ECLAC Methodologies

Guide for establishing a governance framework for digital government in the countries of Latin America and the Caribbean

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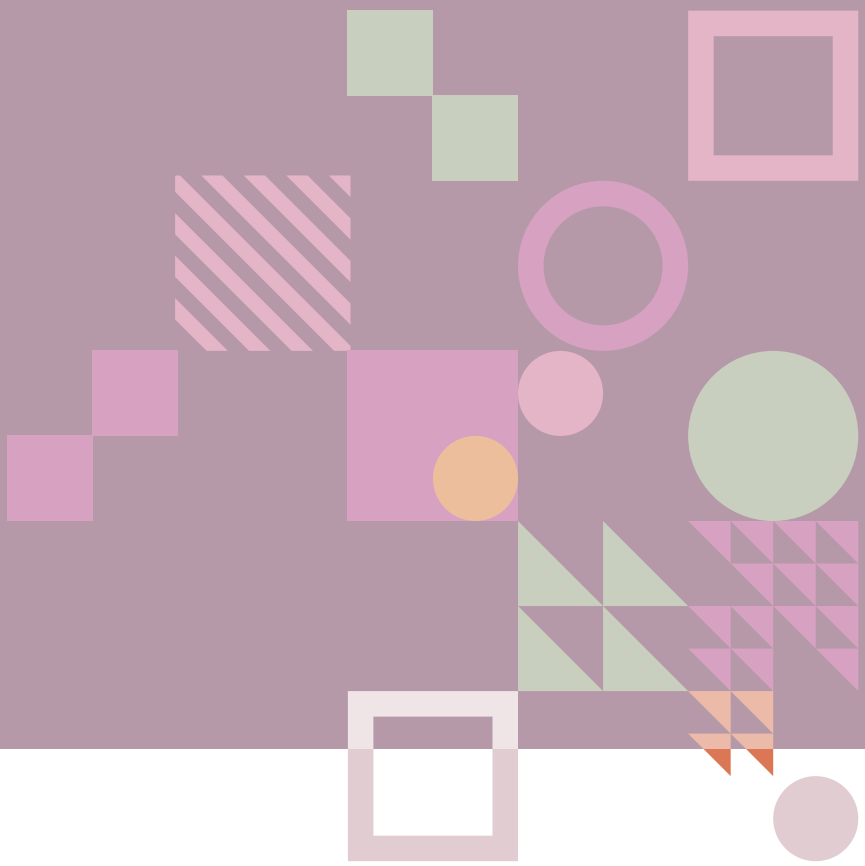

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José Manuel Salazar-Xirinachs
Executive Secretary

Javier Medina Vásquez
Deputy Executive Secretary a.i.
Officer-in-Charge, Latin American and Caribbean Institute
for Economic and Social Planning (ILPES)

Sally Shaw
Chief, Documents and Publications Division

The preparation of this document was coordinated by Valeria Torres, Chief of the Public Management and Open Government Area of the Latin American and Caribbean Institute for Economic and Social Planning (ILPES) of the Economic Commission for Latin America and the Caribbean (ECLAC). The content was prepared by Alejandra Naser, specialist, and Francisco Méndez Sanhueza, consultant, both with ILPES.

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Introduction

Since the start of the twenty-first century, the countries of Latin America and the Caribbean have been working on a series of ambitious digital transformation projects aimed at developing an integrated suite of online government websites to allow people to obtain information, conduct all sorts of administrative procedures and other formalities, and access government services. The objective of this effort is to make public administration more transparent, effective and democratic.

More recently, the introduction and refinement of emerging technologies such as artificial intelligence, machine learning, the Internet of Things and blockchains are further redefining skills and economic opportunities. These innovations are driving process automation, boosting operational efficiency and facilitating big data analytics. The resulting technological and digital transformations are capable of diminishing the Latin American and Caribbean countries' legacy of development traps and gaps by opening up a wide range of opportunities, including opportunities for increasing productivity, strengthening connectivity, leveraging human talent and enhancing the well-being of the population (Economic Commission for Latin America and the Caribbean [ECLAC], 2024b).

