Handbook Series on Innovative Local Governance for the Implementation of the Sustainable Development Goals

Digital Transformation in Local Government

LEADERSHIP, HUMAN RESOURCES AND ORGANIZATIONAL STRUCTURE

United Nations Department of Economic and Social Affairs

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ExecutiveSummary

Executive Summary

The age of digital transformation, including the evolution of early e-government efforts towards a more holistic and user-centered approach, has arrived. The 2030 Agenda for Sustainable Development (2030 Agenda) includes a focus on governments' digital transformation potential to achieve the Sustainable Development Goals (SDGs). To date, governments' input and resources for digital transformation have mainly been in the introduction of specific technologies. The changes remain mainly at the level of the central government. As a result, it is difficult to find a clear consensus on the concept, goals and strategies of digital transformation at the local level. Discussions on digital transformation in local governments have been neglected. This handbook introduces the concept of digital transformation to policymakers and public managers who are contemplating the digital transformation of local governments. It introduces various organizational management elements required for successful digital transformation, including the leadership, human resources and organizational structure of the digital innovator, which are said to be the most essential elements for digital transformation. Examples of successful efforts from several countries also are included.

This handbook consists of five chapters, each addressing a thematic concept.

Chapter 1 introduces the concept of the digital transformation of local government. Existing literature on the topic does not produce a clear consensus on the concept, strategies to achieve it, or objectives to be accomplished through it. A comprehensive approach needs to be built that connects people with new values, strategies and processes and goes beyond a methodological approach limited to digital technology. A comprehensive approach to digital transformation in local government means including new ways of transforming organizational processes and culture based on digital technologies and data, collaborating with stakeholders around public value, building new frameworks for public service delivery, and establishing new types of relationships between citizens and local government.

Chapter 2 looks at studies to date on local government innovation. Factors known to influence local government innovation are expected to have a strong impact on local government digital transformation. They can be divided into internal characteristic factors (those related to human resources within an organization, organizational structure and various material resources influencing local government innovation) and external environmental factors (such as stakeholder-related factors, legal and institutional factors and governance factors). Chapter 2 discusses strategies for the digital transformation of local governments, focusing on leadership, human resources and organizational structure, based on the principle that a sophisticated organizational strategy is required to build a digital local government.

Chapter 3 introduces digital leadership. Digital leaders play an important role in each stage of planning, execution, evaluation and follow-up of digital transformation. In the digital transformation planning stage, vision and goal setting, readiness evaluation and resource allocation and management should be performed. In the execution stage, monitoring and planning optimization, organizational process optimization and motivation for members are required. In the evaluation and follow-up management stages, the continuous cycle of digital transformation needs to be structured and mid-to-long-term plans for digital transformation optimized. Digital leaders must perform complex functions. This chapter addresses C-suite positions similar to those in the private sector that may support local government digital transformations. It also addresses why continuous and systematic education and training are essential to develop and build the technical and business capabilities of digital leaders.

Chapter 4 addresses human resource acquisition for digital transformation. Many local governments do not have enough manpower equipped with digital literacy to meet demands and do not have the resources to strengthen their digital capabilities. There are two main ways that local governments can secure human resources for digital transformation. First, training and education programmes related to digital innovation technology can be provided for civil servants. Those programmes should include both current and future skills needed. Incentives for participation in education and training should be considered. Training should be structured so that best practices are shared, and the latest technologies can be acquired through external networking. The second way to secure human resources for digital transformation is to recruit external experts into the government, offering them monetary and non-monetary incentives taking into consideration the national context. This should be strategized in cooperation with the central government and all local governments, not at the level of individual local authorities.

Chapter 5 introduces the organizational structure for digital transformation. Currently, digital innovation-related work in many local governments functionally separates into planning and coordination and execution and management, taking a decentralized structure in which policy functions are distributed in different departments for each sub-area of digital innovation. For digital transformation to succeed, local governments with such a decentralized structure need to redesign themselves into organizations with a centralized structure.

About This Handbook

About This Handbook

Purpose

This handbook is one in a series on Innovative Local Governance for the Implementation of the Sustainable Development Goals developed by the United Nations Project Office on Governance (UNPOG) of the Division for Public Institutions and Digital Government (DPIDG) of the United Nations Department of Economic and Social Affairs (UN DESA), in collaboration with the Korea Research Institute for Local Administration (KRILA). The series includes six handbooks that aim to support local authorities and other stakeholders in developing the necessary knowledge, skills and capacities to implement the SDGs by introducing strategies, approaches and tools and by showcasing innovative country cases and experiences.

This handbook specifically provides information for policymakers and public managers who are thinking about digital transformation for their local governments. It is designed to introduce various strategies, approaches and policy instruments that will promote that transformation and includes examples from localities in countries that have done so. The handbook focuses on the leadership, human resources and organizational structure of digital transformation agents. Several studies (Pittaway & camp; Montazemi, 2020; Nasi et al., 2011; Damanpour, 1987) say those are the most essential organizational management factors required for successful digital transformation.

Digital Transformation of Government: Global Megatrend

Over the last two decades, changes in the economy, society and government sectors around the world have been accelerated by the unprecedentedly rapid development of digital technologies. The proliferation of digital technologies and the massive amounts of data collected through those technologies are affecting the ways people live, how organizations work, how individuals and businesses engage in economic activities, and how social relationships are formed as well as how governments and citizens interact.

Governments have played an important role in the digital transformation process to date. Examples include government incentives for companies to adopt new digital technologies and certification systems designed to minimize any negative consequences that may arise from their use. Governments' partnerships with universities and businesses have helped create a digital technology ecosystem by organically connecting know-how, facilities and funds to test and develop new digital technologies (OECD, 2018).

The moment has now arrived where governments themselves are required to be digitally transformed (OECD, 2019). Citizens want their governments not only to introduce digital technology, but to use it in innovative ways to improve the efficiency, effectiveness and equity of public sector services. Citizens also hope that the use of digital technologies will enable them to participate more directly in solving complex social problems.

Governments around the world have already established national strategies and plans for their digital transformation and are trying to find an operation method suitable for the post-coronavirus era. This represents the evolution of the early e-government to a more holistic and user-centred approach, which means transformation into a digital government (OECD, 2019). They have begun to invest enormous resources for digital transformation, and that investment is expected to grow.

The 2030 Agenda also draws attention to the potential of governments' digital transformation in helping to achieve the SDGs, for example, in the challenging task of making a significant increase in the availability of high-quality, timely, reliable and disaggregated data.

The importance of digital transformation at the local level

To date, governments' input and resources for digital transformation have been mainly confined to the introduction of a specific technology and have occurred at the central government level. Discussions on digital transformation in local governments have been neglected. For example, most of the contents of the Digital Transformation Promotion Plan of the Yoon Suk-yeoul Government of the Republic of Korea are for the central government. The digital learning platform developed by the Ministry of Personnel Management (2022) in the Republic of Korea also is specialized for public officials of the central government.

