Building Capacity for People-Centred Smart Cities

A playbook for local and regional governments

UN HABITAT
FOR A BETTER URBAN FUTURE

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Building and Securing Digital Public Infrastructure
A playbook for local and regional governments

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Foreword

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As the agency with the mandate to coordinate urbanisation matters within the UN System, UN-Habitat often highlights that half the world's population - 3.5 billion people - now live in cities. The world is both urbanising and digitising at a rapid pace and we see that digital technologies have great potential to assist Member States in their efforts to achieve sustainable urban development. The 'smart city' as a concept is the lynchpin connecting these two global mega-trends. It can help Member States achieve positive transformative change by harnessing ICTs and digital technologies to improve urban efficiency, quality of life and sustainability.

Whilst digital technology can have enormous transformative potential for positive change, it can also perpetuate existing social and economic inequalities. In 2020, I saw many children struggle to get 'connected' including the students in my rural village with many missing out on their educational needs.

To address this yawning digital divide, the UN Secretary-General has made a strong case for human rights in digital spaces in his 2020 Roadmap for Digital Cooperation, which lays out key areas for action including universal connectivity, promoting digital public goods, and ensuring trust and security in the digital environment. Additionally, in the Connect 2030 Agenda, our colleagues at ITU commit to bridging the digital divide for an inclusive information society and enabling the provision of broadband access for all, leaving no one offline.

For UN-Habitat, the use of digital technologies in cities and by cities must be appropriate to ensure that the prosperity they bring is shared among urban residents, cities and regions. Ultimately, the deployment of technology needs to be grounded in the real needs of people. It should pay particular attention to underserved populations in order to address inequalities and bridge social and spatial divides. Our people-centered smart cities flagship programme was launched in 2020 to provide strategic and technical advice to local, regional and national governments to enable them to take a strategic and proactive approach to digital transformation, while meaningfully engaging their residents and ensuring human rights in digital spaces.

We must address the elephant in the room. People-centered smart cities cannot be built when so many remain outside of the digital world. The people-centered smart cities Playbook Series aims to help cities and communities ensure that urban digital transformation works for the benefit of all, driving sustainability, inclusion and prosperity in the process. Each playbook in the series represents one of five Pillars of People-Centered Smart City development: Community, Digital Equity, Infrastructure, Security and Capacity. Collectively, the playbooks outline key activities, provide recommended actions, and policy toolkits that provide actionable guidance for cities seeking to ensure a more equitable, inclusive and sustainable future for smart cities.

About UN-Habitat

The United Nations Human Settlements Programme (UN-Habitat) is the United Nations programme working towards a better urban future. Our mission is to promote socially and environmentally sustainable human settlements development and the achievement of adequate shelter for all. We work with partners to build inclusive, safe, resilient and sustainable cities and communities and promote urbanization as a positive transformative force for people and communities, reducing inequality, discrimination and poverty. UN-Habitat provides technical assistance, policy advice, knowledge and capacity building to national and local governments in over 90 countries.

UN-Habitat is coordinating the implementation of the UN System-Wide Strategy on Sustainable Urban Development[1] and in close coordination with national and local governments, the agency leads the monitoring of Sustainable Development Goal 11 (SDG11) on sustainable cities and communities as well as the New Urban Agenda.

UN-Habitat's approach to people-centered smart cities

Launched in 2020, UN-Habitat's flagship programme 'people-centered smart cities' acknowledges the transformative potential that digital technologies can have for sustainable urban development. Through the people-centered smart cities flagship programme, UN-Habitat provides strategic and technical support on **digital transformation** to national, regional and local governments.

Digital transformation is now critical to meet the demands of sustainable urban development. In the past decade, internet connectivity has become a requisite for full participation in society, including access to education, affordable housing, and critical government services -- yet 3.7 billion people were offline in 2019[2]. In recent years, digital innovations like civic technology, geographic information systems, the sharing economy, open data, and digital platforms have changed how people understand, manage and participate in cities. The COVID-19 pandemic introduced even greater urgency for local and national governments alike to bridge the digital divide especially for marginalized groups and informal settlement communities[3], build more efficient and secure data management systems, and protect citizens' privacy when using digital services. These activities are the foundation for inclusive and resilient smart cities.

Unfortunately, many 'smart city' initiatives have fallen short on sustainability, where technology has been applied uncritically, based on supply rather than demand. Investments in smart city projects that prioritize technology's capabilities over residents' needs have not delivered expected impacts. Instead, we see trends towards surveillance, private ownership of digital public goods and infrastructure, and the perpetuation of discrimination through automated decision-making powered by artificial intelligence. As cities have become testing sites for these new technologies, there is growing concern about a lack of oversight, transparency, and potential human rights violations in smart city frameworks.

Smart cities can have a tremendous positive impact on people's lives, but only when people are at the center of the development process. This is why UN-Habitat is introducing the '**people-centered smart cities**' approach, which aims to show how smart cities can be an inclusive force for good, if implemented with a firm commitment to improving people's lives and building city systems that truly serve their communities. This requires engaging deeply with the needs of all residents and urban stakeholders through meaningful community participation, bridging the digital divide, developing essential digital infrastructure and governance, and building capacity through multi-stakeholder partnerships. It also requires governments to take a strategic approach to digital transformation, understanding its potential, and ensuring that it aligns with existing priorities as outlined in the 2030 Agenda for Sustainable Development, including sustainable transport, inclusive neighbourhood planning, providing affordable housing and reducing carbon emissions.

This new series of playbooks is a key normative component of UN-Habitat's people-centered smart cities flagship programme that aims to empower local governments to take a **multi-stakeholder approach to digital transformation that realizes sustainability, inclusivity, prosperity and human rights for the benefit of all.** To that end, local, regional and national governments will find pragmatic guidance for how to develop smart city strategies that are more inclusive, sustainable, and aligned to the actual needs of residents. We look forward to working with a wide variety of partners to implement the recommendations from the playbooks in a collaborative manner.

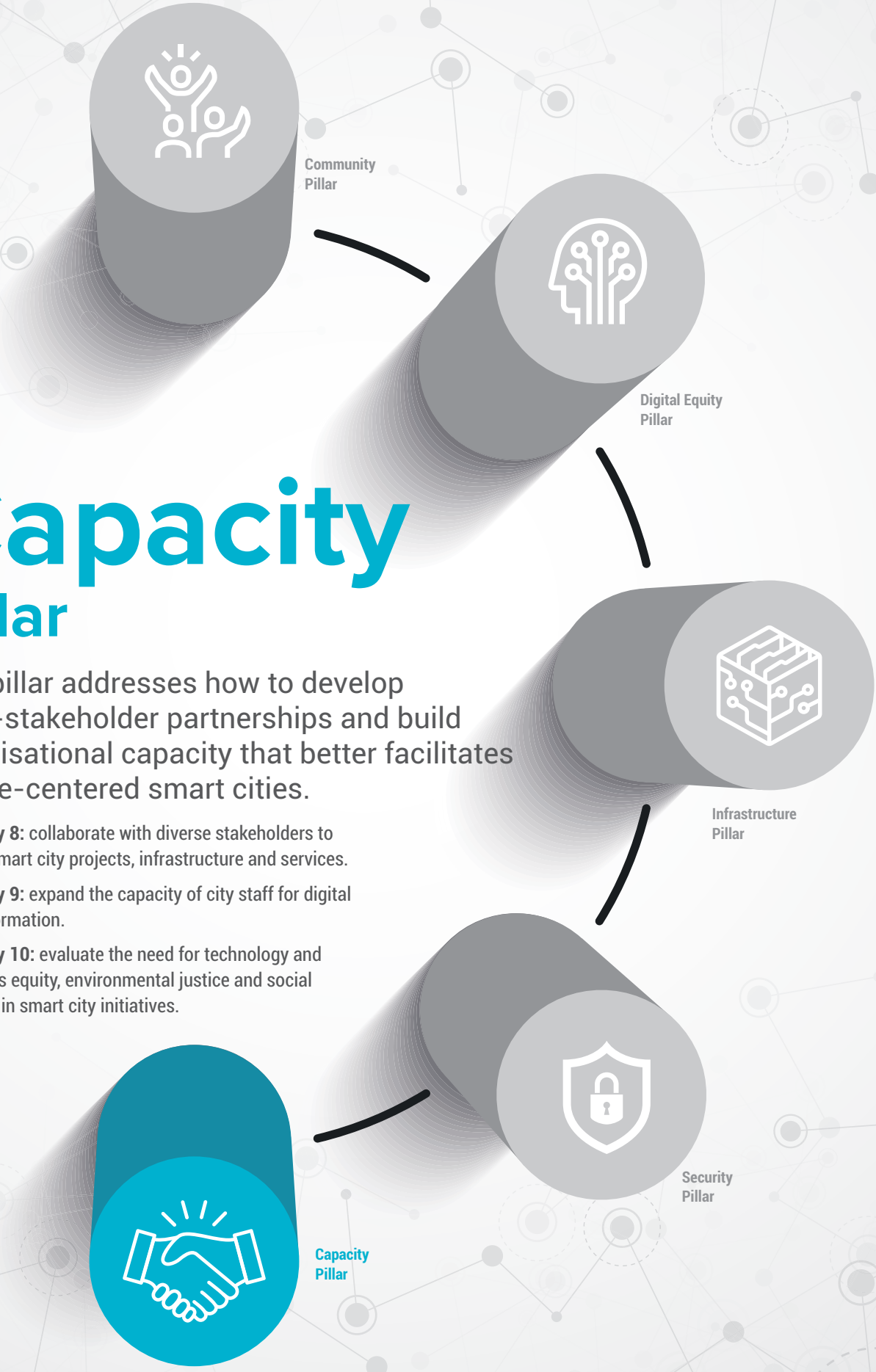
3.7 billion people

were offline in 2019

In the past decade, internet connectivity has become a requisite for full participation in society, including access to education, affordable housing, and critical government services.