While great strides in the development of digital technologies had been made in the years leading up to 2020, it was only then, with the outbreak of the health, economic and social crises triggered by the coronavirus (COVID-19) pandemic, that it became clear that it was absolutely necessary for governments to swiftly step up their use of these technologies in order to provide online access to public services and government processes and procedures. Digital government strategies have thus had to be strengthened and have not only changed the way the government is run but have also been reshaping how it goes about administering, planning, providing information and, most of all, dealing with the public. The findings of the most recent United Nations E-Government Survey (United Nations, 2024) reflect the efforts that governments have been making to secure

the public's active involvement in e-consultations. Successfully matching up public policies with the capabilities offered by advanced technologies creates a unique opportunity for governments to foster an inclusive, sustainable and forward-looking form of development.

On a number of different occasions, the Economic Commission for Latin America and the Caribbean (ECLAC) has made the point that information and communications technologies (ICTs) are not enough in themselves to make public systems more efficient and effective; they must be paired with other key elements in order to achieve those objectives. ECLAC has therefore been underscoring the importance of the institutional, cultural, policy, organizational, leadership and technical elements that can help to consolidate governments' digital development process. Technologies have to be adapted to the needs of people and organizations, and new types of knowledge have to be embedded in order to underpin evidence-based decision-making and data-driven policies that will open the way for what is now being called "smart government".

This guide seeks to provide a holistic picture of the components of governance, digital government and government interoperability, along with their interrelationships, interdependencies and purposes, within the framework of a model for generating public value. The aim is to offer an overview of the relevant issues by providing guidance, describing best practices, outlining solutions for common problems and presenting concepts and models that integrate each component into a coherent whole and that add value to the aggregate of all these elements.

The proposed model is the outcome of more than a decade of technical assistance missions to Latin American countries seeking to close the gaps that hinder their progress or block them from making headway in these areas, with all the consequences for society that this entails. While the model is based on the experiences of countries in Latin America, it can also be adapted to the geographical, demographic, territorial scale, capacities and political and legislative structures of the countries of the Caribbean subregion.

Chapter I
The context

Recent technological advances are posing formidable challenges and, at the same time, opening up new opportunities in the areas of public policy, governance and digital government. In order for institutions to play the predominant role that they are called upon to perform, however, they must have a proper institutional structure and sufficient resources and capabilities to bring about a substantive digital transformation. A transformation of this type will make it possible to fulfil the expectations of the population and avoid the frustration that some people feel if they already have access to these technologies but see that government offices are not making use of them to generate public value more effectively and efficiently. As part of this transformation, the State will need to adopt a holistic approach focusing on the intra- and inter-institutional creation of public value and on placing people at the centre of government action.

It is up to the State and to the government officials tasked with making use of these advances in digital technologies to make sure that technological innovations yield tangible benefits for the citizenry and contribute to the countries' prosperity. The skills, capabilities and resources available to them will play a crucial role in making this transformation a reality. Unless there is a genuine focus on building skills and capabilities and on attracting the required talent, efforts to meld advanced technologies with forward-looking public policies may not be as successful as they could otherwise be. A country's ability to innovate and adapt to new technologies is inextricably linked to the quality and availability of its human capital. What the future may bring will depend on how these and many other uncertainties are resolved in the coming years.

According to the Economic Commission for Latin America and the Caribbean (ECLAC, n.d.), digital development —understood as a form of development that leverages digital technologies in the various areas of social and economic life in order to contribute to a productive, inclusive and sustainable national development process— has the potential to increase the well-being of individuals, boost the productivity of businesses, enhance the efficiency and effectiveness of States and support environmental sustainability, thanks to the synergy of its three dimensions:

(i) A connected economy and society: digital infrastructure

- Deployment of digital infrastructure (fixed and mobile broadband Internet networks, Internet exchange points (IXPs) and data centres, the Internet of Things (IoT)).
- Widespread use of access devices (desktop computers, laptops, tablets and smartphones) and IoT sensors.

