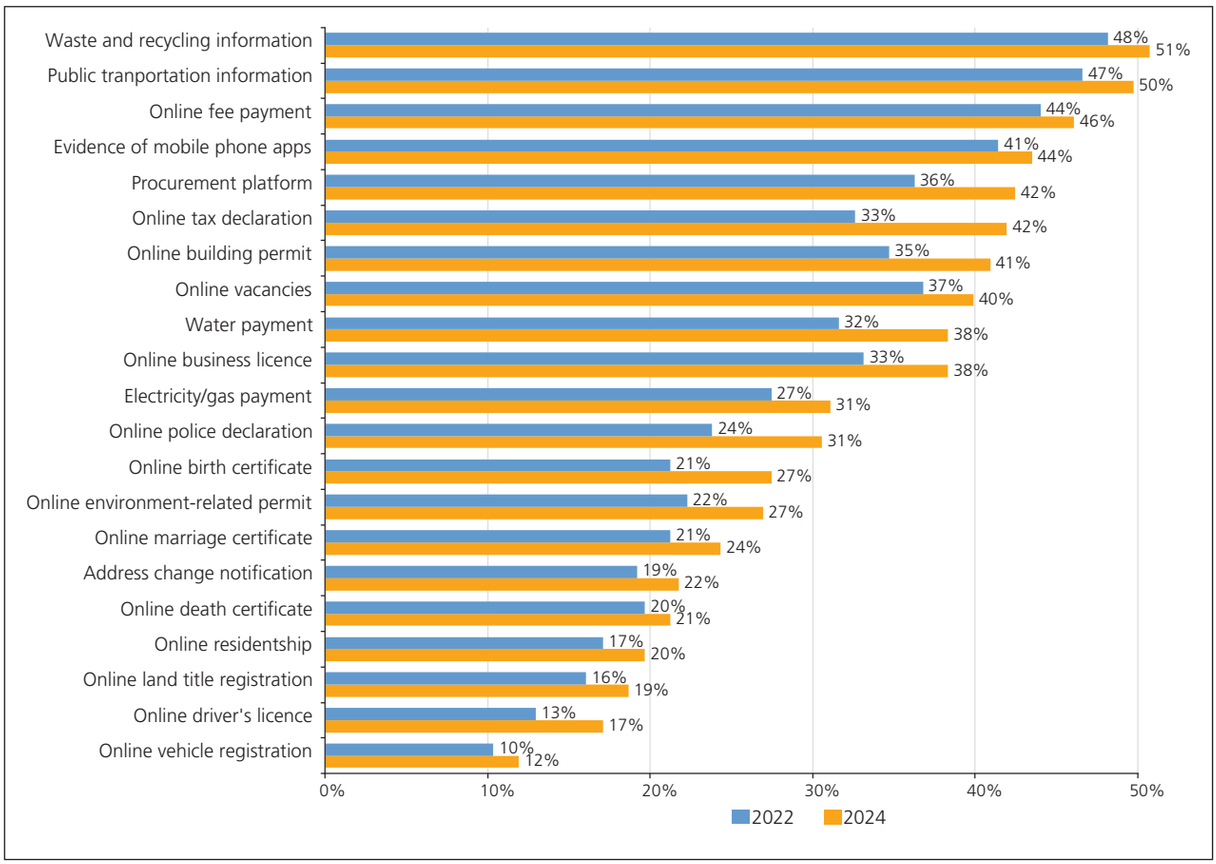
Services provision

Although services provision continues to have the lowest level of compliance among the six criteria assessed (see figure 4.5), the data reveal a notable increase in the availability of online services since 2022, with several indicators showing improvement (see figure 4.10). Among the most frequently met indicators are those relating to waste and recycling information and public transportation services, followed by online payment options for fines, utility bills and services.

It is encouraging to see the increased presence of waste and recycling information on city portals, as this signals a growing commitment to environmental sustainability and the involvement of residents in waste management efforts. Cities recognize the importance of offering people access to resources on waste reduction, recycling and reuse to encourage environmentally friendly behaviours and promote widespread engagement in tackling environmental challenges. These trends are promising and have the potential to contribute meaningfully to environmental sustainability. The Berlin city portal[15] offers comprehensive guidance on waste management and disposal in the city, providing information on bulky waste disposal, clothing donations, e-waste recycling, and household waste segregation. Through its portal, the city government emphasizes the importance of environmental responsibility, offering information on recycling centres, donation organizations, and pollutant collection points to facilitate proper disposal practices and promote sustainability within the community.