The people-centered smart cities Framework

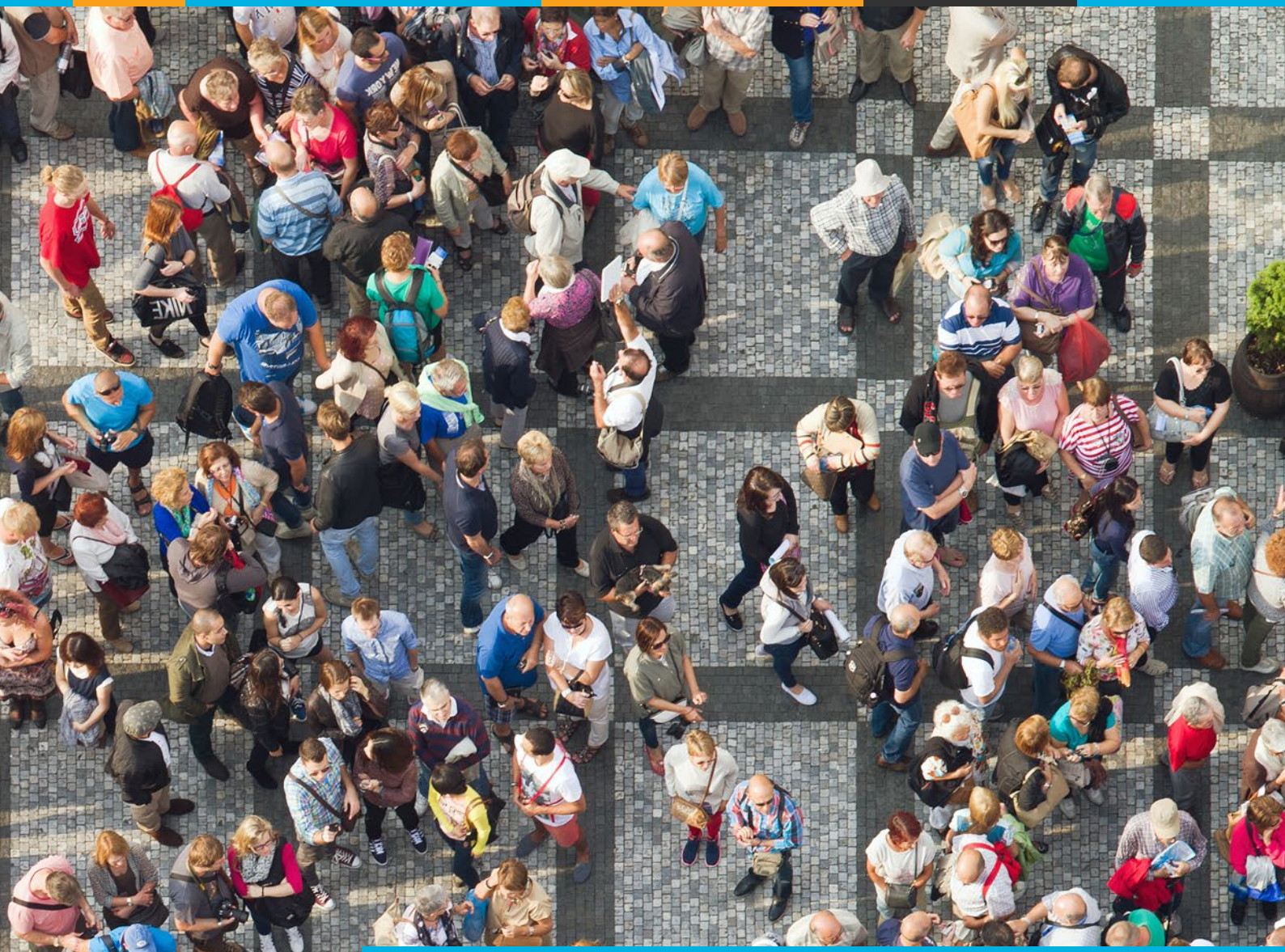
presents a holistic approach to developing smart cities that leverages data, technology, and services to empower people. The framework rests on five pillars: Community, Digital Equity, Infrastructure, Security, and Capacity. Each pillar consists of core values, key activities, and recommended actions compiled from international best practices in government, the private sector and civil society. These activities are outlined in a series of playbooks which when taken together help local governments develop smart cities for people that are more inclusive, safe, and sustainable.



Capacity Pillar

This pillar addresses how to develop multi-stakeholder partnerships and build organisational capacity that better facilitates people-centered smart cities.

- **Activity 8:** collaborate with diverse stakeholders to build smart city projects, infrastructure and services.
- **Activity 9:** expand the capacity of city staff for digital transformation.
- **Activity 10:** evaluate the need for technology and address equity, environmental justice and social justice in smart city initiatives.

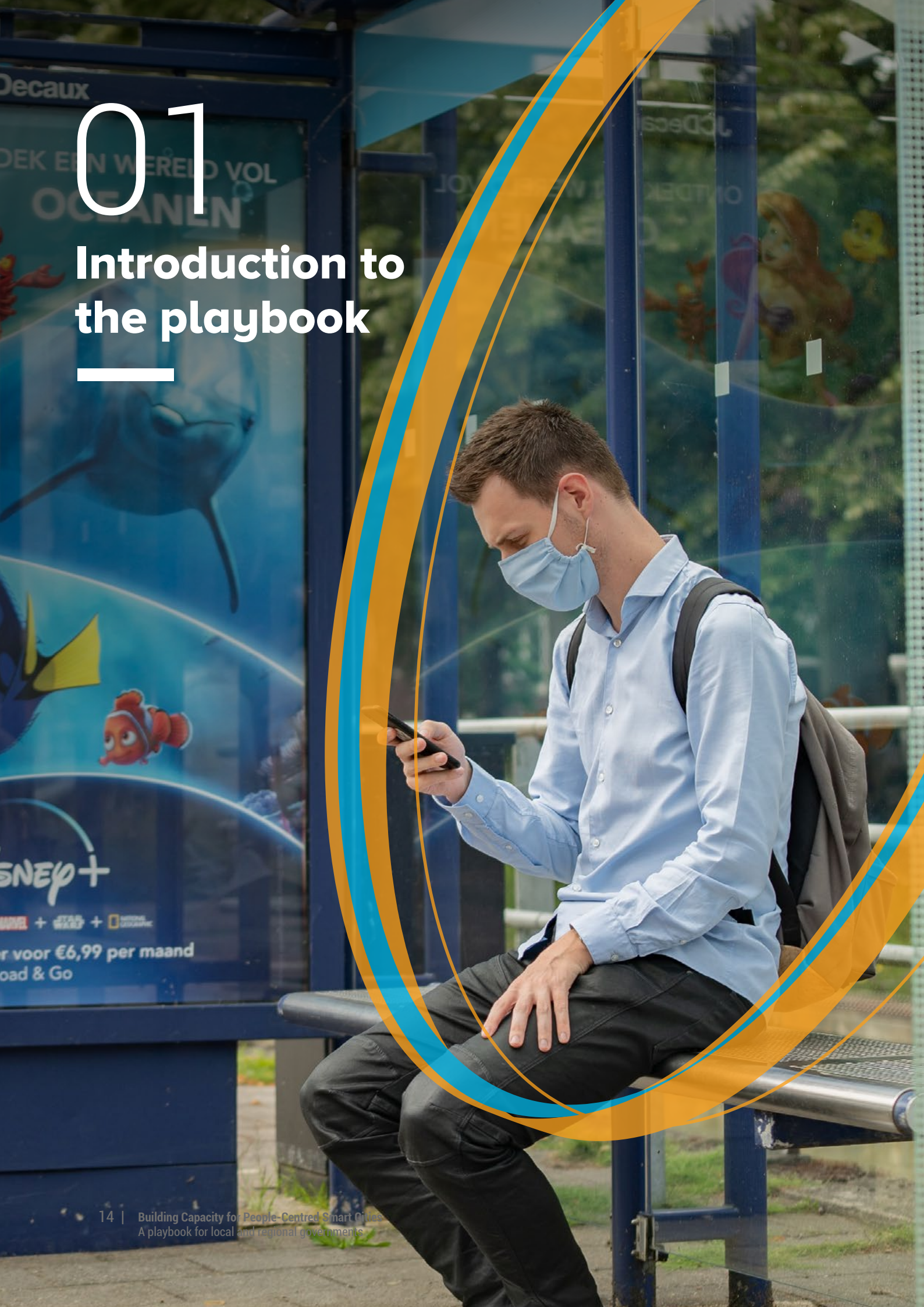


Who is this playbook for?

This playbook is for **local, regional, and national governments, policymakers, civil society, and non-governmental organisations** operating in urban and rural environments seeking practical methods to develop systems, processes and policies for digital transformation while prioritising security and public trust. This playbook provides these groups with support to contextualise their efforts within the broader framework of the UN's resolutions, the Sustainable Development Goals, the New Urban Agenda, and follows the core values outlined under the Digital Infrastructure and Security Pillars in *Centering People in Smart Cities: A Playbook for Local and Regional Governments*. It also includes case studies from around the world and sample policy toolkits for key areas. At the end of this playbook, readers should have a basic understanding of how to operationalize people-centred smart cities through inclusive digital transformation that secures smart city assets, and builds public trust.

01

Introduction to the playbook



Digital transformation is as much a human process as it is digital. Cities today are challenged to adapt to new ways of working, designing and delivering services. In order to achieve modern expectations of fast, convenient and accessible public services, city and regional governments must transform how they operate. Expectations for convenient digital service delivery were enhanced by the CoVID-19 pandemic, which emphasised both the need for digital services, and policies that address security and privacy risks[4]. accelerated digital transformation means the opportunities and risks of emerging technologies will continue to impact government operations well into the future.

While there are many opportunities for using technology to improve city services , **the unprecedented pace of technological change introduces new risks to city leaders in the digital era**, which requires them to build new infrastructure to accommodate modern demands. Cities of today need to create interdisciplinary teams to deliver projects, recruit staff with digital skill sets and establish multi-sector partnerships to accomplish their goals. Municipalities increasingly need to build better ICT capabilities, while strengthening digital leadership, widening their knowledge base and promoting new forms of work that support digital transformation.

Today's cities need to invest in their ability to handle digital transformation. There are several ways to build digital capacity within an organisation and this playbook outlines three key activities that governments can follow towards maximising outputs while reducing inefficiencies and cost:

- **Collaborate** with diverse stakeholders to build smart city projects, infrastructure and services.
- **Expand the capacity** of city staff for digital transformation.
- **Evaluate the need for technology** and address equity, environmental sustainability and inclusion in smart city initiatives.

No city can successfully leverage smart city technologies alone. Multi-sector partnerships are critical to addressing the needs of residents that span across a variety of services and experiences in the built environment. Too often, these partnerships fail because leaders do not fully understand the needs and motives of partners at the table. Additionally, smart city partnerships are necessarily interdisciplinary and can include diverse stakeholders from academia, civil society, public and private sectors. Section 02 outlines a method by which you can establish meaningful, sustainable partnerships by developing trust through transparency, mutualism, reliability and competence. This section also provides an overview of the different mechanisms that can be used to formalise partnerships through interlocal agreements, service level agreements and various contracts.

Aside from working with external partners, smart cities should also invest in their existing talent and adapt their recruitment practices to be flexible and competitive with today's technology labour market. Cities can start by assessing their existing capacity for digital transformation and build a customised approach from there. Section 03 covers steps that municipalities can take towards building internal capacity in support of smart city development and digital transformation. Local governments should invest in training and upskilling their existing workers, strengthen processes for attracting and retaining digital talent, introduce opportunities for participatory leadership in digital transformation and take steps to mitigate workforce disruptions caused by adopting new methods of working.