(ii) A digital economy and society: digital platforms

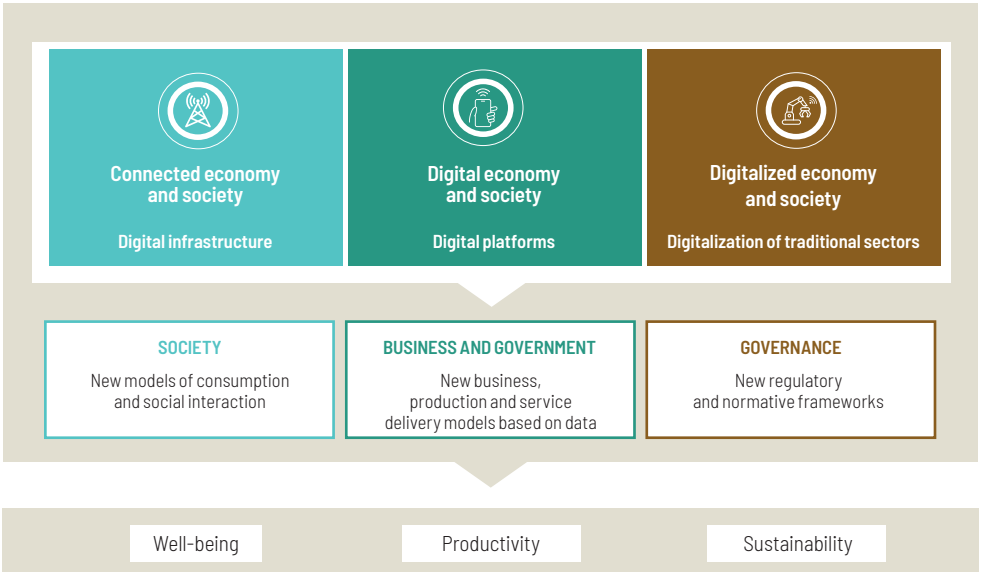
- Economic production based on business models actuated by digital platforms that foster the generation and use of data to develop new value propositions relating to goods and services.

(iii) A digitalized economy and society: digitalization of traditional sectors

- The adoption of advanced technologies by agents in traditional industries that engender new business and production models involving the reconfiguration of their value chains and the transformation of their products and services, which, in turn, have knock-on effects on forms of industrial organization.

Diagram I.1 depicts the different dimensions of digital development:

■ Diagram I.1
Dimensions of digital development



Source: Economic Commission for Latin America and the Caribbean. (n.d.). Digitalization for sustainable development. https://desarrollodigital.cepal.org/en.

Digitalization is transforming the economy and society by facilitating changes and innovations in business, production, public service, and social interaction and communication delivery models. Digital economies and societies are taking shape in which educational, health, production, marketing, entertainment and other forms of activity are increasingly based on the use of an assemblage of different digital technologies. This disruptive process is giving rise to a new, digitally interwoven system marked by the interaction of the analogue and digital worlds. This is engendering complex ecosystems whose organizational, institutional and normative structures are continually evolving and adapting. Within this framework, human- and machine-generated digital data are taking on a central role in value creation. The utilization of those data should take place within a suitable governance framework that includes appropriate normative and institutional structures for ensuring that they are used within a secure environment in ways that respect people's rights.

In recent decades, the technological strides made in data capture, storage, transmission and analysis have paved the way for the development of new technologies such as cloud computing, big data analytics, IoT, artificial intelligence, blockchain technologies and more. As noted by ECLAC (n.d.), innovation cycles are becoming shorter and shorter, while the technologies involved are becoming more and more sophisticated. The combination of these two phenomena is permitting the development of novel applications that are driving progress in the countries and creating value while, at the same time, posing policy, regulatory and institutional challenges.

As noted earlier, value creation is based on the knowledge acquired from the analysis of the digital data captured from production and consumption processes by smart systems employing advanced digital technologies such as fifth generation (5G) mobile networks, IoT, edge computing, big data, artificial intelligence, virtual and augmented reality, cognitive robotics and more. All this is prompting governments to embrace anticipatory governance with a view to generating the public value that is expected of them.

Chapter II
The need for governance

As the Economic Commission for Latin America and the Caribbean (ECLAC) has observed, digitalization can be a powerful tool for addressing structural problems in the region in such areas as education, health, security, justice, institution-building, changing production patterns and many more. Nevertheless, it can serve as such a tool only if it is embedded in national development strategies within an appropriate governance framework as part of a systemic approach designed to prevent it from becoming yet another driver of inequality. National initiatives also need to be backed up by regional agendas and regional efforts focusing on the same objective (Salazar-Xirinachs, 2023). In addition, as also noted by ECLAC, without an overarching vision of digitalization, its potentially positive impacts can be transmuted into negative ones in terms of competitiveness, concentration and inequality. Thus, its net impact will depend on how aware governments are of the importance of the digital transformation and on whether suitable policies are in place for steering digitalization processes towards the advancement of a sustainable development process for the region (ECLAC, n.d.).