The availability of public transportation information and services on city portals reflects a commitment to enhancing urban mobility and reducing traffic congestion. Cities recognize the importance of providing residents with convenient access to public transportation timetables, route maps, fare information, and payment options. By offering these services online, cities aim to improve the overall efficiency and accessibility of public transportation systems, encourage the use of sustainable transportation modes, and reduce reliance on private vehicles.

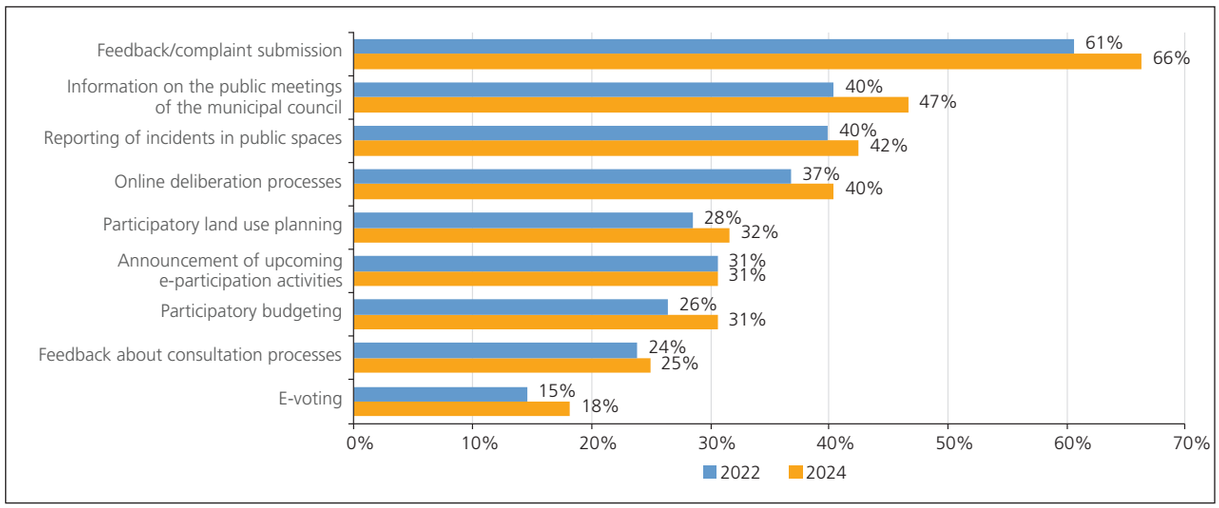
Figure 4.10 Implementation of services provision indicators in city portals



Participation and engagement

As illustrated in figure 4.11, compliance rates for most of the LOSI participation and engagement indicators increased between 2022 and 2024. There has been notable progress made in feedback/complaint submission, information on the public meetings of the municipal council, and participatory budgeting. Other indicators, such as e-voting, reporting incidents in public spaces, participatory land use planning, online deliberation processes, feedback on consultation processes, and announcing upcoming e-participation activities, have seen slight to moderate increases or have remained stable over the two-year period.

Figure 4.11 Implementation of participation and engagement indicators in city portals



Most city portals incorporate feedback mechanisms to promote and facilitate resident engagement. Malé,[16] the capital of the Maldives and its most populous city, pledges to process all duly completed feedback submissions within five business days. Rome allows residents to submit suggestions, comments, complaints, and even reports relating to local government activities or offices and is committed to responding within thirty days, identifying the relevant office and personnel overseeing the investigation and providing information on actions taken. The city of Dublin informs its residents of the avenues available to report various issues to designated service areas without requiring adherence to formal complaint procedures. Formal complaints directed towards the Dublin City Council[17] can be lodged via post, email or online through the Citizen Hub, with assurances of a formal acknowledgment within three working days and an expected response from the relevant department within twenty-one days. Dissatisfied individuals can escalate their complaint to the executive manager within fifteen working days and further to the Office of the Ombudsman if the problem persists.

E-voting is not strictly limited to electoral processes, often extending to decision-making on various initiatives, projects or ideas within city portals. The availability and utility of this option varies. Some platforms showcase e-voting functionality for specific projects or competitions, with evidence of past engagement but limited current activity. Others require registration to access e-voting results or offer opportunities for online voting on specific topics. In some instances, e-voting is integrated into participatory budgeting schemes. While these examples are encouraging, widespread implementation remains uncommon, with sporadic instances of e-voting observed across different municipalities. Although some platforms provide clear avenues for citizens to participate in e-voting opportunities, the policy impact of these contributions remains unclear in certain cases. Overall, while e-voting services are present in various forms, they often represent a minority among the participation mechanisms available within city portals.