All these investments must reach a quantifiable return. That's why establishing **key performance indicators** (KPIs) for smart cities is vital for organisations to evaluate and demonstrate progress towards their goals. Setting KPIs increases transparency both inside and outside the organisation, and helps governments pivot from solutions that are not meeting the mark. Because each community is different, the KPIs set by local governments should ultimately capture the requirements expressed by community members. However, several national and international organisations have recently begun to set high-level standards for smart city development that can be taken into account when designing your own performance indicators. Section 04 covers various international standards, as well as making recommendations for governments seeking to set KPI frameworks for smart cities at the local level.

This Playbook is broken down into three **activities** that relate to the Capacity Building Pillar of the people-centred smart city approach of UN-Habitat. Each activity includes **core values** that can inform your process and overall organisational culture and strategic **goals** that your organisation can adopt to drive forward your people-centred smart city approach. For each goal, we outline a series of actions, recommendations and case studies that will help you take action right away. Finally, we end each activity with a policy toolkit that highlights model policies you can draw inspiration from or adapt for your own context.

02

ACTIVITY 8:

Collaborate with diverse stakeholders to build smart city projects, infrastructure and services

SDG 17. New Urban Agenda 91

Core Values

1 Work with stakeholders

Value 1: People-centered smart city projects and initiatives should work with multiple stakeholders including civil society and community organisations.

2 Respect legal bounderies

Value 2: Legal boundaries of authorities should be understood and respected in people-centered smart city partnerships.

3 Context-aware partnerships

Value 3: Partnerships should be "context-aware" and evaluated for their inclusiveness, resilience and mutual benefit.

Introduction

Sustainable smart city projects are complex endeavours that require collaboration across sectors and industries. Often, a smart city project or initiative requires building digital or physical infrastructure in public space. Such interventions can require the collaboration of multiple agencies. For example, building a sensor network to collect air quality data across the city requires access to rooftops or utility poles, the public right of way and possibly an internet connection. An energy utility may own the utility poles, a municipality might govern permitting for public right of way and a telecommunications provider may be required to ensure the sensor can transmit data wirelessly. All these partners must come together for the project to be successful and sustainable. Therefore, the most impactful smart city efforts **require significant investment and ongoing maintenance which can be best achieved with partnerships that leverage multiple stakeholders, their resources, expertise and perspectives.**

Some smart city projects have been criticised for focusing too much on the technology and failing to address the impact of long term, sustainable urban infrastructure projects[5]. This is in part because the roles of business, government and civil society actors are not well understood, their levers of power are unbalanced or their needs are not met. Each stakeholder in a partnership carries their own power levers, and has vested legal powers and constraints. These should be clearly understood in order to effectively outline the boundaries of each partners' activities. Typical stakeholders of a smart city project including governments, academia, the private sector or community partners, all have different reasons for coming to the table for a smart city initiative. Taking care to identify the stakeholders of a given project and understanding partners' motives and needs, can help to ensure a successful initiative. For example, a university partner may desire to access data sets from a smart streetlight deployment for research purposes, while a municipality could be more interested in reducing energy costs.

There are many opportunities to use technology to build infrastructure or provide services in cities. Additionally, many smart city technologies are fairly new and can require new ways of thinking and working within government. Because of these factors, smart city partnerships are many and diverse. Some cities form coalitions to raise awareness of an issue, share knowledge and pool resources to solve problems. For example, the Cities Coalition for Digital Rights is a network of more than fifty cities that seek to co-develop policies and solutions for digital rights. Other partnerships such as public private partnerships (P3s) bring together private industry and public agencies to develop and scale smart city efforts. For example, the City of San Jose in the US launched a digital inclusion fund that partners with the private sector and local nonprofits to make and award grant funds for local area digital inclusion projects and infrastructure[6].

When forming multi stakeholder partnerships to achieve outcomes, it is critical to ensure that four important elements are in place across partners:

- **trust and transparency**
- **power balance and equity**
- **mutual benefit**
- **accountability and commitment**

Establishing these elements isn't easy, however there are structures and mechanisms that can help. Interlocal agreements, memorandums of understanding (MOUs or MOAs) and service level agreements (SLAs), are among some of the tools cities can use to establish robust partnerships in the smart city space. The *UN SDG Partnership Guidebook*[7] outlines four steps for designing and implementing partnerships:

1. **Establish the fundamentals** - Partnerships must be able to create significant value and the 'right' partners at the table must be included to be successful.

2. **Build a strong partnership relationship** - The complex, multi- faceted dynamic relationship among partners must be kept strong

3. **Create a partnership structure** -The partnership's structure should be fit for purpose.

4. **Partnership management and leadership** -The partnership should be well managed, and requires the application of leadership at multiple levels.

The goals of this activity take a people-centred smart city approach towards how you can work to understand your partnership landscape and build successful mechanisms for collaboration in order to achieve the mutual benefit, and public good outcomes necessary for any smart city project.

GOAL #1 Understand motives, opportunities and constraints across smart city partners by conducting a stakeholder mapping exercise.

The first step to building any sustainable partnership is to understand your stakeholders, their motives and needs. The UN defines multi-stakeholder partnership as "an **ongoing collaborative relationship among organisations from different stakeholder types aligning their interests around a common vision**, combining their complementary resources and competencies and sharing risk, to maximise value creation towards the Sustainable Development Goals and deliver benefit to each of the partners[8]."

The *SDG Partnership Guidebook* provides extensive guidance for building and maintaining partnerships to achieve the SDGs. The Guidebook recommends **stakeholder mapping**[9] as an exercise that can help identify the landscape of partners before engaging them for a project or initiative. Stakeholder mapping provides a systematic approach to identifying all interested parties and begins to help to determine the roles each might take in relation to a new partnership.

According to the Guidebook, stakeholders are defined as those:

- Whose interests are affected by the issue or those whose activities strongly affect the issue;

- Who possess resources of all kinds (financial, influence, expertise) needed for strategy formulation and implementation;

- Who control relevant implementation "instruments"

Stakeholder mapping is conducted in three main phases:

Phase 1 - Initial sweep: An initial sweep is a first attempt at listing all the stakeholders for a project according to the criteria above. For each stakeholder identified, identify if they are affected by the project and/or affecting the project. Next, determine any resources they may have that could support the project. Finally, identify if they control relevant implementation instruments such as public right of way, permitting processes, and access to infrastructure or services.

Phase 2 - Influence vs. interest: The next dimension of stakeholder mapping involves capturing the degree to which each stakeholder has influence over the relevant issues and their level of interest. Collecting this information can be done through discussion or interviews. Ideal partners are those that possess a high degree of influence and interest. By mapping influence vs. interest for each stakeholder on a "Boston Grid," you can begin to distinguish the most important partners from your initial list.

Phase 3 - Roles and degrees of engagement: The last phase of stakeholder mapping is to identify potential roles for each stakeholder that emerges from the first who phases. Stakeholders can play many roles in a partnership, but not all of them are necessarily partners. Categorise your stakeholder list by different types of potential roles. A list of potential roles is available on p. 80 of the SDG Partnership Guidebook.

Smart city projects often involve technology and some aspects of public service. Because some technologies impacting access and use of public services are relatively new, such as autonomous vehicles, digital twins or artificial intelligence, academia and civil society are often included in smart city partnerships. Below is an overview of common smart city partners, their motives and potential partnership roles.

Table 1: Smart city partners, motives and potential partnership roles

Partner	Description	Motive	Roles
National government	National governments can provide overarching leadership, normative policy frameworks and key messages on the value of people-centred smart cities to include prosperity and growth, and finance major infrastructure that provides critical funding to support local governments in smart city endeavours.	• Align national policy with localised outcomes • Learn from local governments deploying new technologies • Disburse federal grant resources • Introduce national standards and laws regulating public safety (privacy, security)	• Funder • Knowledge provider • Disseminator • Influencer/ champion • Informer/ consultation • Regulator
Local, regional, state government and public sector	Local governments are the primary stewards of community engagement that drives improved services for residents. They can leverage procurement standards, local ordinances, municipal codes and policy for people-centred outcomes and make important local by-laws and develop strategies that support the transformative potential of a smart city strategy.	• Demonstrate positive public outcomes • Improve local services and infrastructure • Upgrade systems and build digital capacity within the organisation • Create efficiencies in programs, systems and processes	• Partner • Influencer/ champion • Funder • Regulator • Beneficiary • Knowledge provider
Private sector	The private sector can provide substantial investment in infrastructure and services, often through a public private partnership (P3)[10]. They can also provide consulting services to support the development of digital infrastructure, and develop innovative solutions and approaches to problems articulated in participatory processes. Small businesses, local companies and start-ups can support local innovative approaches to using emerging technology.	• Assess and improve product viability • Expand the market for smart city technologies • Demonstrate partnership capabilities and positive customer service outcomes • Scale a product	• Partner • Contractor • Funder • Informer/ consultation • Knowledge provider
Academia	Research organisations and institutions like universities are instrumental partners for local governments that seek scientific expertise, research and support in the technology and urban planning domains. Academia can collaborate with local governments work with academic institutions to establish smart city research centres, devoted to studying urban dynamics[11], digital human rights[12] or developing new participatory approaches[13].	• Gain access to new knowledge and data sets to inform research and publications • Achieve top tier publications in scientific journals • Successfully obtain grant funding for research • Demonstrate relevant community outcomes for successful grant solicitations • Test research solutions in real-world environments • Identify opportunities for student participation and real-world experience	• Partner • Contractor • Disseminator • Informer/ consultation • Knowledge provider

Partner	Description	Motive	Roles
Social entrepreneurs, community advocacy groups and local communities	These groups can ensure that their perspectives are captured and develop their own solutions to smart city challenges[14]. For example, they can form local alliances and advocacy groups for key themes in people-centred smart cities such as privacy, digital rights or digital inclusion. Often these groups provide important contextual information and galvanise public support for smart city initiatives and approaches.	• Benefit directly from smart city projects and interventions • Advocate for solutions that are responsive to community needs • Advocate for special issues such as privacy, economic development or direct local outcomes • Monitor government activities as a "watchdog," to protect public rights	• Partner • Influencer/ champion • Disseminator • Informer/ consultation • Knowledge provider • Beneficiary
Civil society	Nonprofits seeking to satisfy a public-service mission typically work to improve access to ICTs, or advocate for critical issues in equitable smart city development within their communities. Nonprofits and NGOs are critical partners for local governments seeking to develop a localised plan for building people-centred approaches to smart cities, as they have intimate knowledge of the communities they serve.	• Demonstrate outcomes in alignment with a public service mission • Seek funding to expand services • Serve underrepresented groups and populations	• Partner • Influencer/ champion • Disseminator • Informer/ consultation • Knowledge provider • Beneficiary
International community	The international community provides venues for connecting local, regional and international actors, and facilitating knowledge exchange and dissemination[15]. The international community also plays an important role in providing guidance for establishing interoperability of technology and elevating local best practices to the international level[16].	• Align best practices across all levels of government • Identify global standards and drive local outcomes towards SDGs • Provide guidance and support for achieving SDGs at all levels of government	• Partner • Influencer/ champion • Disseminator • Funder • Informer/ consultation • Knowledge Provider

GOAL #2 **Establish that four critical elements of multi-stakeholder partnerships are in place to ensure inclusiveness, resilience, and mutual benefit.**

Conditions of projects change, and partnerships must be strong enough to weather the storm. Many challenges can be encountered during a partnership. People who championed an effort can leave an organisation, administration changes or priorities within the organisation can shift in response to new opportunities and challenges. These changes are common, and partnerships can be structured in certain ways to make them more resilient to these challenges. Strong, trust-based relationships can overcome the inevitable challenges of partnering and help a team deliver results. The SDG Partnership Guidebook identifies four key ingredients of successful partnerships. Those pursuing long-term smart city projects should attempt to ensure each ingredient is included in a partnership arrangement.