That being said, local governments are in an important position to provide high-value public services in real-time based on new digital technologies that integrate diverse data. During the COVID-19 pandemic, citizens interacted with governments through online channels as digital technologies became an increasingly integral part of the way governments worked, even at local levels. According to the United Nations Department of Economic and Social Affairs (DESA, 2020), local governments used digital technologies to provide information on COVID-19 and to monitor the related contact tracing efforts. Governments provided health care and supported small grocery stores and other essential industries with digital resources for their business activities. The use of those digital technologies posed challenges relating to cybersecurity and access to vast amounts of data.

Beyond the pandemic, local governments must adopt more sophisticated and advanced technologies and actively and pre-emptively use them. That is challenging as they still lack the knowledge and resources to support such digital transformation.

Thematic Chapters

Chapter 1: What Does Digital Transformation Mean in Local Government?

Expected Learning Outcomes

Learning outcomes for this chapter include:

- Readers are introduced to the concept of digital transformation, including digital transformation in the government, specifically in local governments; and
- Readers are introduced to a digital government maturity model that supports learning the digital government development process.

Digital Transformation

A literature review of existing materials on digital transformation does not provide a consensus on what digital transformation exactly means or what the strategies are to achieve it. That said, one thing is clear: conceptualizing digital transformation by limiting it to just new technologies or data is an overly simplistic approach.

Digital transformation must be approached as a comprehensive concept that connects digital technology with new values, strategies, processes and people, going beyond simple digitization. In this sense, digital transformation is the "transformation of business and organizational activities, processes, competencies, and models to fully leverage the changes and opportunities of a mix of digital technologies and their accelerating impact across society in a strategic and prioritized way, with present and future shifts in mind" (Demirkan et al., 2016). Technology is a key factor, but successful digital transformation cannot be achieved unless various factors such as process, individual behaviour, competency, strategy
and leadership are taken into account.

Digital transformation is about governance transformation and cultural change in support of a country's overall national development vision and strategy (United Nations Department of Economic and Social Affairs (DESA), 2020).

Digital Transformation in the Government

As noted above, to date, most literature addressing the importance of digital transformation in modern government has mainly dealt with the discussion of specific technologies, such as artificial intelligence (AI), machine learning and big data. Successful digital transformation at any level of government requires not only the introduction of technologies but also needs to answer questions such as:

(1) How will introducing digital technology provide public services more effectively?
(2) How will digital transformation improve the efficiency of processes in public organizations?
(3) How will digital transformation create new public values?

Digital Transformation in Local Governments

Governments can leverage digital technologies to provide effective public services, strengthen existing public organizations and create new public values. The importance of such digital transformation at local level is often overlooked or undervalued. But it is clear that people tend to have more direct interaction with local governments that implement digital transformation.

Digital transformation of local governments includes new ways to transform organizational processes and culture to collaborate with stakeholders around public value, to build new frameworks for public service delivery and to create new relationships between citizens and local governments (Mergel et al., 2019).

Digital Government Maturity Model

Figure 1 below shows a digital government maturity model developed by Gartner (DSPA of RSA, 2018). The levels in this model do not necessarily progress sequentially, and the elements of each level do not automatically change together. The digital government development process often involves a combination of factors at different levels. The most dramatic change in the development process occurs from stage 2 to stage 3. As the focus of e-government or digital government shifts from government (supplier)-centred (Phase 2) to citizen (demander)-centred (Phase 3), digital government matures rapidly.

After stage 3. digital government will evolve to focus more and more on the implicit needs of citizens as well as their explicit needs and to make strategic, timely and high-quality decisions through the effective use of vast information resources. This model takes a value-oriented and integrated approach beyond just the use of technology to evaluate a government's degree of digital transformation.

Figure 1. Digital Government Maturity Model

Maturity Level	Level 1: Initial (E-Government)	Level 2: Developing (Open)	Level 3: Defined (Data-Centric)	Level 4: Managed (Fully-Digital)	Level 5: Optimizing (Smart)
Value Focus	Compliance	Transparency	Constituent Value	Insight-Driven Transformation	Sustainability
Service Model	Reactive	Intermediated	Proactive	Embedded	Predictive
Platform	IT-Centric	Customer-Centric	Data-Centric	Thing-Centric	Ecosystem-Centric
Ecosystem	Government-Centric	Service Co-creation	Aware	Engaged	Evolving
Leadership	Technology	Data	Business	Information	Innovation
Technology Focus	SOA	API Management	Open Any Data	Modularity	Intelligence
Key Metrics	% Services Online	No. of Open Datasets	% Improvement in Outcomes, KPIs	% New and Retired Services	No. of New Service Delivery Models

Source: Gartner (2017) quoted in DSPA of RSA (2018)

Chapter 2: Success Factors for Digital Transformation of Local Government

Expected Learning Outcomes

Learning outcomes for this chapter include:

- Readers are introduced to internal and external factors for successful digital local government;
- Readers are introduced to why leadership, human resources, and organizational structure are critical factors for successful digital transformation.

Digital Government and Innovation

Local government digital transformation is directly related to the innovation goals of promoting democracy, enhancing efficiency, increasing flexibility and increasing equity. Innovation is important in internal management, public service content, public service delivery methods and process and governance surrounding public service. Digital transformation occupies a key position in all types of innovation. Factors that may negatively influence local government innovation must be actively managed. Those factors can be broadly divided into internal characteristics and external environmental factors.

Internal Characteristics for Successful Digital Local Government

Among internal factors related to local government innovation, the most frequently mentioned is who promotes innovation (Stewart & Kringas, 2003; Ruhil et al., 1999; Damanpour, 1987). Major innovators include the heads of local governments and public officials. It is difficult for innovation to succeed when the heads of governments do not show interest, lack the capacity to promote it, participate passively and do not make any effort to innovate, or strongly resist or are reluctant to innovate. Innovations often fail because of a fragmentary and short-sighted view of innovation (Cyert & March, 1963; Adams & Dirlam, 1966). That is why establishing a strategic plan for innovation is important. Strategic plans reflect what an organization is doing now, what it wants to do in the future, and why it wants to do it (Bryson, 1988). Without such a plan, it is difficult to gain support for efforts to innovate, and there is a high possibility that efforts will end up as fragmentary and short-sighted changes rather than truly fundamental, mid-to-long-term innovations.

For innovation to succeed, in addition to human resources, material resources such as time, budget, technology and infrastructure must be supported. The bureaucratic structure should be changed so that those resources can be transformed (Thompson, 1965; Mohr, 1969; Borins, 2006). It is difficult to achieve transformation goals when there are not enough resources for innovation when the level of specialization of the innovators is low or centralized, and when the incentive system is insufficient. Conflict between groups within an organization and a lack of coordination between organizations also make it difficult to succeed.