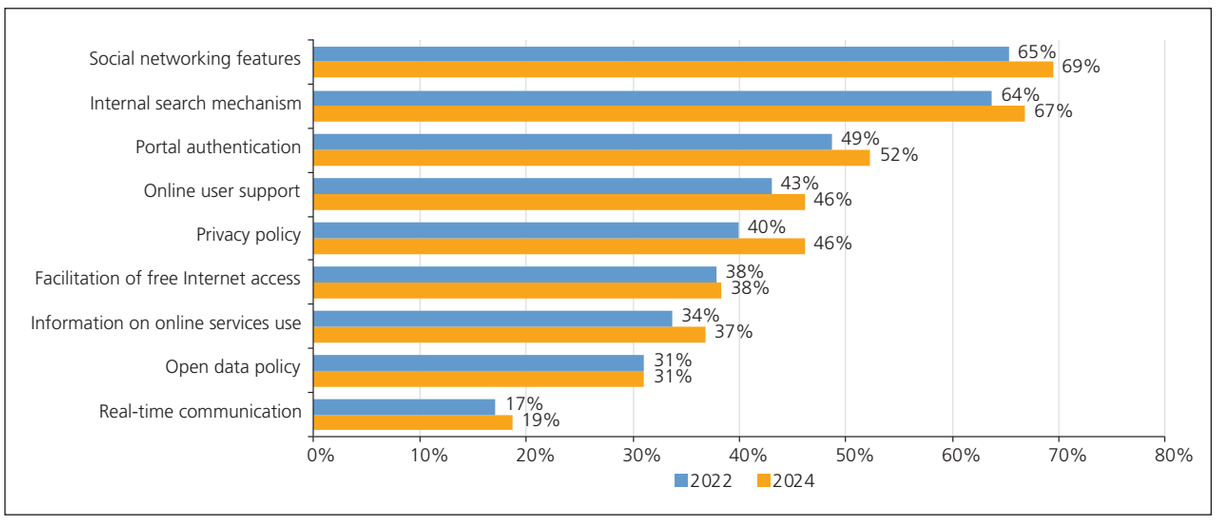
E-government literacy

In the 2024 edition of the E-Government Survey, UN DESA introduces the concept of e-government literacy to measure the ability of residents – especially vulnerable groups – to utilize e-government services and take advantage of e-participation opportunities. In the present analysis, e-government literacy is based on the assessment of key features within government portals, including support services, privacy protection, digital identity authentication, and access to online resources, as these indicators are aligned with enhancing digital literacy and engagement across diverse domains. Although e-government literacy was not a specific category in 2022, many of its indicators were

included in the LOSI assessment, allowing for feasible comparisons between 2022 and 2024 data. As seen in figure 4.12, progress has been made in several areas, with rates of compliance increasing for indicators such as real-time communication functionality, the availability of information on online services use, privacy policies, online user support features, portal authentication, internal search mechanisms, and the integration of social networking features in government portals. These advances reflect a commitment to enhancing accessibility and engagement for the users of online services.

Many members of society remain digitally disconnected and are in danger of being left behind in a world that is rapidly moving online. Providing free Internet access at the local level is crucial for ensuring inclusion. The availability of physical spaces for accessing online services varies across cities. Some municipalities offer service centres or "digital islands" within government offices, facilitating access to online services and often providing personal assistance. Vienna is one city that offers digital islands and provides support for users of online services. Belmopan, in Belize, boasts numerous free mobile Wi-Fi hotspots. Public libraries often serve as hubs for accessing online services, with free Wi-Fi widely available in many cities. While some cities have dedicated spaces for digital access, such as community centres or libraries, others lack clear evidence of facilities for public Internet access. Notably, some cities provide free Wi-Fi in public spaces such as parks, squares and metro stations, further enhancing connectivity. These varied efforts to ensure public Internet access underscore the importance assigned to digital inclusion in modern governance.