Trust and transparency

Trust in a partnership is hard to win and easy to break. Inconsistent actions or lack of transparency often lead to reducing trust in a partnership. Low trust partnerships are costly to manage, can take more time to achieve results, and can lead to poor outcomes for residents. The UN recommends four main elements of trust that are important for partnerships:

- **Competence** - Is the partner capable of doing what they say they will do?
- **Reliability** - Will the partner do what they say they will do?
- **Mutualism** - Will the partner act in the best interest of the group, or be self interested?
- **Transparency** - Is the partner honest and open about their motivations?

For smart city partnerships, these ingredients carry additional weight because the nature of smart city projects can involve building or maintaining services that fundamentally impact people's lives in cities. Ensuring public safety on a roadway embellished with sensors that automate traffic signals, for example, requires a high degree of confidence in a technology or traffic management partner.

Power balance and equity

A people-centred smart city approach emphasises public sector and resident autonomy over smart city technologies and their impact on public life. Ensuring that residents have significant opportunities to collaborate, communicate and dissent can shift the balance of power in a traditional smart city model. When power balances break down, they can result in lowered commitment and poor decision-making. Equity in partnerships occurs when all partners have sufficient resources to and are engaged fully in, decision-making and key activities[17].

It is also important to challenge traditional notions of power in partnerships. Power, or influence over group decision-making has a variety of sources beyond traditional notions of capital. Access to data for example, often occurs in smart city partnerships as a source of power. Those who have access to data are able to make informed decisions, and influence behaviour. The battle over data ownership rights in smart cities projects was highlighted internationally in 2019, when Sidewalk Labs, a subsidiary of Alphabet (the parent company of Google), was widely criticised for a lack of transparency about data ownership in Toronto's Quayside project.

The table below, sourced from the SDG partnership guidebook, summarises the various sources of power applicable to partnerships:

Table 2: Types of power in smart city partnerships

Power Sources	Examples
Critical resources	• Money • Access to/ credibility with a stakeholder group • Technical knowledge / skills • Data / information • Legal instruments • Political influence
Structural/ positional power	• Formal / legal authority • Reputation / brand / size • Social status and legitimacy • Network centrality / control (e.g. being the fiduciary agent for a partnership or controlling communications)
Cultural/ human influence	• Cultural norms / societal imbalances (e.g. around gender) • Discursive power / ability to communicate / persuade
Ability to walk away	• The partner has alternative approaches it could take - the partnership is not critical to its mission or survival

Mutual benefit

Partners that join a partnership should also benefit from it. Often benefits to each partner are not clearly defined or the benefits to one partner take precedent over the other. Each partner should be able to clearly communicate how it benefits from the partnership, establish "**returns on investment**" or ROIs, and track and manage such outcomes across the life of the project.

Of course, being able to articulate how a partnership can benefit you requires a clear understanding of your own criteria for involvement. Because smart city initiatives can be complex t, spanning issues in transportation, housing, environment, economy and so on, it can be challenging for any organisation entering a smart city partnership to define the criteria that must be met for their involvement in a project. Before building partnerships to accomplish large scale goals, local governments should take care to determine what criteria is important for them to enter in, and stay in a partnership.

Accountability and commitment

Shared risk and reward creates accountability. Accountability, or how each partner can ensure other partners follow through on their statements, is critical to a successful partnerships. In smart city partnerships, accountability can be specified through a work contract, or some form of legally binding agreement between the parties. Such contracts outline terms and conditions of a partnership, and potentially consequences if one partner fails to deliver. Accountability does not necessarily have to take the form of a legally binding agreement however. **Collective accountability** refers to the collective responsibility of everyone involved in the effort, and a sense of mutual accountability for the partnership as a whole. Developing this culture in a partnership is just as important as backing it up with a formal agreement. For example, an agreement agreed upon by all partners is not enough to drive change itself. The partners must share a strong sense of responsibility for the outcome to achieve results.

Overcoming organisational changes

Individuals that come together to achieve a goal often represent a small part of a large organisation. All institutions, whether public or private experience change, turnover, or a shift in culture and leadership that can shift its priorities. These macro changes in an organisation can trickle down and threaten the sustainability of a partnership for a specific project. Below are some common types of organisational challenges and tips for addressing them.

Table 3: Organisational challenges and their impacts

Challenge	Effects	Steps to mitigation
Turnover	A champion of a project no longer represents the organisation and must leave the partnership, resulting in the absence of a key partner.	• At the start of the partnership, ensure each representative has a back-up that can ensure redundancy
Leadership change	A new CEO, or administration change occurs and shifts priorities away from the project at hand, resulting in lack of support within a partner organisation.	• Work to build long-term champions within each partnering organisation • Work to build and document public support for a project • Gather data that supports the project and make it available in easily digestible reports
Change in organisational priorities	A new issue of internal or external importance dominates a partner organisation, shifting support away from the goals of the partnership.	• Work to align the outcomes of the partnership with the new issue. • Identify efficiencies created by the partnership that can contribute to the new issue.

GOAL #3 Establish an appropriate formal structure for the partnership

How do you actually operationalize a partnership? What keeps people at the table from a formal or legal standpoint? There are many fundamentals to establishing partnerships and executing them formally. In smart city projects which involve a variety of stakeholders, sectors and types of infrastructure or technology, special care should be taken to establish partnership mechanisms that are flexible and functional. For example, The Chinese province Guangdong's Digital Government programme partnered with Tencent Cloud to help the province transition to an e-governance model. The collaboration resulted in the "Digital Guangdong Series" platform that included 1,800 public services and functions for public access.

Below is an overview of the common types of partnerships in smart city development, their strengths, weaknesses, opportunities and constraints.

Table 4: People-centred smart city partnership taxonomy

Type of partnership	Description	Strengths/ weaknesses
Public partnerships	This type of partnership occurs exclusively between public or municipally-owned agencies. For example a municipality and a public water, transportation, university or energy authority.	**Strength** - Largely resilient, can have sizable impact, shares existing infrastructure. **Weakness** - Can take several years to establish and often require repeated contract renegotiations. Can be challenging to identify a consistent team to manage operations.
Public private partnerships (P3s)	P3s bring public and private sector actors together to co-develop digital divide solutions in an attempt to distribute cost, risk and benefits.	**Strength** - Can be structured in different ways, which makes them flexible for a variety of unique conditions. **Weakness** - Can take several years to establish and often require repeated contract renegotiations.
Coalitions & alliances	Coalitions and alliances are informal collaborations where partners volunteer their time and efforts towards a cause.	**Strength** - Quick set up, flexible rules and regulations, and functions independently. **Weakness** - Challenging to manage volunteer time, which can result in a lack of sustainability.
Public Private People Partnerships (P4s)	This framework includes the P3 model but also embraces bottom-up participative strategies which bring the public engagement clearly visible for infrastructure planning and policy making[18].	**Strength** - Public input is baked into the model, effective at moderating risk. **Weakness** - Takes time to establish the public participation aspect. Public aspirations can be at odds with institutional partners.

Operationalising a partnership

There are many ways to structure partnerships formally, with interlocal agreements, memorandums of agreement, and service level agreements being among some of the most common. These structures often include provisions for governance, funding, management and reporting that are required to implement the partnership's goals. The SDG Partnership Guidebook recommends five key components for implementing a partnership that should be included in any operational model:

Legal / fiduciary arrangement: *These types of agreements are legally binding, meaning that partners can hold each other legally accountable for failing to provide deliverables, or abide by certain rules as specified in the agreements. Often a "fiscal sponsor" is named that is legally authorised to receive funds in support of a project. Sometimes new legal entities such as a non-profit or corporation can be formed to manage the overall direction and deliverables of the partnership's work.*

Governance, management and operational structures: *Governance refers to how decisions are made within the partnership. Lightweight, volunteer partnerships don't typically need formal decision-making processes. Larger, more complex endeavours can require the establishment of a board, management board or advisory board that oversees decision-making and makes approvals.*

Partnership documentation: *Documentation of the partnership and its agreements are essential for the functioning of the effort. Partners can form an informal partnership agreement or opt for a legally binding agreement that includes but is not limited to interlocal agreements, memorandums of understanding (MOUs) or service level agreements (SLAs). These agreements should be accompanied by a work plan, which is a living document that outlines the expected deliverables and timeline.*

Theory of change and measures of success: *Partnerships should share a mission and be able to demonstrate progress toward their goals. A theory of change refers to a shared mission statement, or document that clearly outlines the challenge at hand and how the partnership intends to address it. By creating* ***key performance indicators*** *(KPIs), the partnership can establish how to measure progress towards their goals.*

Funding and resourcing: *Funding is a critical element of smart city partnerships, and can come from a variety of resources. A partnership should identify the constraints different entities may have for accepting funding, and structure the partnership in such a way that money can be transparently received and easily spent. It is also important to diversify funding sources, in order to avoid the domination of one funding group over another.*

BOX 2.1

Public Private Partnerships in Action: Smart Colombus

https://www.columbus.gov/smartcity/

Smart Columbus is a smart city programme in the city of Columbus, Ohio initially funded by a $40 million grant from the U.S Department of Transportation and a $10 million grant from the Paul G. Allen Family Foundation. Smart Columbus is a non-profit initiative outside of, but intimately tied with, Columbus's city government. While in practice a separate organisation, members of Columbus's city government sit on the board of Smart Columbus. In this way, Smart Columbus can work directly with decision makers in the city as well as those best familiar with the city's systems while maintaining its own expertise and special focus, moving forward on projects in a potentially faster and more agile manner than the city normally might be able to. Smart Columbus's work to this point has been especially focused on transportation in the city, working to find ways to make the city less automobile-centric, adding resources to connect residents with a wider spectrum of ways to move through the city as well as developing alternative and more sustainable transportation options. While transportation remains a major concern in Columbus, a city characterized by sprawl (as with many other North American cities), it remains to be seen what other areas this programme can target.