External Factors for Successful Digital Local Government

External environmental factors that hinder innovation include stakeholder opposition, legal and institutional restrictions and an insufficient governance system (Borins, 2006). Stakeholders, including residents, private companies, superior institutions and related public institutions all impact local government innovation. If a local government encounters opposition from those stakeholders, innovation is not likely to occur. Restrictions in the legal system also can pose an obstacle to innovation by local governments. Collaboration between government, businesses and civil society and among central ministries and related social groups also are important to success..

The characteristics of the target group affected by the innovation can significantly influence the success or failure of the innovation (Labay & Kinnear, 1981). It is harder for innovation to succeed when the level of innovation acceptance of the target groups is low.

Leadership, Human Resources and Organizational Structure for Digital Transformation

The characteristics of the actors leading the innovation and the various situations they might create are key factors influencing successful organizational innovation. If they lack the capacity and knowledge to lead the digital transformation of local governments, digitization is likely to fail (Loubier, 2017; Pittaway & Montazemi, 2020). Those innovation leaders wield a strong influence in managing resources to apply the latest digital technology to the core processes of local government and organizational operation and in establishing supportive partnerships inside and outside the organization.

Building a digital local government requires a comprehensive organizational strategy and an organizational system that can effectively promote it. The strategy should be developed from a macro perspective that combines digital technology and strong administration to develop and provide public services. To achieve effective digital leadership of local governments, organizational systems need to be reorganized, and the expertise of relevant departments such as ICT needs to be strengthened.

Chapter 3: Establish Effective Digital Leadership for Digital Transformation

This chapter explores leadership, human resources and organizational structure for the digital transformation of local governments in more detail and discusses strategies and shares examples for managing such efforts.

Digital transformation in local governments inevitably disrupts existing methods and introduces new ways of working. These digital innovations require flexibility and adaptability. The process and results will have a broad and significant impact on almost all local government sub-departments and members.

Expected Learning Outcomes

Learning outcomes for this chapter include:

- Readers are introduced the concept of digital leadership;
- Readers are introduced to approaches and good practices to enhance digital leadership.

Concepts

Digital leadership means the strategic use of governments' digital assets and technology to achieve its public values. This can be addressed at both organizational and individual levels. As noted above, digital leadership has been pointed out as an important determinant of the success or failure of digital government or e-government. In countries where inequality in the distribution of power is prevalent, leaders' strong will to innovate plays an even more important role in the adoption and process of innovation. Strong leadership drives successful government innovation by ensuring long-term resources and that different parts of the organization are integrated to work together.

To carry out the complex and comprehensive functions that must be performed when driving digital innovation, consider establishing the chief executive officer position, which has evolved from the private sector and is increasingly being adopted by governments.

Case Study 1. Sragen One Stop Service Initiative (SOSSI) and Digital Leadership

Sragen is one of approximately 400 Provinces (Districts, Kabupaten/Cities, Kota/Municipalities) located in the eastern part of Central Java Province in Indonesia. Sragen began using information technology in 1998, but the level of utilization was insufficient. In 2002, Sragen's Bupati (the Head of District) determined that e-Government could not be implemented due to employees' lack of IT competency. Sragen then began providing regular training for its employees to strengthen their IT competencies. The Head of District promoted the Sragen One-Stop Services Initiative (SOSSI) based on the idea that local governments should provide better public services conveniently and transparently. He said that the initiative would establish a system to provide residents with the public services needed to obtain permits or licenses, such as building permits and restaurant permits, in an integrated manner.

The Head of District emphasized the need for change management to successfully realize e- Government and underlined the dedication of the members of the organization to move forward, even saying, "Those who oppose e-Government should quit their jobs." Support from the head of the agencies with the authority to issue permits or licenses and from the legislative body were essential to successfully promote the SOSSI.

He defined the role of each actor in detail based on the results of the meetings. The Head of District emphasized that a successful SOSSI business process should be simple, fast and transparent and that the authorities involved should support new ways of working. He said that through SOSSI, employees could be fully equipped with the latest information and communication technologies and knowledge on private sector best practices. He also predicted that SOSSI would attract more investment through superior permitting and licensing services.

Three policies were designed to support SOSSI's success :
- give SOSSI institutions the authority to issue permits or licenses, which had been held by various
- institutions;
- encourage SOSSI institutions to move away from the existing bureaucratic culture to introduce
- organizational culture and organizational management techniques with a new reward system;
- and
- provide incentives to individuals and businesses who want to start a business in Sragen.

The Head of Council succeeded in winning the full support of the local council, and in 2003, an ordinance was enacted to ensure the sustainability of SOSSI. Enacting the ordinance was an especially important measure given changes in leadership at the local government level in an unstable and fluctuating Indonesian national context.

SOSSI was carried out with strong local leadership as a driving force. Among the many digital policies of Indonesian local governments, it is seen as the most successful case of digital transformation to date.

Source: Furuholt & Wahid (2008), Priyatma (2013).

The position of an executive responsible for digital transformation carries a strong impact across the planning, execution and monitoring of digital government initiatives (Obi, 2010a). Ideally this person is an expert on information systems and a specialist in user experience and project management. They must be proficient in security and knowledge management as well as in evaluating digital innovation performance (Obi, 2010b: 91).

The more powers and responsibilities given to the position of a chief executive when implementing digital transformation, the better (Obi, 2010b: 91). Digital transformation efforts are complex and must be carried out throughout the organization. Communication and collaboration can be difficult due to the bureaucratic culture within government organizations.

The list below and Figure 2 summarize the many types of executive positions that can drive digital transformation. Several of these titles can be held by a single person.

- Chief Information Officer (CIO): the main task is to set up information strategy and take responsibility for the organization's information technology and information system
- Chief Knowledge Officer (CKO): in charge of knowledge management within the organization; often held by the same person as CIO
- Chief Data Officer or Chief Digital Officer (CDO): community-oriented position utilizing a range of data and assets across the organization to engage with citizens
- Chief Technology Officer (CTO): technology-focused position that provides services for government agencies
- Chief Information Security Officer (CISO): responsible for cybersecurity strategy to protect information and digital assets from both internal and external threats.

Figure 2. C-suite positions supporting digital transformation

Chief Digital Officer
- Community-oriented
- Citizen engagement focus
- Increase the value of government information and services for the public and industry

Chief Data Officer
- Data-oriented
- Open government focus
- Increase the value of government data for the public and industry

Chief Information Officer
- Business-oriented
- Employee engagement and innovation focus
- Increase the value of government information across the enterprise

Chief Technology Officer
- Information security-oriented
- Enterprise-wide Information security focus
- Strengthen the safety of information and services

Chief Technology Officer
- Technology- and sourcing-oriented
- Customer support and vendor engagement focus
- Delivers the best value for IT services to government agencies

Source: Gatner (2013) quoted in Lauchlan (2013,) revised for this handbook

The C-suite positions a local government chooses to include may vary depending on its IT policy and strategy. To reduce costs and gain momentum, roles and responsibilities should be clearly defined. All executive officers who will lead digital innovation should have appropriate technical expertise and managerial and strategic competence.