An inefficient State is a source of frustration both for the public at large and for the government employees who have to put up with the complications associated with institutions that are operating in silos and that mainly use analogue procedures alongside unintegrated digital components, obsolescent technologies that are difficult to maintain and inconsistent data that are riddled with duplications. This situation is compounded by the fact that, in many cases, the authorities are faced with a disconnect between the strategic importance of the digital transformation and the meagreness of their budgets. Further complications, in some cases, include the presence of knowledge and skill gaps and the absence of a model of a modern State that could guide decision-making in this area.

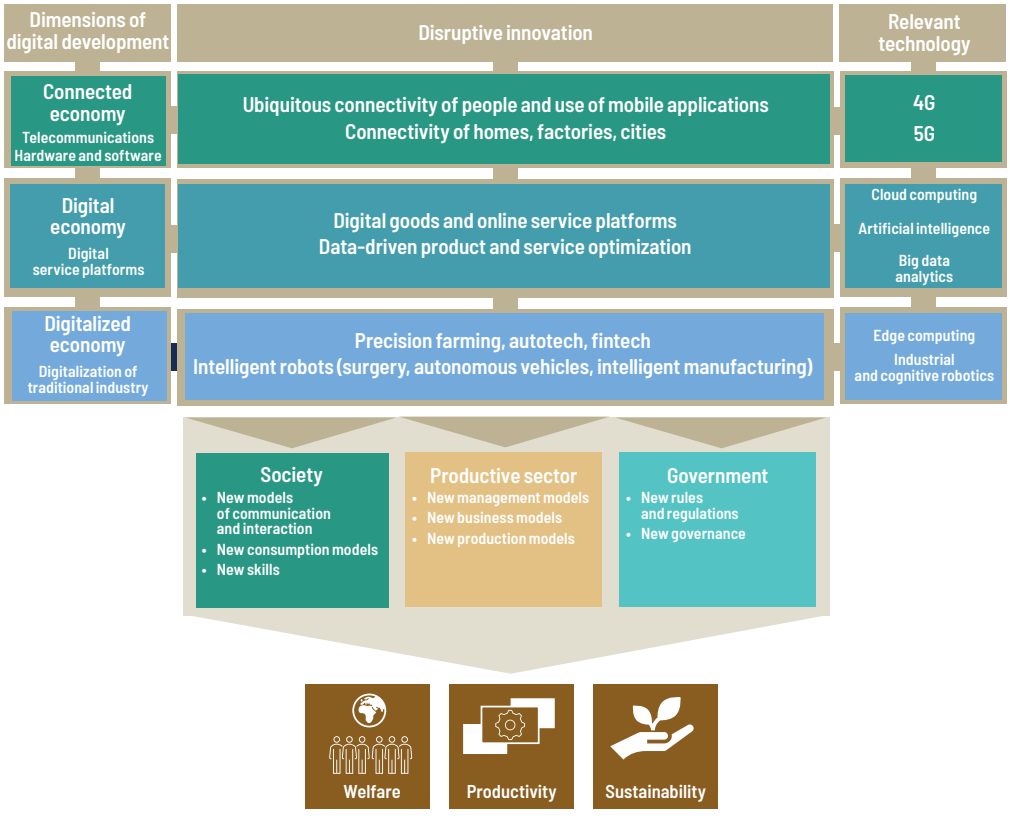
Development policies in the digital era have to be adapted to this technological transformation and should thus be focused on building the digital skills of decision makers, civil servants and the general public and on promoting education in the fields of science, technology, engineering and mathematics (STEM) in order to expand the pool of technology specialists. The future will be a digital one, and the State will therefore need to be equipped with the necessary tools to make the best possible use of digitalization in order to strengthen social protection and improve the quality of people's lives.