BOX 2.2

The 4P Model (Public-Private-People-Partnership): Iran

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7373498/

In the context of the COVID-19 pandemic, one of the worst disasters in decades in Iran, a rethinking of traditional approaches was needed. A variety of public-private, public-people and private-people partnerships emerged, facing off this crisis with necessary new means. For example, many private hospitals shared their resources with the government and production lines were reconfigured for the needs of the COVID-19 crisis. In terms of public-people partnerships, the government increased its support for a variety of civil society organizations, for example thethe Iranian Red Crescent Society. Finally, for an example of private-people partnerships, the biggest online shop in Iran partnered with the Iranian Red Crescent Society, using their private resources to assist this civil society organization to collect and dispatch aid. Increasing the variety and number of partnerships in such a way is an essential step in effective disaster relief, and analyzing how this process took place in Iran can be enlightening in choosing approaches for the rest of the world.

BOX 2.3

Smart Coalitions: The Cities Coalition for Digital Rights

https://www.marketing-interactive.com/malaysia-microsoft-digital-skills-training

The Cities Coalition for Digital Rights was launched in November 2018 by the cities of Amsterdam, New York, and Barcelona, and now includes over 50 member cities helping each other in the largely unexplored field of 'digital rights'. Along with expertise from people working in city governments, the coalition is also partnered with UN-Habitat, Eurocities and United Cities and Local Governments (UCLG). The coalition's two flagship projects are its Digital Rights Governance Project and Global Observatory of Urban AI, both of which aim to catalogue and support best practices in the field. A major strength of this coalition is its membership consisting of a long list of major cities, many of which being trailblazers in this field. Some weaknesses of the coalition based model, however, include the fact participants are largely volunteers with potentially little time to contribute to work outside of their usual obligations.

03

ACTIVITY 9:

Expand the capacity of city staff for digital transformation

SDG 16, 16.7
New Urban Agenda 66, 151

Core Values

1 Investing in digital capacity

Value 1: Investing in the digital capacity of city staff in addition to recruiting new talent enhances smart city efforts.

2 Strategic approach

Value 2: Taking a more strategic approach to structuring technology leadership and digital capacity within the organisation is critical for local governments to be able to adapt to the digital era.

3 Leadership commitment

Value 3: Leadership commitment at top levels is necessary for a successful digital transformation.

Introduction

According to some estimates, the global smart cities market was valued at USD 392.9 billion in 2019 and is predicted to reach USD 1380.21 billion by 2030[19]. This accelerated digital transformation means the opportunities and risks of emerging technologies will continue to impact government operations. While there are many opportunities for using technology to improve services, the unprecedented pace of technological change introduces new risks to city leaders in the digital era, including algorithmic bias, cybersecurity, and privacy threats. City leaders and staff must be prepared to evaluate these technologies and make decisions about them that minimise risk and maximise public benefit, while delivering services that meet modern demands for convenience and accessibility.

The digital transformation required for governments to meet these demands, implies changing how local governments work. Historically, civil servants have been trained to provide uniform services from siloed departments. Success was measured by the employee's aptitude for solving a standard problem repeatedly and at scale. Today, building services that meet modern demands for convenience and efficiency requires managing interdisciplinary teams and complex projects involving new technologies. A service that allows small businesses to register online for CoVID-19 relief grants, for example, would be powered by a service delivery team that may include software developers, UX designers, legal staff, economic experts and contract administrators. Helping public servants adapt to this new form of collaborative service delivery requires teaching them digital skills and processes[20].

Digital capacity continues to be a problem for public servants around the world. A recent survey by IDC of 250 health, government, and education organisations in seven European countries[21] showed that 63% of organisations say they lack the digital skills necessary to adopt emerging technologies and only 35% of organisations had an internal programme for digital skills development. Likewise, the Pathways for Prosperity Commission emphasises[22] that developing countries should invest in digital skills for public servants in order to adapt to the demands of digital transformation and e-government.

However, many governments have found that attracting talent to support digital transformation and smart city development is challenging. Cities can reduce costs by investing in the digital literacy of their existing employees. Some governments, like the government of Malaysia have partnered with large technology firms such as Microsoft to upskill government employees. Meanwhile, Singapore has developed its own digital skills training programme for public servants, which aims to offer 95 training programmes to 6,000 public servants[23] in its first year. Other initiatives such as Teaching Public Service in the Digital Age provide open source training materials for any entity seeking to upskill public servants.

The goals of this section outline key competencies that should be part of digital skills training for today's public servants, and highlights key modes for training development and delivery, including working internally or with external partners. This section also explores common barriers for governments seeking to build digital capacity and provides suggestions for overcoming them.

BOX 3.1

MyDIGITAL GovTech innovation partnership

https://www.marketing-interactive.com/malaysia-microsoft-digital-skills-training

The MyDIGITAL GovTech Innovation Partnership is a collaboration between Microsoft and the Modernisation and Management Planet Unit (MAMPU) of Malaysia. This cooperation aligns with the government's plan to improve economic competitiveness through digitalization. In order to achieve this they have acknowledged the need for trustworthy and secure digital infrastructure together with improving agile and competent digital talent in the country.

The objective of the partnership is to reach 100% digital literacy among civil servants and 80% end-to-end online government services by 2025. The plan also has the goal of 80% of government data being stored in cloud storage by 2022. While there are some noteworthy problems with cloud storage, this represents a clear, technologically-driven approach. This partnership will allow civil servants to be more innovative and data-driven in finding solutions as well as formulating effective policies. With this plan, the government of Malaysia aspires to create a resilient economy through inclusive sustainable and responsible development.

GOAL #1 Target and address common barriers to digital transformation capacity

Digital transformation, or the process of using digital technologies to modify existing systems, is both a challenging and necessary step for local governments. As the smart city industry continues to mature, local governments that don't invest in building internal capacity to build, manage, and maintain digital services risk to outsource them completely. As addressed in *Building and Securing Digital Public Infrastructure: A playbook for local and regional governments,* outsourcing digital public services to third parties can result in local governments losing autonomy over public services by relinquishing ownership and access of critical data or infrastructure assets.

There are several common barriers to building digital capacity within a municipality. Some common barriers include:

Resistance to change within the organisation: *Digital transformation introduces new efficiencies that can threaten job security, or simply change "the way things are done around here." These culture changes should be addressed by leadership within the organisation.*

Lack of resources for internal training: *Governments often lack access to resources that equip their staff with the necessary resources to learn digital transformation skills. This can be due to a lack of digital transformation leadership, or budget. However, there are free and open source training resources available.*

Insufficient workforce planning: *Sometimes governments don't plan in advance for personnel requirements, especially as they relate to technology. This makes it challenging for cities to anticipate future workforce needs, or identify obsolete ones.*

Outdated job descriptions: *To be competitive with today's labour market, job descriptions must reflect updated skills and requirements. This is critical not only to attract talent, but to acquire personnel with skills required for digital transformation.*

Insufficient budget: *A perennial problem in local government, lacking the budget required to attract new talent at competitive salaries consistently bars cities from competing in today's labour market.*

Outdated and cumbersome recruitment processes: *Public processes of recruitment can involve several redundancies and inefficiencies. Cities seeking to attract digital skills talent, should closely examine their hiring policies and streamline them where possible.*

Barriers abound, what can local governments actually do to attract, retain and build digital talent within their organisations? Below are several recommendations to help local governments address capacity issues for smart city development.

1. Assess your organisation's digital transformation capacity

There are many ways to build digital transformation within a municipality, but to conserve resources and target them effectively, local governments should perform an assessment of their staff to determine existing gaps in skill sets and resources. A survey of staff can include a basic assessment of digital competencies, satisfaction with existing processes and offer opportunities for staff to suggest improvements.

Depending on the depth of your analysis, you may want to release multiple assessments for different audiences. For example, how a staff member perceives digital transformation opportunities in the organisation could vary significantly from how an executive director might view such opportunities. Tailor your assessments to your audience, and analyse the resulting data to identify the most productive ways to intervene.

2. Strengthen processes for attracting and retaining digital talent

COVID-19 transformed how many organisations work, and simultaneously created more demand for efficient public services from local governments. Attracting digital talent, or those skilled in various aspects of digital transformation, requires rethinking how local governments hire and position themselves as choice employers in a competitive labour market. It also requires governments to understand multiple "families" of roles that are necessary for comprehensive digital transformation. The Inter-American Development Bank identifies six job families for digital transformation[24]: user-centred design, product and delivery, technical, IT operations, data and quality control. Local governments seeking to prioritise digital transformation should consider creating new roles across the organisation within each of these job families. Additionally, we offer the following recommendations for strengthening your approach to attracting and retaining digital talent:

- **Engage with the education sector:** Local universities often seek placement of recent graduates and sometimes establish programmes that local governments can take advantage of. Reach out to your local university to identify any opportunities to take advantage of new talent entering the market.

- **Reform recruitment processes:** Take a close look at how hiring practices currently operate within your organisation, and identify opportunities to improve. Improvements can include reducing overall processing time, eliminating redundant steps in hiring or simply updating your job description system.

- **Offer different position classifications to fit different needs:** How an organisation describes available positions makes a huge difference in its ability to match with the type of talent it's looking for. Consider your current classifications, and identify if any changes need to be made to update them. Several consulting firms, such as McKinsey, Deloitte, and others offer services to help governments revamp job classifications to reflect today's market.

- **Emphasise your public service mission:** Public servants often have a strong public service mission. This mission, whether it be equity, public health, or improving quality of life, is a powerful motivator and an added benefit to those seeking purposeful employment. Communicate in interviews, job descriptions and advertisements how the role will respond to the mission of the organisation.

- **Mitigate the gender gap in digital talent hiring:** Women are consistently underrepresented in technology roles, and as a result the development of digital public services is at risk of incurring certain biases. Create special initiatives to recruit women into technology and leadership roles, include women in interview panels, and consider establishing quotas in your organisation for female hires.

3. Invest in digital training at scale

In addition to focusing on making your organisation more competitive on the technology labour market, also consider investing in the talent you already have within your organisation. If you already have digital training in your city, consider evaluating it to ensure it is up to date with the latest proficiencies. Consider that digital skills training is an ongoing process, and invest in your current employees' desires to learn and improve their skills. Digital skills training is not always about acquiring new skills however, sometimes it is about helping current employees adapt to new processes and methods of working. Use your digital capacity assessment to determine what type of skills training is most relevant to your workforce. Below are some additional suggestions:

- **Target training for specific roles:** Training is not "one size fits all" for digital skills across your organisation. Take care to identify what roles within your organisation require training, and adapt that training accordingly. For example, an employee at risk of having their role eliminated due to automation could benefit from being re-trained for a similar role using a new skill. Alternatively, someone who seeks to update or enhance their existing skills in data analytics, would require a very different training mechanism.

- **Training academies:** Some national or regional governments offer digital training opportunities for public servants that can be leveraged to upskill your municipal workforce. For example, Canada's Digital Academy, Singapore's Civil Service College, and the UK's GDS Academy all offer training for public servants across levels of government. There are also non-profit and philanthropic training academies such as Bloomberg's City Data Alliance, or PUBLIC's Public School of Technology. Finally, you can also invest in building your own internal training academy, for example Cambodia's Ministry of Post and Telecommunications established its own Academy of Digital Technology.