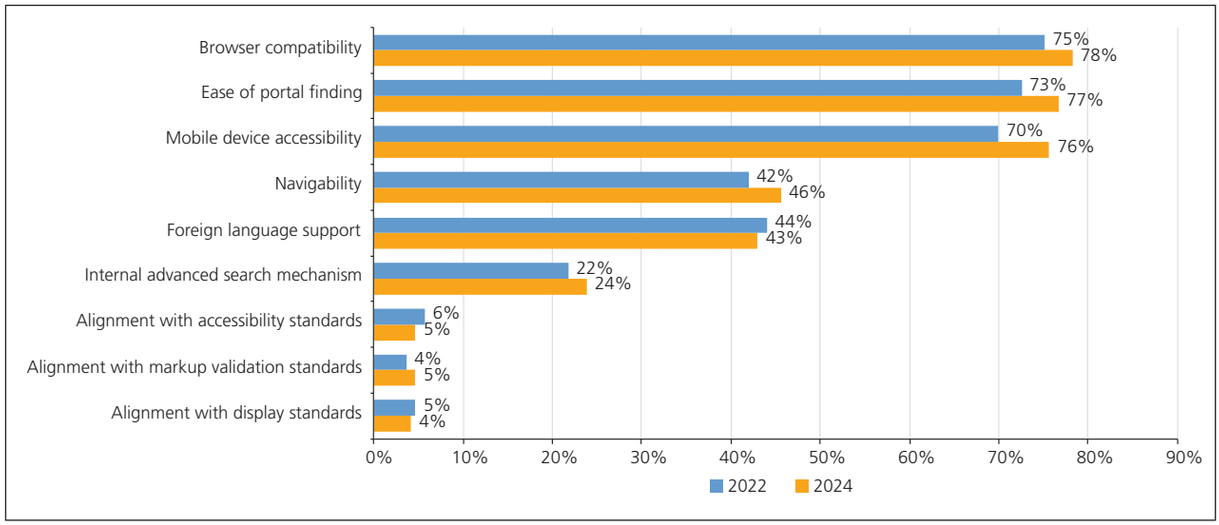
Figure 4.12 Implementation of e-government literacy indicators in city portals



Technology

As illustrated in figure 4.13, there have been improvements in most of the LOSI technology indicators since 2022. Notably, compliance rates have increased for mobile device accessibility (from 70 to 76 per cent), the ease with which portals can be found (from 73 to 77 per cent), and browser compatibility (from 75 to 78 per cent). Indicators such as the availability of internal advanced search mechanisms, foreign language support, and navigability have also registered improvement. However, compliance rates have dropped slightly for alignment with display standards, markup validation standards, and accessibility standards. As an example of the technological advancements being made, the Beijing Municipal Government Service Centre website has introduced easy-access and senior-friendly features such as text-to-speech functionality, large fonts, and customizable colours, along with a one-stop service zone to simplify access to various services for individuals with disabilities and the elderly. These enhancements are intended to make government services more accessible and user-friendly for special groups, ensuring a more satisfying online experience for a wider range of consumers.

Figure 4.13 Implementation of technology indicators in city portals



The importance of search engines cannot be overstated. Growing numbers of people needing services or information are turning to search engines and generative AI tools such as ChatGPT and Copilot for assistance. In the present context, the ability to find city portals easily on the first result page produced by a search engine is crucial. This ensures that residents and visitors can swiftly access important information and services provided by municipal governments. It is worth noting that, across a wide range of countries, city portal links consistently appear among the top results from popular search engines such as Google, Bing and Yahoo. Search engine visibility is key to ensuring seamless access to municipal services and information.

4.3 Smart cities for sustainable development

A smart city for sustainable development embodies a vision of urban progress aligned with the principles of inclusivity, safety, resilience, and sustainability articulated in SDG 11. Cities that offer numerous opportunities and promote prosperity can also face challenges such as poor health conditions and environmental degradation. The integration of digital technologies in urban infrastructure and services is essential for addressing these and other challenges. By leveraging digital innovations, cities can better meet the needs of residents, enhancing overall liveability, workability and sustainability. The LOSI underscores the importance of digital technologies in empowering local officials to improve urban conditions and meet the evolving needs of communities. This emphasis on digital empowerment aligns with the broader goal of creating cities that are not only technologically advanced but also inclusive, resilient and environmentally sustainable. Towards that end, the LOSI can serve as a tool for measuring e-government progress within cities.

A number of smart city initiatives have been undertaken worldwide. It is important to note that there is no universally agreed-upon definition of a smart city. The digital transformation of urban spaces is a dynamic process or journey rather than a static destination; with the rapid advances in technology, cities can continuously evolve and improve their smart capabilities. UN DESA, through its LOSI assessments since 2018, has been instrumental in highlighting various smart city initiatives but has not provided definitive guidelines on what constitutes a smart city. ITU offers the following definition: "A smart sustainable city is an innovative city that uses information and communication technologies (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".[18] This definition, based on Recommendation ITU-T Y.4900 and approved by the 193 ITU member States, has become an international standard that is also used for United for Smart Sustainable Cities (U4SSC) deliverables. Although the ITU definition is widely recognized, the smart city concept continues to be interpreted and implemented in various ways across the globe.

Fundamentally, a smart city is a city that responds to the needs of its residents by leveraging digital technologies. City government officials play a crucial role in identifying local priorities and challenges and employing the most appropriate digital tools to effectively address those needs.