Case Study 2. Chief Technology Officer in Seattle Digital Innovation

The Seattle, Washington City Government in the United States introduced the Internet-based Seattle Public Access Network (PAN) in 1995. The main goals of the PAN were to: provide citizens with city government information, support two-way communication between city government and citizens, and promote economic development and tourism by advertising a positive image of Seattle. The PAN shared various city-related information and gave residents access to publicly available information such as parliamentary minutes or ordinances, and allowed citizens to receive or provide information via email or e-form. It also provided the means for interactive financial transactions to meet the needs of companies wishing to do business in Seattle. In the early days of PAN, there was no IT manpower or budget to oversee or guide IT policies in Seattle. As PAN use quadrupled from 1995 to 1996, Seattle's leaders began to think about a more coherent organizational structure to oversee IT policy. The position of Chief Technology Officer (CTO) was created, and the budget for IT was increased. The CTO is responsible for managing the city's extensive IT infrastructure and creating a strategic plan for the city's use of IT. A CTO Charter manages the scope of the CTO's powers. To this day, Seattle's CTO interacts with the city's other senior officials, playing a key role in driving the city's ICT policy and fulfilling the city's goal of delivering innovative digital services to residents.

Source: Wohlers, T. E., & Bernier, L. L. (2016).

Approaches

As noted above, digital leadership is important in the digital transformation of local governments. What role should a digital leader in local government play, and what competencies are needed to fulfil that role? Studies indicate the core roles and competencies of digital leaders in the public sector are not significantly different from those of digital leaders in the private sector (Dawson et al., 2015).

Digital leaders serve operational roles for budget, performance, security, personnel and other areas. They also present an organizational vision to external stakeholders (for example, citizens or the media) and support the strategic value of digital innovation through formal and informal interactions with the organization's top management. As citizens' demands around digitization increase, the digital leader's role as a senior executive becomes increasingly important. Digital leaders in the public sector may sometimes have insufficient authority compared to those in the private sector. Public sector organizations often tend to be hierarchical, rigid and resistant to change. Local governments also are influenced by the regulations of higher-level governments. Digital leaders in the public sector must overcome those challenges (Dawson et al., 2015).

The role of a local government digital leader can be divided into three stages of digital innovation: planning, execution and evaluation, and follow-up. In the digital innovation planning stage, digital leaders define the vision and goals that local governments want to advance through digital innovation. Those goals should be defined as clearly as possible. The level of local government preparation for digital innovation needs to be evaluated from various angles. Relevant human, material, institutional and cultural elements should be strategically placed and managed. An assessment of the readiness level of local government for digital innovation needs to include evaluations of the following factors:

- the knowledge, skills, experience and authority levels of local government IT personnel;
- local government leaders' and senior IT personnel's perceptions of barriers and enablers to IT leadership;
- the extent to which local government resources (financial, human, technical, organizational, etc.) can be mobilized for digital innovation;
- current laws and regulations affecting digital innovation initiatives (Auffret et al., 2010).

In the execution phase of digital transformation, digital leaders continuously monitor obstacles to digital transformation. They work to optimize innovation initiatives, establish organizational processes to capture high-value digital transformation project opportunities and decentralize digital leadership so the entire organization is encouraged to strive for innovation.

In the evaluation and follow-up stage of digital innovation, digital leaders structure a continuous cycle of digital transformation. Based on information obtained through the execution of previous digital transformation projects, they identify the types and amounts of resources, governance systems and incentive structures required to promote mid-to-long-term and continuous digital transformation. Those are shared with stakeholders involved in innovation. In this cycle of digital transformation, the evaluation and follow-up stage is followed by a planning stage, which starts the whole process again based on new knowledge gained. Throughout the entire process, communication with external actors such as citizens, media, companies, higher-level governments, and other local governments should be included.

Figure 3. Checklist for the Role of Digital Leader

Step	Check list	
Plan	Establish the vision and goals of digital transformation(DT) 　- define the vision and goals that local governments want to advance 　　through digital innovation as clearly as possible	☐
	Assess readiness for DT 　- evaluate the level of preparation of local governments for digital 　　innovation from various angles	☐
	Identify risks and opportunities	☐
	Establish stakeholders' support	☐
	Develop detailed strategic plans 　　- place and manage strategically relevant human, material, institutional, 　　　and cultural elements	☐
Implement	Manage DT initiatives 　- monitor continuously obstacles to digital transformation to optimize 　　innovation initiatives	☐
	Decentralize digital leadership 　- decentralize digital leadership for the entire organization to be 　　encouraged to strive with will and interest in innovation	☐
	Encourage whole members to have the will and interest in DT	☐
Assessment & Feedback	Gather feedback from the members and stakeholders impacted 　　- communicate with members and external actors of local government such 　　　as citizens, media, companies, higher governments, and other local 　　　governments	☐
	Evaluate the performance of DT	☐
	Provide regular DT reporting back to stakeholders 　　- share information obtained through the execution of previous digital 　　　transformation projects with stakeholders involved in innovation	☐
	Make DT an ongoing process with the feedback	☐

Source: Made by the author

Figure 4. Feedback Loop for Digital Transformation and the Role of Digital Leader

Implement
- Manage DT initiatives
- Decentralize digital leadership
- Encourage whole members to have the will and interest in DT

Plan
- Establish the vision and goals of digital transformation (DT)
- Assess readiness for DT
- Identify risks and opportunities
- Establish stakeholders'(central government, citizen, relevant agencies etc.) support
- Develop detailed strategic plans

Assessment
- Gather feedback from the members and stakeholders impacted
- Evaluate the performance of DT
- Provide regular DT reporting back to stakeholders
- Make DT an ongoing process with the feedback

Strategies

To fulfil the roles described above, actors leading digital innovation in local governments must continuously improve their capabilities. Local government digital leaders must have extensive knowledge about opportunities and obstacles inside and outside the local government. They must be able to accurately interpret widely collected information and based on that knowledge and information, should be able to make strategic decisions. Digital leaders also should be able to reorganize human and material resources and use systems and technologies for digital innovation (Ojo, Janowski, & Estevez, 2011). Digital leaders also should be able to create an organizational culture that recognizes digital technology as a source of value rather than just a tool (Chen, Preston, & Weidong, 2010). Hooper & Bunker (2013) summarized previous studies on the competencies that CIOs should have. These are shown in Figure 5 below. Many researchers have emphasized that CIOs must have business competence as well as various technical competencies.