- **Train the trainers:** Scaling digital skills training can be expensive and resource-heavy. One approach to scaling training programs is to "train the trainer," or train individuals within departments who then have a responsibility to impart their knowledge on other city staff. Train the trainer programmes have been successful in Chile's *Líderes Digitales* programme for example, where civil servants aged 30 or younger, are paired with older staff to teach them digital skills.

- **Online courses:** Online courses are cost effective and can be taken 'at your own pace,' which offers significant advantages to employees juggling a work-life balance. There are several online courses available both paid, and free & open source. Under a "hybrid" model, you can offer online training with an in-person supplement to tie such training to real-world outcomes in the organisation.

- **Education grant programs:** Support your employees that seek to gain higher education credentials while on the job. You can work with your local university system to establish a program that allows you to subsidise coursework related to your employees' positions.

4. Create opportunities for participatory leadership

Digital transformation is about changing the culture within government towards a more innovative and flexible approach to building and delivering services. Demonstrate the change you want to see take place in your organisation by creating opportunities for public servants to participate in digital transformation directly. They can do this by influencing decision-making about new enterprise technologies, helping design digital services, or by collaborating with other city staff in open forums. All these activities contribute to greater transparency about digital transformation, and build a culture of active participation within the organisation. Investing in an employee's ability to learn and contribute over time not only helps them adapt to changes in technology, but also demonstrates a concerted effort to retain talent. Below are three types of programs you can introduce that help activate your workforce:

- **Innovation laboratories:** City governments are designed to guarantee continuity and minimise risk, which can be at odds with innovation processes. By establishing an innovation laboratory within your organisation, you are creating a safe space for experimentation and failure. Innovation labs are centres where multidisciplinary teams can collaborate to solve problems. However, such labs can be challenging to fund and maintain. For example, the City of San Francisco's innovation laboratory, Superpublic, closed down after the termination of a federal grant[25]. Consider establishing partnerships with universities, non-profits or philanthropic foundations to sustain innovation labs.

- **Communities of practice:** Communities of practice are informal forums where professionals can collaborate, troubleshoot, and share experiences. Communities of practice are a cost-effective way to drive culture change, and invest in the long term education of employees. Communities of practice are largely volunteer-based, but are more likely to succeed if designated staff are responsible for scheduling meetings and documenting outcomes.

- **Digital leadership programmes:** Digital leadership programmes or "digital ambassador" programmes, provide opportunities for management to learn about digital transformation and subsequently work to prepare their staff for changes. This attempt to create "change agents" within local government serves to raise awareness in the organisation about digital transformation opportunities, and prepare staff to adapt.

5. Create ways to manage disruption brought by digital transformation

Prioritising digital transformation in your city fundamentally implies changing how your government works. Adopting new efficiencies created by smart city technologies can mean eliminating redundancies in your organisation, where new roles are introduced, others are changed, and some are eliminated completely. While helping existing staff acquire new skills to participate in digital transformation should be a priority, there are additional measures you can take to mitigate disruption created by digital transformation. Failing to address these changes can be significantly detrimental to the overall effort.

- **Create personalised adaptation measures for impacted roles:** Work to identify what roles are impacted most by digital transformation and create a personalised plan to support the role. If a role will be modified, be sure to equip your staff with training and tools necessary to adapt. You can also facilitate transfers and upward mobility opportunities by working with your human resources department to create special programs or pathways.

- **Create digital leadership opportunities that are visible:** Empower your leadership to champion digital transformation efforts. Digital leadership programmes can help upskill your municipality's leaders so that they can understand digital transformation and effectively communicate its implications to staff.

- **Identify new roles within digital transformation:** New roles will be created as a necessary outcome of transitioning to a new way of working in government. Thinking about how new technologies impact your processes and services is a great opportunity to introduce new roles into your organisation. For example, with the emergence of AI and automation, new roles are needed in public administration that require combining the skills of an experienced regulator with skills in emerging technology. Creating specialised roles in legal, procurement, and other regulatory departments that focus on technology is one opportunity to create new roles that existing staff can adapt to.

- **Integrate departments involved in both hiring and digital transformation:** Successful digital transformation will be a collaborative effort, and involving the departments responsible for hiring up front will help lead to a successful recruitment effort. Work with your human resources department to create a 'future of work' advisory committee, or form a specialised digital transformation recruitment team.

BOX 3.2

Embracing new roles in government powered by digital transformation

https://publications.iadb.org/publications/english/document/Digital-Transformation-and-Public-Employment-The-Future-of-Government-Work.pdf

The creation of new roles and growth opportunities to embrace digital transformation for civil servants is key to managing the disruption brought by digital transformation. The lack of resources available in the public sector in countries compared to the private sector can make it difficult for cities to retain talent. Many countries have implemented human talent management models to tackle this issue. Allowing civil servants the possibility to develop in new roles and lead stable and fruitful careers can help compensate for salary differences. Managers attract talent by promising high social impact and generating change inside the government. The "Algorithm Auditor" role is a good example of this, as it is a new position that requires high skills and it has become almost mandatory for cities. The goal in this case is to make sure that the algorithms used to improve efficiency and effectiveness don't have bias or privacy violations, and those in charge have to be aware of the legislation of data protection and understand the general operations of data collection, storage, use and deletion. This profile requires highly qualified individuals, presenting a challenge for local governments to retain or find.

GOAL #2 Set the stage for digital literacy and capacity training.

Digital capacity training programs can focus on several topics including software, UX design, agile development, digital government services and digital tools, design thinking, coding, digital human rights and inclusion and cybersecurity. To facilitate internal capacity building, four main approaches are most widely used:

Demand-driven - Offer training and capacity building services based on listening tours, and facilitated discussions with city staff.

Needs-based - Deliver training and capacity building services based on a capacity needs assessment.

Holistic - Design policies that incentivise or require training, and provide the necessary tools and resources for compliance.

External - Work with an NGO or external certification programme that requires certain benchmarks to be met and can provide resources and training to your local government to achieve programmatic goals[26].

But what should public servants in the digital era be learning exactly? The Teaching Public Service in the Digital Age syllabus recommends eight core competencies for today's public servants. The table below is adapted from this syllabus, including each of the eight recommended core competencies for public servants. Additionally, we've added key areas of study relevant to each competency and highlighted resources you can use to learn about, or gain proficiency in each. Additional core competencies for smart cities and tools for urban planners can be found in the *Appendix: Policy Resource Toolkits.*

Table 5: Core competencies for public servants

Core competency for public servants	Areas of study	Resources
A public servant values the experience of service users and can collaborate with specialists to understand user needs, then design, test and adopt effective solutions.	• User centred design • User testing	OECD - User Centred Design Toolkit IDB - Citizen Experience Design ADB - Putting People at the Heart of Policy Design
A public servant can anticipate and mitigate the privacy, security and ethical risks that are inherent to governing in a digital era.	• Data science basics • Privacy (local laws and international standards) • Cybersecurity • Ethics in AI • Digital Rights	Good Practice Principles for Data Ethics in the Public Sector Data Ethics Canvas Cybersecurity Governance Cybersecurity - Digitalskillup
A public servant understands the need to blend traditional public service skills with modern, digital skills, and can effectively work within and lead multidisciplinary teams.	• SCRUM and agile methodology	Agile in Government - Deloitte SCRUM in Government Agile Government Handbook
A public servant understands the importance of iteration and rapid feedback loops and can create a working environment that can continuously learn and improve outcomes.	• Digital services • Performance management and KPIs	Digital Services Playbook Measuring Public Affairs Measuring and Managing Results in Development Cooperation
Can identify the opportunities to improve government operations, service delivery or policy making and can overcome structural and institutional obstacles to change.	• Procurement	World Bank Procurement for Development Harvard Kennedy School Procurement Systems Compendium of Good Practices for Integrity in Public Procurement
Can use a range of techniques and tools to make government more open, collaborative and accountable.	• Open government • Open digital standards • Open data platforms • Open digital service standards	Digital Standards - Canada The Path to Becoming a Data-Driven Public Sector Smart Cities for City Officials
Understands how to use data to inform decisions, design and run services, and create public value inside and outside government.	• Data analytics tools such as GIS, Tableau, and Ushahidi	QGIS - Training Manual The Use of Visualisation in Government Data Visualisation for Government Agencies Data and Digital Directory: 100 places for public servants to learn for free
Understands the current and evolving affordances of digital technologies and can assess how they can be used to improve public outcomes.	• People Centred Smart Cities Playbook	People Centred Smart Cities Playbook

BOX 3.3

Developing learning materials to embed cyber resilience into local government supply chains

https://www.public.io/case-study/lga-cyber-resilience-project

LGA Cyber Resilience Projects is a project by the UK Local Government Association to address cyber security in public services supply chains. Challenges faced by councils are increasing due to a larger focus on offering digital public and corporate services. Local governments face a variety of threats, from theft of private information to the wider breakdown of the delivery of public services. A successful cyber attack can invoke major costs and damage to a city together while at the same time hurting citizens' trust in government.

PUBLIC is a company that helps to reimagine and build digitally-enabled public services and will provide guidance and tools to support local councils to ensure that their supply chains are resilient to emerging cyber threats. The project aims to promote practical cyber security awareness and an understanding of the risks. Having this in mind the company will create targeted learning resources that are evidence-based, coming from stakeholder interviews, focus groups, and survey data. The idea is to create engaging content and develop resources such as webinars, guides, and other materials to promote cyber resilience.

GOAL #3 Establish key roles in your organisation to champion digital transformation efforts, training and literacy.

Implementing digital transformation in city governments can be challenging and time consuming. If digital transformation for smart city development is a goal of your city, then city leadership must invest in the capacity to carry it out. You can start by identifying a champion in your local government, such as a Mayor, City Manager or other executive that has decision-making authority and can initiate the creation of new positions, offices and initiatives.

It's important to note that the creation of a new office should also be backed by a funding mechanism that sustains it. Will the office be funded by grants, capital funds, municipal bonds, core budget or another mechanism? These are important questions to answer in order to effectively implement digital transformation at scale. Most cities will not have the resources or capacity to create all the roles listed below. Small or medium sized cities should consider developing at least one role in order to initiate digital transformation. Below is a brief overview of the types of offices and roles needed in your organisation to kickstart digital transformation.