Moving forward, it is essential that smart city initiatives be aligned with SDG 11 targets and with the principles of effective governance endorsed by the Committee of Experts on Public Administration (see figure 4.14).[19] The eleven principles of effective governance for sustainable development are grouped under three subheadings: effectiveness, accountability and inclusiveness. Effectiveness is based on ensuring that city institutions have the expertise and resources necessary to address urban challenges appropriately and efficiently. Accountability emphasizes the importance of transparency, integrity and independent oversight in strengthening and preserving public trust in government. Inclusiveness promotes the involvement of all segments of society in decision-making processes, ensuring that no one is left behind. When these principles are linked to the goals of liveability, workability and sustainability, residents of smart cities can expect urban environments that are not only technologically advanced but also conducive to a high quality of life, economic success, and environmental preservation. Cities that intentionally integrate principles of effective governance in their smart city initiatives will be better positioned to meet these expectations and support inclusive, resilient and sustainable urban development.

Figure 4.14 Integrating the principles of effective governance and SDG 11 targets in the development of smart and sustainable cities

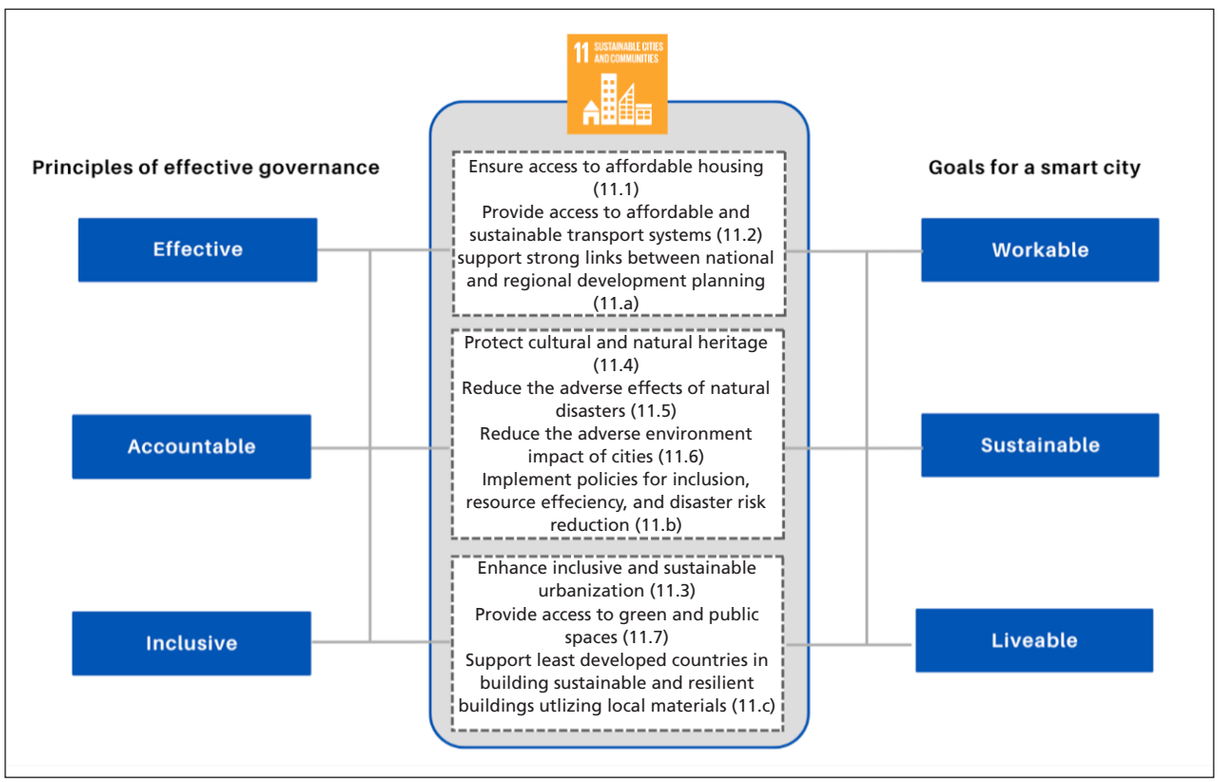
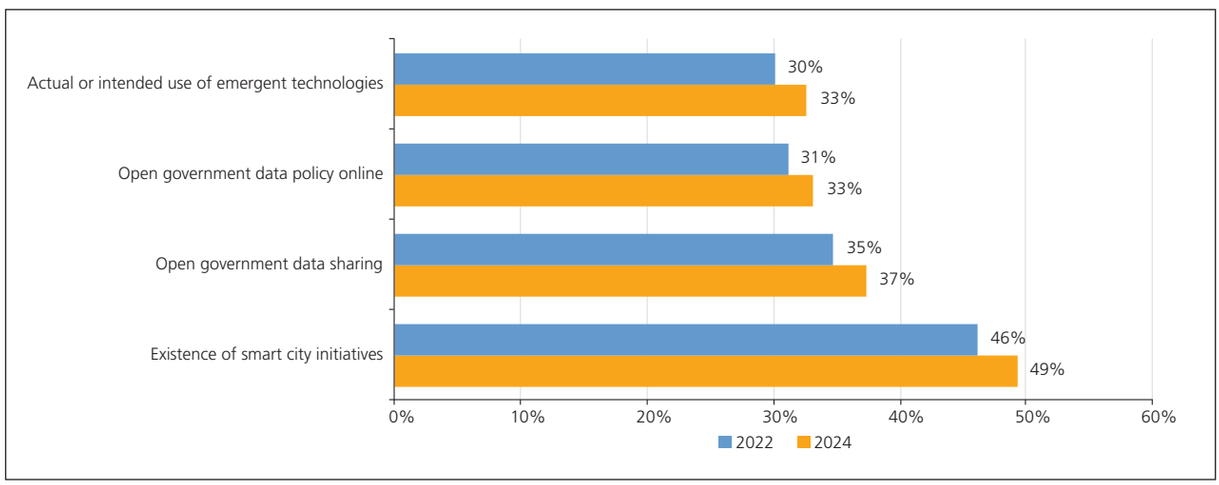