Figure 5. Business and Technical Competence Expected of Digital Leaders

Business Competence	Business domain Knowledge	Organizational overview, External environment, Organizational units, Organizational responsibility, IT/Business integration, High-level business knowledge, Knowledge networking
	Management and Leadership Competency	Strategic perspective, Leadership, Human resource management, Budgetary & financial management, Business planning, Decision making, Change Management
	Behavioral Skills and Attributes	Interpersonal communication, Relationship building, People skills, Problem solving and creative thinking, Team work, Learning, Openness/adaptability, Results focus
Technical Competence	IT industry Knowledge	Broad industry concepts, Technologies, IT solutions, Architectures, Access to IT knowledge
	IT management expertise	IS strategic planning, IS processes and procedures, IS Governance and regulatory compliance, Vendor and Supplier Management, IT contract development and negotiation, IS Service delivery management
	IT technical Expertise	IS Risk and Security management, IS project management, IS asset management, Application development and support

Source: Hooper & Bunker (2013) revised for this handbook

Exercise 1. Digital Leader Competence Self-assessment

Digital Leader Competence self-assessment
How do you rate on the competence expected of digital leader?

Business domain Knowledge	Organizational overview	Low 1 2 3 4 5 High
	External environment	Low 1 2 3 4 5 High
	Organizational units	Low 1 2 3 4 5 High
	Organizational responsibility	Low 1 2 3 4 5 High
	IT/Business integration	Low 1 2 3 4 5 High
	High-level business knowledge	Low 1 2 3 4 5 High
	Knowledge networking	Low 1 2 3 4 5 High
Management and Leadership Competency	Strategic perspective	Low 1 2 3 4 5 High
	Leadership	Low 1 2 3 4 5 High
	Human resource management	Low 1 2 3 4 5 High
	Budgetary & financial management	Low 1 2 3 4 5 High
	Business planning	Low 1 2 3 4 5 High
	Decision making	Low 1 2 3 4 5 High
	Change Management	Low 1 2 3 4 5 High
Behavioral Skills and Attributes	Interpersonal communication	Low 1 2 3 4 5 High
	Relationship building,	Low 1 2 3 4 5 High
	People skills	Low 1 2 3 4 5 High
	Problem solving and creative thinking	Low 1 2 3 4 5 High
	Team work	Low 1 2 3 4 5 High
	Learning	Low 1 2 3 4 5 High
	Openness/adaptability	Low 1 2 3 4 5 High
	Results focus	Low 1 2 3 4 5 High
IT industry Knowledge	Broad industry concepts	Low 1 2 3 4 5 High
	Technologies	Low 1 2 3 4 5 High
	IT solutions	Low 1 2 3 4 5 High
	Architectures	Low 1 2 3 4 5 High
	Access to IT knowledge	Low 1 2 3 4 5 High
IT management expertise	IS (Information System) strategic planning	Low 1 2 3 4 5 High
	IS processes and procedures,	Low 1 2 3 4 5 High
	IS Governance and regulatory compliance	Low 1 2 3 4 5 High
	Vendor and Supplier Management	Low 1 2 3 4 5 High
	IT contract development and negotiation	Low 1 2 3 4 5 High
	IS Service delivery management	Low 1 2 3 4 5 High
IT technical Expertise	IS Risk and Security management	Low 1 2 3 4 5 High
	IS project management	Low 1 2 3 4 5 High
	IS asset management	Low 1 2 3 4 5 High
	Application development and support	Low 1 2 3 4 5 High

Source: Hooper & Bunker (2013) revised for this handbook

Exercise 2. Digital Leadership Training Matrix

| Digital Leadership Training Matrix | | Delivery Options | | |
Training Area	Module	Priority	Time (day)	Program (Workshop, Talk-show etc.)
Business domain Knowledge	Organizational overview			
	External environment			
	Organizational units			
	Organizational responsibility			
	IT/Business integration			
	High-level business knowledge			
	Knowledge networking			
Management and Leadership Competency	Strategic perspective			
	Leadership			
	Human resource management			
	Budgetary & financial management			
	Business planning			
	Decision making			
	Change Management			
Behavioral Skills and Attributes	Interpersonal communication			
	Relationship building,			
	People skills			
	Problem solving and creative thinking			
	Team work			
	Learning			
	Openness/adaptability			
	Results focus			
IT industry Knowledge	Broad industry concepts			
	Technologies			
	IT solutions			
	Architectures			
	Access to IT knowledge			
IT management expertise	IS(Information System) strategic planning			
	IS processes and procedures,			
	IS Governance and regulatory compliance			
	Vendor and Supplier Management			
	IT contract development and negotiation			
	IS Service delivery management			
IT technical Expertise	IS Risk and Security management			
	IS project management			
	IS asset management			
	Application development and support			

Source: Hooper & Bunker (2013) revised for this handbook

To successfully carry out the digital transformation of local governments, competencies of leaders in key areas need to be assessed and further developed as necessary. Exercise 1 provides an example of a competence self-assessment. Training should then be provided to address any shortcomings or weaknesses. Exercise 2 provides an example of a possible training matrix.

Case Study 3. Training and Education Programs to Build the Capacity of the Government Chief Information Officer (GCIO) in Saudi Arabia

Saudi Arabia emphasized the importance of e-leadership from the early days of e-government. One of the e-leadership strengthening measures taken was a workshop to build the capacity of the Government Chief Information Officer (GCIO).

The workshop was designed by the Boston University School of Management under the supervision of the Saudi e-Government Program (YESSER). It addressed topics such as strategy development and implementation plans, IT budget securing methods, new trends and directions of e-Government, and ways to retain excellent talent. The final workshop was designed by the Center for Electronic Governance at United Nations University and Saudi Computer Society and included content to strengthen GCIO's awareness of policy-driven e-government initiatives and the capacity to design, manage and maintain them.

YESSER is continuously planning workshops and training programmes to improve the capabilities of the GCIO. A series of formal and informal meetings, private CIO invitation events, overseas dispatch programmes, and partnerships with academies/business schools also support the GCIO in acquiring knowledge and skills to succeed.

Source: Gharawi et al. (2014).

Actions/Steps

Actions/steps to develop digital leadership include:

Vision

- Look at the local government's macro-system of organization, which is composed of many units.
- Understand the interactions and interdependence among sub-systems.
- Help build a digital culture to access the right digital technology at the right time.
- Support the vision with a strategy that helps the organization to nurture a digital culture internally and lead to digital transformation.

Communication

- Build a strong network of communication – for example, use virtual meetings and other technology to provide the latest information.
- Develop feedback loops that engage stakeholders and provide them with access to information faster and increase their ability to respond to challenges.

Adaptability

- Know how to respond to common variability and to special variability.
- Most variation is a common variation that is set up in the system. When special variations occur, digital leaders can remain adaptable and ready to make a decision.
- Be willing to take risks; encourage organizations to try new things and test new ideas.