Critical Roles

Chief Information Officer: *A CIO is an enterprise executive that typically reports directly to a chief executive officer, city manager or mayor. CIOs are needed in many organisations including government because they provide an interface between business needs, user needs and information communication technology operations. CIOs must have the ability to join their skills in information technology with skills in policy, planning, resourcing, training and budgeting.*

Chief Innovation Officer: *A CINO is primarily responsible for managing the process of innovation and change management within an organisation. CINOs identify strategies, business opportunities and new technologies and then develop new processes and methods to serve those opportunities. CINOs are responsible for building new architectures, service delivery models, operational models and capabilities within the organisation. A CINO does not necessarily report directly to the CEO or mayor.*

Chief Data Officer: *A CDO is responsible for the organisation's enterprise-wide data strategy, governance, management, and overall strategic use of data for decision-making within the organisation. A CDO need not report directly to the CEO or mayor.*

Chief Technology Officer: *CTOs are responsible for aligning enterprise-wide technologies with the organisation's overall goals. A CTO will evaluate and make decisions about backbone technology serving the organisation. CTOs should also be aware of emerging technologies that can impact or enhance the organisation's goals, and the ability for staff to perform regular operations.*

Offices and Departments

Smart Cities: *These teams are responsible for aligning data, technology and innovation with public service outcomes that improve quality of life for residents. Smart cities teams can function as their own departments, offices, divisions or as teams working within other departments. Depending on what priorities your municipality has, a smart cities division can be standalone, or operate inside other departments such as Sustainability, Equity or Economics.*

Innovation: *An innovation team typically functions as a standalone department or office. Innovation teams report to a CINO, and work to operationalise architectures, service delivery models, and operational models that embrace new ideas, methods or ways of acting upon the organisation's mission.*

Digital Transformation: *A digital transformation team focuses on designing and executing an organisation's process of digitisation. A digital transformation team will introduce new technologies, processes, policies for digital transformation and make recommendations to leadership for how to transform the organisation's overall ability to leverage technology in service of its mission.*

04

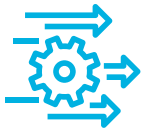
ACTIVITY 10:

Evaluate the need for technology and address equity, environmental justice and social justice in smart city initiatives

SDG 10, 10.2, 13, 13.1
New Urban Agenda 66

Core Values

1 A tool for local governments



Value 1: Smart city technology is not a solution, but rather a tool that can help local governments address complex social, economic and environmental challenges.

2 Public interest

Value 2: Smart city technologies are most effective when evaluated using an equity lens, and for their ability to serve a clearly specified public interest.

3 Community involvement

Value 3: Residents should be involved in the determination of smart city goals and the evaluation of a technology's ability to meet their own needs.

Introduction

A people-centred smart city works to empower people by centering smart city activities based on their needs. This involves responsibly managing data and digital infrastructure and evaluating the potential of any technology to produce positive, real-world outcomes for residents. A common pitfall of smart city initiatives is that they lead with technology that is looking for a problem to solve, rather than bringing technology to bear on a problem that needs solving. To avoid this, local and regional governments should think about smart city technology not as a a solution in itself, but instead as a tool that is part of a comprehensive response to a problem.

Smart city technologies should be evaluated as tools and embedded in a larger strategic approach to delivering urban services such as affordable housing, sanitation, transportation and improving the environment. Smart city technologies should always be evaluated from an equity lens, as governments work to understand its impact on unserved and underserved communities.

Fortunately, there is plenty of guidance for establishing key performance indicators (KPIs) in smart cities, as well as guidance on how to evaluate emerging technologies like artificial intelligence, autonomous vehicles or IoT. The UN 'United for Sustainable Smart Cities' initiative has published a methodology for creating KPIs around sustainable smart cities[27]. The International Telecommunications Union (ITU) has developed KPIs related to sustainability impacts of ICTs in smart cities[28], OECD has published a KPI framework for smart cities[29], and the UN has published the Global Urban Monitoring Framework that ties KPIs to outcomes for SDGs[30]. Ultimately, KPIs provide a framework by which to measure progress towards specific goals, and vary according to the context encountered by city staff working in the field.

Smart cities have a responsibility to leverage technology in a way that truly helps people improve their lives and their environment. Under the people-centred smart city approach, technology is evaluated for its ability to address the needs determined by the people it serves, people are empowered to intervene and shape interventions in collaboration with the government and human rights are at the core of all activities.

GOAL #1 Evaluate smart city technology in context, ensuring that it clearly addresses a public need and responds to lived experiences of a diverse set of stakeholders.

There is no one-size-fits all solution to assessing the performance of smart cities, in part because the landscape of available technologies is rapidly evolving and the needs of communities are myriad and diverse. Key performance indicators attempt to establish a basic set of parameters around which progress can be evaluated. Because each community is different, the KPIs set by local governments should ultimately capture the requirements expressed by community members. However, local governments can look to international organisations who have set high-level standards that should be accounted for when developing local KPIs and performance metrics. The ITU, UN-Habitat and UNECE recommends developing KPIs to evaluate sustainable smart cities as a whole across four dimensions[31]:

- **Economic:** The ability to generate income and employment for the livelihood of the inhabitants.
- **Social:** The ability to ensure that the welfare (safety, health, education) of the citizens can be equally delivered despite differences in class, race or gender.
- **Environmental:** The ability to protect future quality and reproducibility of natural resources.
- **Governance:** The ability to maintain social conditions of stability, democracy, participation, and justice.

Several international organisations have published KPIs and evaluation frameworks for smart cities, many of which are listed in the table below adapted from "Review of Smart City Assessment Tools" by Moura, Patrao, et. al.[32] These frameworks can be helpful as a starting point for cities seeking to establish their own KPIs for smart cities or digital transformation. Performance indicators should combine international standards with the unique needs of your residents' lived experiences.

Table 6: International smart city KPI & evaluation frameworks

Framework	Areas of focus
National Institute of Standards and Technology (NIST) Smart Cities and Communities: A Key Performance Indicators Framework	(1) the alignment of KPIs with community priorities across districts and neighbourhoods, (2) investment alignment with community priorities, (3) investment efficiency, (4) information flow density and (5) quality of infrastructure services and community benefits.
International Standard Organisation 37120:2018 sustainable development of communities – indicators for city services and quality of life. Abbreviation: ISO 37120	Economy, education, energy, environment and climate change, finance, governance, health, housing, population and social conditions, recreation, safety, solid waste, sport and culture, telecommunication, transportation, urban/local agriculture and food security, urban planning, wastewater, water
International Standard Organisation/DIS 37122:2019 sustainable development in communities - indicators for Smart cities. Abbreviation: ISO 37122	Economy, education, energy, environment and climate change, finance, governance, health, housing, population and social conditions, recreation, safety, solid waste, sport and culture, telecommunication, transportation, urban/local agriculture and food security, urban planning, wastewater, water
ITU-T Y.4901/L.1601 key performance indicators related to the use of information and communication technology in Smart sustainable cities. Abbreviation: ITU 4901.	ICT, environmental sustainability, productivity, quality of life, equity and social inclusion, physical infrastructure
ITU-T Y.4902/L.1602 key performance indicators related to the sustainability impacts of information and communication technology in Smart sustainable cities. Abbreviation: ITU 4902	Environmental sustainability, productivity, quality of life, equity and social inclusion, physical infrastructure
ITU-T Y.4903/L.1603 key performance indicators for Smart sustainable cities to assess the achievement of sustainable development goals. Abbreviation: ITU 4903	Economy, environment, society and culture
Sustainable Development Goal 11+ monitoring framework UN Inter-Agency Expert Group definition. Abbreviation: UN SDG 11+ indicators	UN SDG targets 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11a, 11b, 11c, 1.4, 6.3
OECD Measuring Smart Cities' Performance Framework	Connectivity, energy, water and waste, e-government, education and skills, health and safety, housing and environment, jobs and firms, mobility

Methods of setting smart city KPIs

How do you go about establishing a key performance indicator for smart cities? Typically this responsibility should be assigned to a dedicated smart cities team, digital transformation, or innovation office that can ensure adoption of the framework city-wide, and manage reporting. There are many ways to establish KPIs within your organisation, and cities have taken different approaches based on their unique contexts. Below is a summary of four approaches to establishing smart city KPIs.

- **Measure inputs, outputs and outcomes:** *The most standard and effective of the four approaches is to measure inputs, outputs and outcomes of a service, technology, project or initiative. Inputs refer to what quantifiable investments are made in the project, technology or service. Outputs refer to what quantifiable results are achieved as a result of the inputs, for example, "5,000 residents were served". Finally, outcomes refers to the impact that was created by the service, technology or project, for example "food insecurity was reduced by 30%."*

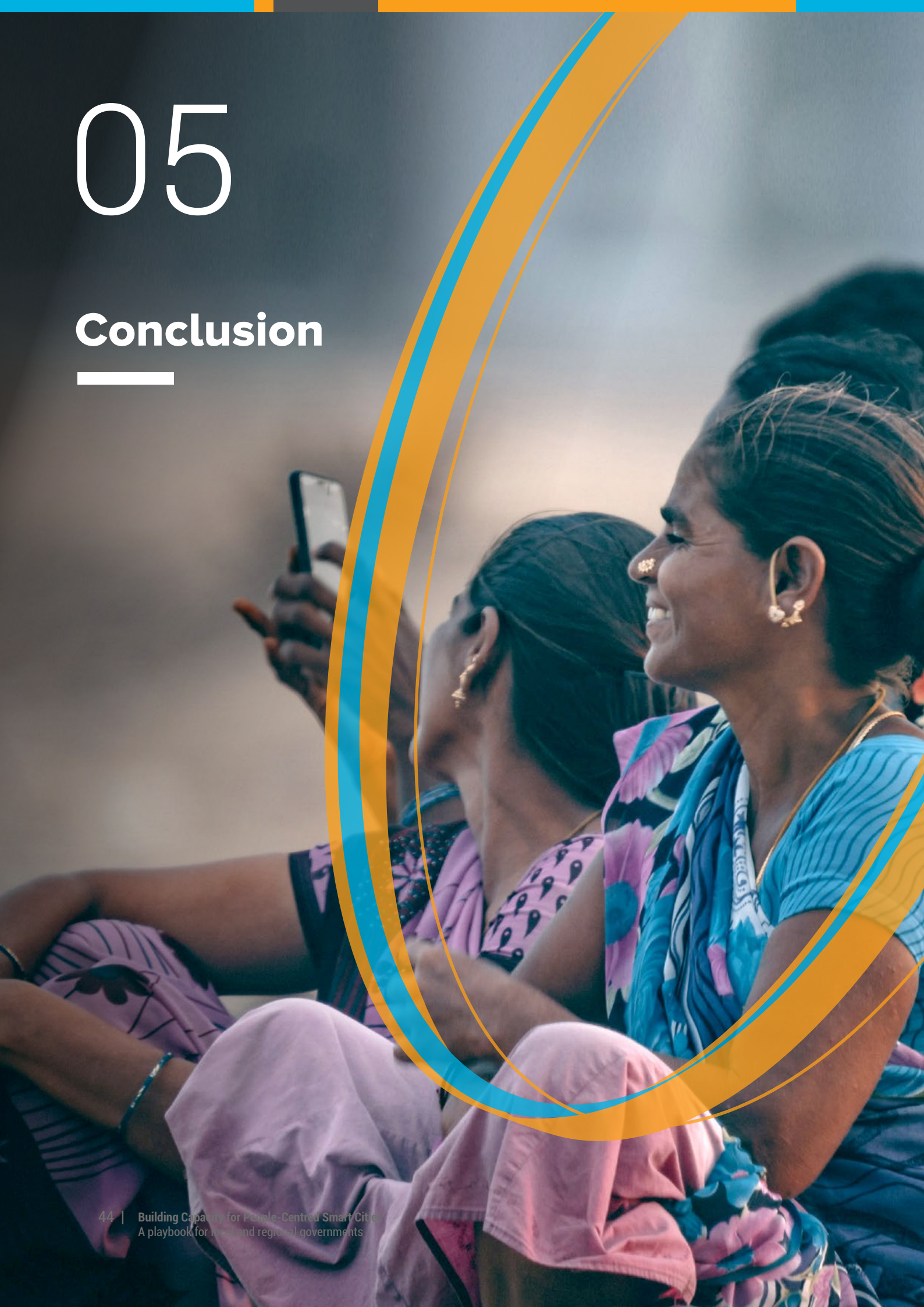
- **Measure return on investment and community impact of certain technology projects:** *In this approach your focus is to quantify investment, and measure the return on investment in addition to community impact. The National Institute of Standards and Technology (NIST) recommends starting by identifying community priorities for selected geographic boundaries such as districts or neighbourhoods. Then work to track investment with progress made towards community priorities.*