In order for the State to adopt a forward-looking stance and ready itself for the implementation of digital policies, an appropriate form of governance will be needed for the coordination of policy actions. It is not simply a matter of devising cross-cutting technological solutions; national strategies will be needed in order to successfully take on these challenges and to do so in a way that will have the best economic development and growth outcomes. A digital transformation process that includes a synergistic feedback loop linking up its various dimensions will be needed in order to have the desired effects on society, the production apparatus and the State. In order for this to be brought about, the countries will need to adopt a systemic approach that encompasses the interrelationships between digital systems, on the one hand, and innovation, an improved user experience and complex problem-solving capacities within the digital world, on the other.

The Commission's Digital Development Observatory (ECLAC, n.d.) has mapped out the various dimensions of this systematic approach:

■ Diagram II.1

Dimensions of digital development and its disruptive effects on society, the production sector and the State



Source: Economic Commission for Latin America and the Caribbean. (n.d.). *Digitalization for sustainable development*. https://desarrollodigital.cepal.org/en.

Given the various dimensions of the proposed digital development path and the characteristics of the necessary forms of disruptive innovation, ECLAC has been identifying relevant technology and adapting the technical assistance and training in the areas of digital government and smart government that it furnishes to the countries of the region. It has thus developed a framework based on a model for public value creation that encompasses and integrates the different components of digital government and governance, government interoperability and the associated interrelationships, interdependencies and objectives. The central purpose of all this is to provide more and better tools for the design of empirically based public policies that will give rise to a sustainable development process.

A. The concept of governance

As has been noted by the Executive Secretary of ECLAC, the region is undergoing a true development crisis marked by three main development traps or syndromes (Salazar-Xirinachs, 2023) that hinder its efforts to take on the development challenges it faces. One of these is the trap of low institutional capacity and ineffective governance. ECLAC has taken the position that it is not enough simply to identify that development trap and point out what needs to be done to overcome the entire range of development challenges confronting the countries of the region; close attention has to be paid to exactly how to go about doing so. Consequently, ECLAC is focusing its greatest efforts on systematically setting out the specific steps that need to be taken to improve public policy governance and to build up the technical, operational, political and prospective (TOPP) capabilities of the region's institutions, alongside the issues of social dialogue, political economy reforms and financing (Salazar-Xirinachs, 2023).

The modernization of the public administrative structure is a decisive factor in the effort to build governance capacity. According to Jorquera (2015, p. 2), good governance provides a way of strengthening the horizontal relationship between a plurality of public and private actors and thereby improving decision-making and the management and development of public and collective affairs by greatly intensifying their integration and interdependence.

As proposed by Whittingham (2010), there are two approaches to governance: one that focuses on the State, and one that embodies a polycentric perspective and focuses on other actors within the system.

The State-focused approach to governance defines it as the art of public leadership, with the State cast as the leading actor. The political system, public management and government capacity are therefore critical elements of good governance (Whittingham, 2010). Governance is thus a function of the State and involves steering society along a coherent path. This function is independent of changes in the government's structure brought about by decentralization and democratization processes (Peters, 2000, as cited in Whittingham, 2010).

A polycentric approach to governance defines it as a process involving the State, civil society and the private sector, although the roles assigned to each of those groups are quite different (Whittingham, 2010, p. 221).

On the basis of the framework developed by Whittingham, ECLAC has proposed the following definition of governance: The management of relationships among various actors involved in decision-making, implementation and the assessment of matters having a bearing on the creation of public value. This process involves both formal and informal institutions and can be characterized as a power game in which competition and cooperation are both possible rules. The way in which these actors interact with one another reflects the quality of the system and influences each and every one of its components, as well as the system as a whole.

According to the Organisation for Economic Co-operation and Development (OECD), the reference to public value relates to:

> ... the various benefits for society, which may vary depending on the approach taken or the actors involved. They may include:
>
> - Goods or services that are desired by members of the population and clients
> - Production choices that are in line with people's expectations regarding justice, fairness, efficiency and effectiveness
> - Well-organized, productive public institutions that reflect the wishes and preferences of members of the public
> - Fairness and efficiency in distribution
> - Legitimate use of resources to accomplish public purposes
> - Innovation and adaptability to changing preferences and demands (OECD, 2014)