Figure 4.15 presents proxy indicators from the LOSI assessment that may offer some insight into the extent of digital readiness for smart city development. These indicators serve as a valuable tool for gauging the level of digitalization and innovation within urban environments and underscore the importance of data in driving smart city initiatives forward. Data not only inform decision-making processes but also serve as the foundation for AI applications and other smart city endeavours. In the LOSI assessments, indicators such as the existence of smart city initiatives, open government data sharing, the presence of online policies for data accessibility, and indications of emergent technology utilization provide valuable insight into the progress cities are making towards becoming smarter and more responsive to the needs of residents.

An analysis of smart city initiatives around the world reveals varying levels and stages of engagement, implementation and visibility. Many cities, including Dubai, Amsterdam, Riyadh, Seoul, Singapore, and New York City, are actively engaged in smart city development. Cities such as Berlin,[20] Copenhagen and Istanbul have dedicated departments, units or projects focused solely on smart city development – an indication of their strong commitment to digital urban development. Smart City Berlin is a collaborative effort involving various stakeholders, including government agencies, private companies, academic institutions, and the residents themselves, all working together to create a more liveable, resilient and prosperous urban environment. The Copenhagen Solutions Lab[21] is a development unit under the Technical and Environmental Administration for the Municipality of Copenhagen. The Lab acts as an incubator for smart city development and leverages the opportunities provided by urban laboratories, which are real-world testing grounds within the city itself. These laboratories provide the ideal scale for systematic and targeted experiments and the exploration of new solutions. By developing, testing, and operationalizing innovative solutions in urban laboratories, Copenhagen Solutions Lab gains valuable insight into which ones can be effectively scaled to encompass larger areas of the city, ultimately benefiting all of Copenhagen. This approach also provides a critical foundation for informed decisions regarding investments in new technologies for the Municipality's smart city initiatives.

Figure 4.15 LOSI indicators as a proxy for progress towards smart city development



The Smart Municipalities and Artificial Intelligence Programme in Saudi Arabia focuses on transforming urban landscapes through digitalization and AI integration across key verticals. By leveraging advanced technologies such as AI-enabled CCTV and drones, the programme aims to optimize inspection activities and improve safety. Through initiatives such as smart waste management platforms and connected bins, it seeks to enhance cleanliness and environmental preservation. By employing digital tools such as social media sentiment analysis and digital applications for proposals, the programme aims to increase accessibility to administrative services and better engage people in community activities and decision-making processes. Mexico City has set up an innovative AI-driven platform to address gender disparities in urban policymaking. Overseen by the Women's Secretariat, this platform integrates diverse AI-processed data sources to provide detailed insights into critical priorities at the granular level, down to individual city blocks. It supports gender-responsive initiatives focused on improving transport connectivity and local childcare services, ultimately fostering women's economic empowerment and promoting inclusive urban governance. Featuring a user-friendly interface, the platform empowers policymakers to take informed action based on the insights provided. By enhancing survey data with advanced natural language understanding models, Mexico City ensures that women's voices are heard and that their perspectives are integrated into policy formulation. These efforts collectively contribute to creating a digital city ecosystem that improves city services and benefits for residents while also ensuring efficient operations through advanced analytical approaches and the maintenance of digital capabilities.[22]