- **Measure risks and returns for using technology to solve a specific problem:** *This approach focuses on a specific technology, rather than a larger smart city strategy. In this method, you can evaluate a specific technology across certain criteria established by your organisation. Such criteria can include impacts to privacy, security, bias, ethics and transparency. Smart city advisory committees can be established in your organisation to set such criteria and evaluate emerging technologies as part of the procurement process.*

- **Assess potential and realised impacts to women, minorities, persons on the move and unserved communities:** *All the above approaches can include an equity lens where technologies, programs, projects and initiatives are evaluated according to their impacts (positive and negative) to underrepresented communities.*

05

Conclusion



The accelerated digital transformation seen in the last few years points towards a future where emerging technologies will have a strong impact on government operations. Demand for accessible, user-friendly and convenient digital services during COVID-19 accelerated an existing trend for more modern services from government. City governments must ready themselves by not only investing in digital infrastructure, but also the people behind the process of digital transformation. Cities of today must address the need to build ICT capabilities, while strengthening digital leadership within their organisation, and expanding towards new forms of work that support sustainable digital services. **People-centred smart cities recognise that people are behind the process of digital transformation**, and cities should carefully consider how they invest in their external partnerships as well as their organisational culture.

To build capacity, local and regional governments can do three main things. First, they can **collaborate with a diverse set of stakeholders to expand their reach and impact.** Building trustful, sustainable partnerships is key to success in any smart city initiative, especially as technology introduces new challenges requiring innovation and shared infrastructure. Second, they can **invest in the capacity of their city staff** by investing in digital skills training at scale, managing disruption caused by digital transformation, and creating new opportunities for participatory leadership. Third, they can **evaluate whether smart city technology is fit for purpose**, and establish key performance indicators to measure progress towards goals to better target return on investment.

Municipalities have a tremendous opportunity to build workforces of the future by investing in their existing talent, and reforming hiring practices to accommodate today's competitive labour market. Local government's public service mission is a precious competitive advantage for those seeking to contribute their skills towards community benefit. By taking advantage of these opportunities, municipalities have the opportunity to shape markets, and drive real change that is needed for achieving the SDGs. This playbook outlined several steps that city governments can take today, to build a sustainable, prosperous future for tomorrow.

Appendix: Policy Resource Toolkits

Additional core competencies

In addition to the core competencies listed under Activity 9, Goal 2, we also recommend a special focus on two key areas as they pertain particularly to smart cities.

Competency 1: Evaluating risks of emerging technologies

Staff level: Executive staff, Mayor or City Manager

Core competency: Should be able to evaluate risks to digital rights posed by some smart city technologies.

Description: Massive amounts of data created by smart city technologies have sparked a global dialogue about cybersecurity, privacy and surveillance, requiring local governments to upgrade their digital infrastructure and assess their ability to secure data and guarantee human rights in the digital era. The Internet of Things (IoT) has created new opportunities for digitising infrastructure like streetlights and energy meters, but has also introduced new cybersecurity vulnerabilities. Some prominent writers and researchers have recently shed light on failures of large technology companies to address ethics in artificial intelligence and surveillance technologies such as facial recognition, noting the impending threat these technologies may have on human autonomy, their implicit biases leading to racial and gender discrimination. **City leaders should have a fundamental awareness of these issues, and understand their potential impacts on human rights.** In procurement settings, executives should encourage their staff to ask questions of solution-providers about their ability to address human rights and cybersecurity concerns.

Resources:

Cities for Digital Rights Help Desk

Good Practice Principles for Data Ethics in the Public Sector

NYC IoT Strategy

Competency 2: Tools for urban planners

Staff level: Urban planners, technical staff

Core competency: Should possess awareness of smart city software, applications and tools that support urban planning processes.

Description: In recent years, urban planning processes have been revolutionised by several digital applications. Planners of today should possess basic skill sets that enable them to take advantage of these tools and introduce efficiencies to their organisation. Most smart city technologies in this space help to digitise planning processes, collect data from the field, or visualise data in new ways. The tools described below are not comprehensive, but provide a sample of some of the currently available technologies as the landscape continues to evolve.

- **Geospatial planning:** *Several mapping tools are available for today's planners. Local governments can invest in enterprise based solutions, or individual licences making the cost of geospatial planning software flexible. Current notable tools include ArcGIS online, QGIS, Ushahidi, CARTO, Tableau, Mapbox and Replica. For an assessment of these tools view Table 10.2 in "Addressing the Digital Divide: a playbook for local and regional governments.*

- **Infrastructure & asset inventories:** *Digital Twin technology has emerged recently as a new way to monitor infrastructure assets and establish robust asset inventories. Digital Twins are essential virtual replicas of urban environments created by data collected from sensors and drone technology. At their most basic level, digital twins can help cities track and manage inventory assets. Some of the most complex deployments include using artificial intelligence to predict rates of failure for critical infrastructure.*

- **Traffic management & transportation:** *Transportation and traffic management have been a major target of smart city technologies. Products like Remix Streets and Replica focus on assisting planners with data-driven decision making by making transportation accessible and easily visualised for planning purposes.*

Endnotes

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2 Measuring Digital Development: Facts and Figures 2020, International Telecommunication Union Development Sector (ITU).

3 UN Human Rights & Social Inclusion Unit

4 Zwitter, A., Gstrein, O.J. Big data, privacy and COVID-19 – learning from humanitarian expertise in data protection. Int J Humanitarian Action 5, 4 (2020). https://doi.org/10.1186/s41018-020-00072-6

5 Stewart, Matthew. "The Deceptive Platform Utopianism of Google's Sidewalk Labs," Failed Architecture, (2019)

6 San Jose Digital Inclusion Fund, "San José Digital Inclusion Partnership"

7 The SDG Partnership Guidebook: A practical guide to building high- impact multi-stakeholder partnerships for the Sustainable Development Goals, Darian Stibbe and Dave Prescott, The Partnering Initiative and UNDESA 2020

8 See the: Sustainable Development Goals Knowledge Platform "Multi-stakeholder partnerships & voluntary commitments"

9 Pg. 80: Tool 1: Stakeholder Mapping, The SDG Partnership Guidebook: A practical guide to building high- impact multi-stakeholder partnerships for the Sustainable Development Goals, Darian Stibbe and Dave Prescott, The Partnering Initiative and UNDESA 2020

10 P3s involve a long term partnership between one or more public authorities and private sector partners typically for the purpose of financing, building, maintaining and operating infrastructure or providing services to a population. P3s are globally popular, but their performance and impact remains contested. Due to the growing privatisation of public infrastructure and services globally, gaps have emerged in areas where it is not lucrative for private actors to deliver their products.

11 See "Urban Labs". Available at https://urbanlabs.uchicago.edu/

12 See "Good Systems". Available at https://bridgingbarriers.utexas.edu/good-systems/

13 https://idc.sutd.edu.sg/design-contributions/creations/city-form-labs-urban-planning-workshops-collaborations

14 For example the Rhizomatica project that enables community-developed internet infrastructure in Mexico.

15 For example, the U4SSC is a UN initiative led by UN-Habitat, ITU and UNECE, along with the support of over 14 UN agencies and bodies, to serve as a global platform for advocating public policies and supporting the transition to smart sustainable cities. Available at https://www.itu.int/en/ITU-T/ssc/united/Pages/default.aspx.

16 ITU Study Group 20 works to develop international standards that address the standardisation requirements of IoTs and their application in smart cities and communities.

17 Pg. 51 The SDG Partnership Guidebook: A practical guide to building high- impact multi-stakeholder partnerships for the Sustainable Development Goals, Darian Stibbe and Dave Prescott, The Partnering Initiative and UNDESA 2020

18 S. Thomas Ng, James M.W. Wong, Kelwin K.W. Wong. A public private people partnerships (P4) process framework for infrastructure development in Hong Kong. Cities, Volume 31, 2013, Pages 370-381.

19 https://www.nextmsc.com/report/smart-cities-market

20 Teaching Public Service in the Digital Age: Competency 3 of 8 - Multidisciplinary.

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22 Pathways for Prosperity Commission. (2019). The Digital Roadmap: how developing countries can get ahead. Final report of the Pathways for Prosperity Commission. Oxford, UK.

23 https://www.channelnewsasia.com/singapore/digital-academy-public-officers-digital-skills-smart-nation-376966

24 Annex 3.4, pg. 118: Digital Transformation and Public Employment: The future of government work. Institutions for Development Sector, 2021.

25 Schwenk, Katya. "Innovation labs take a gamble to improve city government," StateScoop 2019.

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29 "Measuring Smart Cities' Performance: Do smart cities benefit everyone," OECD, 2020.

30 Urban Monitoring Framework, United Nations, 2022.

31 ITU, (2016), "Key Performance Indicators Related to the Sustainability Impacts of Information and Communication Technology in Smart Sustainable Cities", Recommendation database. Available at Y.4902/L.1602

32 Moura, Pedro., Patrao, Carlos., et. al, "Review of Smart City Assessment Tools," Smart Cities. August 2020.

Terms & Definitions

Collective accountability
The collective responsibility of everyone involved in an effort leading to a sense of mutual accountability for a partnership as a whole.

Digital transformation
The process of using digital technologies to modify existing systems.

Key performance indicators
Critical indicators of progress toward an intended result.

Return on investment
A performance measure used to evaluate the efficiency or profitability of an investment

Stakeholder mapping
An activity whereby stakeholders in a proposed project or partnership are identified along with their roles and motivations.

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11 SUSTAINABLE CITIES AND COMMUNITIES