Innovation

- Be open to new ideas and technologies
- Structure digital transformation into a continuous cycle
- Leverage technologies to help the organization grow

Chapter 4: Enhance the Digital Manpower of Local Government

Expected Learning Outcomes

Learning outcomes for this chapter include:

- Readers are introduced to approaches and good practices to enhance the digital manpower of local government;
- Readers are introduced to a civil servants' digital competencies matrix model.

Approaches

Lack of expertise is a problem for many local governments attempting digital transformation. The technological and institutional environment of governments is rapidly changing, and the quantity and quality of digital innovation work are drastically expanding. Many local governments do not have enough manpower with digital literacy to meet demands, and as a result, digital competency enhancement is not going smoothly. Many are finding it difficult to provide high-quality public services to citizens by adopting new technologies in real-time. The lack of a digital organization and professional manpower to take practical charge of developing new technology policies and the increased burden of carrying out new technology tasks while implementing existing tasks are obstacles to the mid-to-long-term implementation of digital innovation by local governments.

To effectively utilize digital technologies, enough people must be trained in their use. Two main ways to secure such manpower at the local government level are summarized below.

Strategies

Training and education on digital innovation technology should be provided to civil servants in various positions within the government. A strategy for digital transformation should be shared with working-level officials as well as top managers.

Training and education programmes for local government digital transformation should consider the following:
- training and education programmes should include both current and future skills needed
- professional certification should be encouraged, and employees who have completed the required number of years should be encouraged to take the exam – time should be set aside for education and training, sponsoring formal study groups, and to the extent permitted, obtaining professional qualifications should be subsidized
- increase access to new digital technologies through cross-education with external groups and consider case education that can benchmark best practices.

The field of digital technology is developing at a very fast pace, which may make it difficult to immediately recruit qualified personnel. Recruiting external experts into the government sector can help address the lack of digital competency, but there are many difficulties in doing so. One of the biggest obstacles in attracting technology experts to work in the public sector is the wage gap. Monetary and non-monetary incentives can be considered depending on the national context (Sarker et al., 2018). Given that local governments have financial and institutional limitations, it is important for the central government and local governments to work together to establish a strategy to secure professional digital manpower.

Case Study 4. Digital Education Program for Reinforcing Digital Competency of Civil Servants in the Republic of Korea

In 2021, the Government of the Republic of Korea started to provide its first online Digital Education Center (Academy), an integrated education programme in Nara Learning Center. It contains approximately 640 customized educational materials to strengthen the digital utilization capabilities of central and local public officials and provides one central place for any public official in the Republic of Korea to easily access digital competency education materials.

The programme is provided through the online education platform operated by the government e- learning platform (https://e-learning.nhi.go.kr), with the National Human Resources Development Institute, an institution affiliated with the Ministry of Personnel Management of the Republic of Korea, which oversees affairs related to education and training, R&D and evaluation, exchange and cooperation for public officials.

The Digital Education Center (Academy) is designed to effectively support the digital new deal innovation and information (data)-based administration vitalization promoted by the government, and to cultivate digital information thinking and utilization capabilities for public officials. It defines the digital competency required in the front-line work environment and categorizes the learning areas to form a digital education system specialized for public office.

Contents for the Digital Education Institute (Academy) are carefully selected in collaboration with 54 organizations, including the Ministry of Public Administration and Security and the Korea Press Foundation. The education categories include: information (data) literacy, media literacy, communication and ethics, and digital flow and technology. Customized training guides are tailored for specific positions such as practitioners, managers (leaders), and strategists (senior positions). Services also are tailored to the individual learner according to required learning areas and competency levels.

To help learners deepen their digital competencies, the programme also links with the digital-related curricula of specialized educational institutions such as the Statistics Education Institute and the Korea Intelligent Information Society Promotion Agency. There is also a function that promotes peer learning and communication between learners by allowing public officials to share educational materials.

Source: Hye-seong (2021).

Figure 6. Civil Servants Digital Competencies Matrix Model

Level	Competencies	Competencies nature	Job categories			
			Managers	Assistants	Experts	Supporting Specialists
Basic	to use ICTs (e-mail, social networks, and mobile media) to communicate and exchange information	communication	✓	✓	✓	✓
	to work in a team through information communication channels	communication	✓	✓	✓	✓
	to work in interdisciplinary groups and projects	communication	✓	✓	✓	✓
	to follow the rules for filling out documents when working on projects with ICT	technical	✓	✓	✓	✓
	to apply data analysis in public administration, including large amounts of information analysis	technical	✓	✓	✓	
	to apply general knowledge of working with a personal computer (office software)	technical	✓	✓	✓	✓
	to use antivirus programs	technical	✓	✓	✓	✓
	to act in accordance with the transparency and accountability principles	technical	✓	✓	✓	✓
	to use different sources to find the necessary information for solving professional tasks	technical	✓	✓	✓	
	to understand the state bodies informatization specifics in accordance with industry characteristics	technical	✓	✓	✓	
	to assume responsibility for the management of public resources, including information and technology assets	technical	✓	✓	✓	✓
	to understand the social networks use legal and regulatory aspects	technical	✓	✓	✓	✓
	to be able to apply the legislation on the protection of personal data during working process	management	✓	✓	✓	
	to perform universal functions for the EP services provision to interested citizens and commercial organizations	management	✓	✓	✓	✓
	to have skills in working with security protocols	management	✓	✓	✓	✓
Advanced	to monitor changes in information systems and adapt to them professionally	management	✓	✓	✓	
	to be able to establish communication with various categories of citizens and legal entities	communication	✓	✓	✓	✓
	to create processes based on information and communication technologies	technical	✓	✓	✓	
	to actively use ICT to solve complex applied problems	technical	✓	✓	✓	
	to coordinate the employees actions with the help of special software	management	✓	✓		
	to be able to systematize and verify the received data using ICT tools	management	✓	✓	✓	
	to apply digital technologies in working with the public procurement and contracts system	management	✓	✓	✓	

Civil Servants Digital Competencies Matrix Model

Level	Competencies	Competencies nature	Managers	Assistants	Experts	Supporting Specialists
Advanced	to plan and control key processes based on information and communication technologies	management	✓	✓	✓	
	managing risks and organizational changes associated with the use of ICT	management	✓	✓		
	to consistently manage all e-government components development, i.e. data, processes, regulatory framework, technical infrastructure and personnel	management	✓	✓		
	to work as a team in a multi-disciplinary data group empowered to develop new technologies	management	✓	✓	✓	
	to participate in the feasibility of introducing new technologies and initiatives assessment in the service in the field of ICT	management	✓	✓	✓	
	to realize the need for continuous professional development in the information and communication technologies field	management	✓	✓	✓	
	to implement ICT in the personnel management system	management	✓	✓	✓	
Special	To understand cloud technologies and their advantages	technical	✓	✓		
	to participate in the public administration new technologies development	technical	✓	✓		
	to have professional computer skills (to work with specialized software)	technical	✓	✓		
	to manage the ICT projects implementation	management	✓	✓		
	to know modeling on the IT technologies basis	management	✓	✓		
	to optimize business models in the e-government system	management	✓	✓		
	to simulate key administrative processes for the information analysis purpose	management	✓	✓		
	to solve the ICT implementation problems in various ways, including creative ones	management	✓	✓		
	to adapt digital innovations to their work functions and the service delivery technologies development	management	✓	✓		
	to identify the public administration systems innovative development reserves and design the strategic development directions	management	✓	✓		
	to formulate the information technology challenges faced by organizations and their impact on results	management	✓	✓		
	to understand how to hire, select, and manage IT consultants and staff	management	✓	✓		