The U4SSC initiative,[23] coordinated by ITU, the United Nations Economic Commission for Europe and UN-Habitat and supported by 16 United Nations entities, is playing a pivotal role in advancing efforts to create smart sustainable cities and achieve the SDGs – in particular Goal 11, which aims to make cities inclusive, safe, resilient and sustainable. The U4SSC initiative provides a global platform for knowledge exchange and collaboration, fostering the development of policies and strategies that promote smart urban solutions. It has developed a set of key performance indicators (KPIs) for smart sustainable cities, including metrics on ICT infrastructure, environmental sustainability, quality of life, and urban governance. These KPIs help cities measure their progress, identify areas for improvement, and implement data-driven policies that contribute to sustainable urban development. Through these efforts, U4SSC supports cities in becoming more efficient, liveable and resilient, aligning urban growth with the broader SDG agenda. The LOSI complements these efforts by evaluating the availability and quality of online services at the local level, emphasizing the importance of synergies among United Nations entities in fostering integrated and data-driven approaches to sustainable urban governance and development.

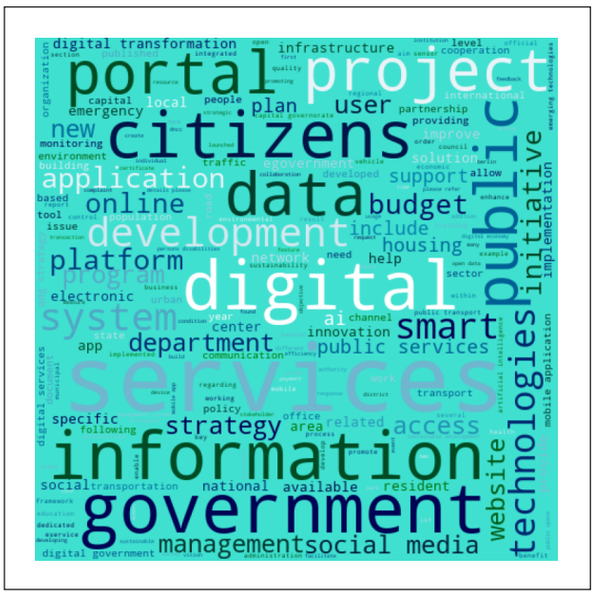
4.4 Local Government Questionnaire

The LGQ is a preparatory survey administered to support the LOSI process. The LGQ survey template may be found in the Section 9 of the Technical Appendix. While the LGQ does not directly affect Index values or rankings, it serves an important purpose in helping assessors check the correct web features and refer to the most recent policy documents. The LGQ has a total of 46 questions, not all of which are answered by all respondents. The questions cover eight clusters of information: institutional framework, legal framework, strategy and implementation, usage of online services, user satisfaction, social media, addressing crisis/emergency situations, and smart city and new technologies. A total of 51 local government representatives participated in the 2024 survey (10 from Africa, 7 from the Americas, 23 from Asia, 10 from Europe, and 1 from Oceania), representing a response rate of 26 per cent. While still relatively low, this represents an improvement over the 2022 LGQ response rate of 22 per cent (with 42 countries participating). UN DESA expects that more cities will participate in the LGQ over time, providing enriched input for future editions of the E-Government Survey.

The LGQ was made available online in early 2023 and was also sent to municipalities. Figure 4.16 highlights the keywords used most frequently in city responses. Along with "citizens" and "government", "digital" and "services" are identified as top priorities, indicating a concerted effort by municipal authorities to prioritize the digitalization of public services and a commitment to improving accessibility and efficiency for local residents. The prominence of "information" underscores the importance of providing comprehensive content on city portals and ensuring that people have access to relevant, up-to-date information. Although the word "smart" features prominently, the relatively lower occurrence of "AI" and "sustainable" suggests that while smart city initiatives are gaining traction, artificial intelligence and sustainability measures may not yet be fully integrated into mainstream e-government strategies. The moderately high occurrence of "budget" may underscore how crucial financial considerations are for local e-government initiatives, while the attention given to "housing" and "transport" may signify sectoral priorities in government efforts to address urban challenges and enhance essential services through digital innovation.