Source: Oborin (2021) p.591-592 revised for this handbook

Actions/Steps

The following are suggested actions/steps for local governments to improve digital manpower:

Human Resource Strategic Plans

- Forecast demand and supply for digital manpower; create plans to match future supply and demand
- Define future activity levels and demand new digital skills
- Assess the digital manpower within and outside the organization

Work Environment

- Analyse the work environment
- Utilize digital workers to increase flexibility to respond to variability
- Make the best use of people and adapt swiftly to changing environments

Talent Management

- Use an integrated set of activities to ensure that talented digital workers have the sequence of experience supplemented by coaching and learning programmes that prepare them for demanding roles in the future
- Provide the basis for career planning and development so that digital staff have the opportunity to develop their roles by making better and expanded use of their talents

Retention

- Understand factors that affect the turnover of digital workers in the public sphere; Consider performance recognition and rewards and learning opportunities
- Analyse the reasons staff leave; deal with uncompetitive, inequitable or unfair pay systems; provide opportunities for learning and growth

Recruitment

- Design specific job descriptions and decide on terms and conditions of employment for external experts
- Develop a referral program to attract candidates from outside the local government

Chapter 5: Reshape the Digital Organizational Structure of Local Government

Expected Learning Outcomes

Learning outcomes for this chapter include:

- Readers are introduced to three types of organizational structures for digital innovation;
- Readers are introduced to approaches and strategies to reshape the digital organizational structure of local government.

Approaches

Factors that indicate the degree of importance and influence on decision-making that digital innovation takes in an organization include the location, independence and authority levels of staff, size of the workforce, especially the IT staff, and the financial resources of the departments leading the digital transformation. The various attributes of these digital innovation-led departments provide information on how the organization prioritizes digital innovation in its strategies (Nasi et al., 2011). The level of professionalism of the members of the department leading the digital innovation can improve the confidence and willingness of all members of the organization to use digital technology and can reduce anxiety and resistance to digital innovation (Damanpour, 1987).

Many local governments currently separate policy planning/adjustment and execution/management functions or distribute those functions in different departments for each sub-area of digital innovation (See Figure 7, Decentralized Structure). With such a structure, it is difficult to effectively manage digital policies, secure synergy between areas of digital innovation, or obtain sufficient cooperation and coordination between departments on issues such as the design of digital policy projects, feasibility studies and exploration of related new technologies. As a result, in those cases, digital innovation is not being effectively implemented. Despite the quantitative expansion and qualitative diversification of digital demand, few digital innovation-led organizations exist in local governments. Many local governments see their IT staff as being mainly responsible for support/cooperation functions, with limitations on their functions across digital administration.

To successfully promote the digital transformation of local governments, jobs of related organizations need to be redistributed, and the organization needs to be redesigned accordingly. Measures to do so include establishing a department or a separate independent organization that can integrate and perform all digital innovation-related functions (See Figure 7, Centralized Structure). It may also be possible to introduce a kind of matrix organization that performs a 'control tower' function for digital innovation planning and development in each department, leaving the informatization function of the existing departments intact (See Figure 7, Federal Structure).

Figure 7, Federal Structure

Source: KOSTAT (2010) revised for this handbook
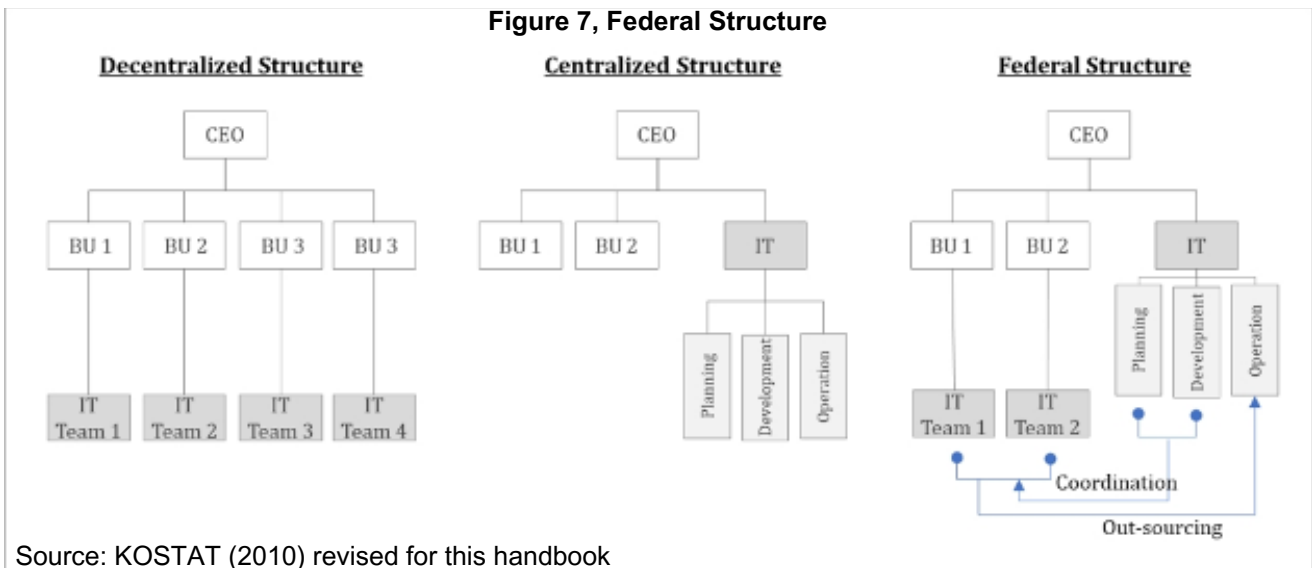
Strategies

Local government circumstances and characteristics should be considered when deciding on the type of organizational structure to be introduced. An integrated structure, such as a centralized or federal one, is more appropriate than a distributed structure when a local government needs to maximize resources and capabilities. When local governments lack experience and expertise in using digital technology, they need to build an organizational system that enables smooth and rapid collaboration with the private sector. For that to take place, an integrated structure with a high level of decision-making authority is advantageous. A system needs to be established that supports integrated goals being pursued across departments through a goal-driven project management framework at the local government level (Huang & Karduck, 2017; Sarantis, Charalabidis & Askounis, 2011). A problem-solving-oriented organizational structure that can overcome silos between individual departments is needed.

Digital policies dealing with the convergence of new technologies and policies are complex. They require a creative approach, organic cooperation and communication and coordination between departments. The federal structure creates a digital team based on digital organizations for each work area without establishing a new independent organization, thereby reducing conflicts between departments. It guarantees mutual communication between departments and increases the feasibility of successful organizational restructuring.

Willingness and ability to share information between departments are critical variables for successful digital transformation (Huang & Karduck, 2017). Local governments also need to build an integrated database that allows for information to be exchanged within the organization (Huang & Karduck, 2017). When building such an integrated database, a process needs to be developed that gathers all data in a standardized format. This will prevent data duplication and conflict, ensure consistency of measurement, simplify data aggregation, and facilitate enforcement and reconciliation efforts (Huang & Karduck, 2017).

Case Study 5. Indiana Management Performance Hub

In the mid-2000s, the organizational structure of the government in the state of Indiana in the United States was reorganized to respond to a need to better use the data it created, held and managed. To achieve its goal of providing a higher quality of service at a lower cost, the Government of Indiana initially decided to establish a separate department focused on data-driven analytics.

Nearly a decade later, in 2017, the Governor of Indiana signed the Data Act, which officially codified the establishment of the Indiana Management Performance Hub (MPH) as an independent state agency with the power to collect, analyze and exchange data from any state agency. Under the law, Indiana's Chief Data Officer (CDO) oversees the MPH and advises state agencies on best practices for data maintenance, security and privacy. MPH requested all government institutions to comply with the data standardization and established and distributed information protection policies with which each institution must comply.

MPH has an integrated Education and Workforce Development database, which contains information from 12 state agencies, including the Commission for Higher Education, Department of Education, Department of Health, Department of Corrections, Department of Workforce Development and Family and Social Services Administration. Based on this database, MPH also has created an integrated database to support key decision-making of state agencies on important policy issues such as COVID-19, Medicaid, and fiscal transparency.

By having a consolidated IT organization in the Indiana Office of Technology, MPH is designed to work using the IT infrastructure within each state agency without separate approval. While the state agencies own the data, and all original copies reside in a protected security zone, MPH uses a cleaned and normalized copy for its operation.

Source: Results for America (2020), NASCIO (2020).

Actions/Steps:

Local governments can take the following actions/steps to redesign their digital organizational structures:

Solidify Digital Vision and Strategy

- Find out why the local government wants to redesign its digital organizational structure
- Understand the new directions that the local government is heading and define the problems that need to be urgently solved through digital transformation
- Build the strategic plans for digital transformation using a variety of tools such as strengths, weaknesses, opportunities and threats (SWOT), short-to-mid-term goals (at the levels of organization, department and individuals), and key performance indicators

Diagnose Current Organizational Structure, HR, Process and Technology

- Create an organizational chart showing the current structure's strengths and weaknesses for a digital strategic planning process
- Analyse digital staff levels, required digital skill sets, and digital leadership
- Determine the potential gaps between future demand for digital transformation and current workforce capabilities
- Assess the digital policies and processes in the local government focusing on efficiency, effectiveness, consistency, formalization and accountability
- Find any unclear procedures and inconsistent policies that can lead to inefficiencies
- Document information flows along the work processes
- Review all systems' interfaces and interconnectivity and look for ways to improve them
- Identify existing automated processes and areas for further automation

Design a New Structure

- Design a first draft of a new organizational model considering lines of authority, decision-making systems, attributes of employees, definition and distribution of the digital function and different types of organizational structure
- Consider governance and functional alignment related to digital transformation
- Develop a structure that can foster a culture enhancing collaboration and interdependencies based on digital technologies

Communicate with Members

- Share the first draft of the reorganization model, including old and new organizational charts, with members of the local government
- Communicate with members and ask for their feedback on the proposed draft, answer their questions and encourage their participation in the reorganization process

Execute and Adjust

- Prepare a change management model to help members adjust to the reorganization
- Execute the organizational restructuring
- Adjust the new structure as needed to meet digital strategy goals

Summary and Concluding Thoughts

Summary and Concluding Thoughts

This handbook defined digital transformation and discussed the organizational management factors that lead to successful digital transformation in local governments to achieve the Sustainable Development Goals (SDGs) and implement the 2030 Agenda for Sustainable Development. Specifically, this handbook has focused on leadership, human resources and organizational structure for the digital transformation of local governments. Several case studies about local innovators' digital leadership have been shared, along with practical exercises and actions/steps to implement digital transformations of local governments.

In Chapter 1, the concept of digital transformation was introduced, and a digital government maturity model was shared. While previous literature has focused on the technological aspect of digital transformation, this handbook focuses on the public aspect of digital transformation in local governments. By leveraging digital technologies, local governments can provide public services more effectively, strengthen public organizations and create new public values. The digital government maturity model shared suggests a development process of digital government that leads to evaluating the degree of digital transformation of local governments.

In Chapter 2, success factors for the digital transformation of local government were examined. Factors involving internal and external actors must be considered. Internally, major innovators who have strategic plans and human and material resources are needed. Externally, various stakeholders and institutional restrictions that can prevent local governments from initiating digital transformation must be addressed.

In Chapter 3, the concept of digital leadership was introduced, and effective digital leadership for digital transformation was investigated. A checklist was provided to evaluate digital leadership roles, along with a competence self-assessment for digital leaders. A digital leadership training matrix also was provided. Specific actions were suggested to establish the vision, communication skills, adaptability, digital literacy and innovation for digital leadership.

In Chapter 4, ways to improve the digital manpower of local government were investigated, and a competencies matrix model was shared to design education programmes and train civil servants. Five steps are suggested to enhance digital competencies in local government: create a human resource strategic plan to match future demand and supply; analyse the work environment; talent management, making use of the extended talents of civil servants; improve workforce retainment; and recruit an additional workforce with the necessary skill sets.

In Chapter 5, three types of organizational structures for digital innovation were introduced (decentralized, centralized, and federal), along with structures and strategies to reshape the digital organizational structure of local government. Specific actions local governments can take to reshape their digital organizational structure include: collecting data to prepare action plans; engaging in team building and linking individual behaviour and outcomes; analysing the potential impact of change; and creating and communicating a new vision to drive behaviour that leads to organizational transformation.

This handbook has several limitations. The cases presented are for countries with their own cultural and demographic characteristics. And the handbook focuses on only three of the factors (leadership, human resource, and organizational structure) among many that lead to the successful digital transformation of local government.

That being said, this handbook provides a good guide and basis for local governments to prepare for digital transformation. The information, case studies and action steps shared can increase understanding of important factors that play a role in digital transformation. The handbook provides a foundation for further work to localize digital innovation and explore other key factors to achieve successful digital transformation.

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