The 2024 LGQ results show that the responding cities stably provide services through the web and are increasingly introducing content through mobile channels. One notable observation is that some cities – at least 16 per cent of the sample – use more than one website for specific areas of e-government (including e-services, e-participation, open government data and public procurement). Most city organizational charts include a chief information officer to oversee the implementation of municipal e-government objectives. Most of the municipalities are aligned and collaborate with central e-government agencies, contributing to broader national e-government goals and exploiting national resources. Most of the cities allocate a portion of their budget to e-government projects and link those initiatives with specific sustainability goals based on residents' needs. Networking with other cities and organizations nationally or internationally is a growing phenomenon, allowing local government authorities to exchange information, access expertise, share best practices and digital platforms, and improve capacity-building. A gap is identified in open data provision, signaled by the slight decrease in usage statistics and in the publication of user satisfaction data. Municipalities are increasingly leveraging social media, using a variety of tools to engage with residents and thereby enhancing the inclusivity and accessibility of e-government activities.

Figure 4.16 Local Government Questionnaire keyword summary



Finally, even though emerging technologies are a stable feature of local e-government among the LGQ respondents, there remains a significant gap in the application of AI technologies in local government decision-making. An analysis of LGQ responses shows that AI is being leveraged to enhance various aspects of governance, public services delivery, and urban management. Azerbaijan is working on a national strategy for AI, aiming to develop smart cities and advanced technological infrastructure. Bahrain integrates AI in its MyCapital app to improve service efficiency and conducts workshops to educate officials on the impact of AI and other new technologies on public services. Monaco uses AI for public event security and natural disaster prediction, the latter exemplified by its AI-powered hazard detection system. The Singapore National AI Strategy seeks to position the country as a leader in scalable AI solutions by 2030 through the integration of AI in manufacturing, urban solutions and other strategic sectors. The United Arab Emirates fosters AI innovation through initiatives such as the AI Lab and the Dubai Blockchain Strategy, promoting the use of AI to improve public services delivery and position Dubai as a leader in AI adoption. Across the globe, AI is becoming instrumental in strengthening service efficiency, security, and overall urban management.

Additional information from the LGQ review is available in "Assessing digital government at the local level: an analysis of worldwide municipalities", a paper prepared for the upcoming International Conference on Theory and Practice of Electronic Governance, to be held in Pretoria from 1 to 4 October 2024.[24]

4.5 Application of LOSI methodology in countries

LOSI network

Owing to resource limitations, UN DESA was able to invite only the most populous cities in the 193 Member States to participate in the 2022 and 2024 LOSI surveys. These cities were selected to cover as many residents as possible. However, there has been strong interest in applying the LOSI methodology to assess e-government in more cities in individual countries, and over the past couple of years UN DESA has been able to sign memorandums of understanding and partner with various institutions to run LOSI pilots, in collaboration with the United Nations University Operating Unit on Policy-Driven Electronic Governance (UNU-EGOV), in multiple cities within selected countries. In 2022, the LOSI methodology was applied in the State of Palestine, Jordan and Brazil. In 2023, the methodology was applied in India, Uzbekistan and Greece. As of this writing, assessments are being conducted in Brazil (second application), the Republic of Korea, Tanzania and Tunisia. To review the completed projects and read the outcome documents prepared by partnering entities, visit the links provided in the figure below.

Figure 4.17 Application of LOSI methodology in countries

2022	2023
Brazil 	Greece 
Jordan 	India 
State of Palestine 	Uzbekistan 

It is expected that a growing number of partners will utilize the LOSI methodology, become part of the LOSI network, support national and local governments, and help other cities that may be experiencing similar challenges in e-government development. UN DESA and UNU-EGOV welcome opportunities for collaboration in applying the LOSI methodology in different countries; interested parties are encouraged to contact the Division for Public Institutions and Digital Government at dpidg@un.org.

4.6 Key findings and recommendations

- The LOSI 2024 findings indicate that while there is a strong correlation between national and city portal development, national portals generally outperform city portals. Continued monitoring and assessment of local and national e-government development is essential to close the gaps and support digital transformation at all levels.
- The average LOSI value remained stable at around 0.51 between 2022 and 2024. While the halfway point has been surpassed by the surveyed group as a whole in terms of meeting development indicators, there is still significant room for growth. Almost all indicators show an increase of 1 to 8 per cent in overall compliance, pointing to the usefulness of the LOSI as a guidance tool for city portal development.
- Europe leads in LOSI values, with an average of 0.803, reflecting a high degree of uniformity in digital services delivery across its cities. However, there are still many cities in Africa and the Americas that lack an online presence.
- In 2024, as in 2022, the analysis indicates that more populous cities tend to have higher LOSI values, as they are able to benefit from abundant resources and higher demand for online services. These cities are likely to continue to lead in digital services provision, largely because of their higher capacity to invest in and innovate their e-governance systems.
- Among the six criteria assessed for the 2024 LOSI, the highest average compliance rate is observed for the institutional framework criterion, with most cities meeting 75 to 100 per cent of the indicators. The newly introduced e-government literacy criterion has the second highest overall compliance rate.

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