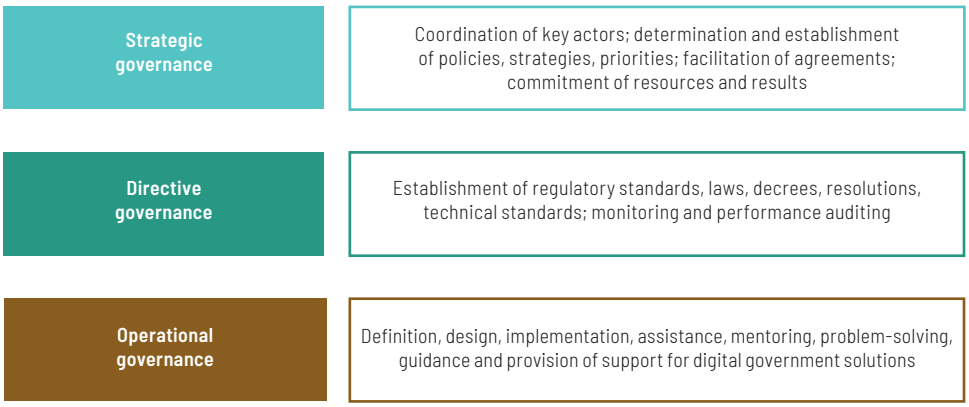
In the light of the new horizons opened up by emerging technological trends and the resulting expectations on the part of the public, the countries of the region will need to re-examine their governance strategies. Within the framework of the definition set out above, ECLAC proposes considering governance as consisting of three hierarchies, as shown in diagram II.2.

The actions taken in each area of governance contribute to the flow of coordinated cycles of actions and actors with a shared aim and purpose that will help to ensure that the digital development policy will be a feasible one that generates the expected value. These cycles should flow both horizontally (solutions for the general public) and vertically (coordination of actors, resources and initiatives).

What is needed is a constellation of specialized components for planning and coordinating public policies dealing with specific subject areas that will benefit the population and further the country's development. These areas of governance need to be embodied in different groups or institutions. The former are made up of representatives of different agencies who come together in order to fulfil a stated purpose and have the necessary authority to do so. This applies primarily to the area of strategic governance and may take the form,

for example, of a council of ministers or a high-level commission dealing with strategic digital government issues. The relevant institutions, for their part, should be granted the specific regulatory powers and spheres of authority that they require in order to achieve their assigned objectives.

■ Diagram II.2
Hierarchies of governance



Source: Economic Commission for Latin America and the Caribbean, on the basis of Naser, A. (2021). Gobernanza digital e interoperabilidad gubernamental: una guía para su implementación. *Project Documents* (LC/TS.2021/80). https://hdl.handle.net/11362/47018.

The structure, scope, emphasis and authorities of each governance hierarchy will vary depending on the type of digital government strategy that each country adopts.

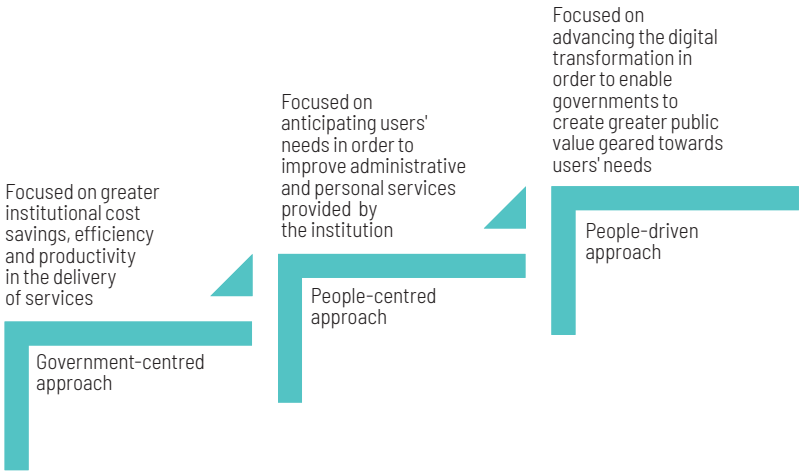
B. The strategy

The countries of the region need to adopt strategic approaches that allow for the involvement of the leading actors responsible for modernizing the State at all levels (ranging from coordination offices all the way up to sectoral ministries and public agencies) in establishing more effective coordination mechanisms, more solid capabilities and the framework conditions for enhancing the effectiveness of the use of digital technologies to generate public value and build greater trust among members of the population (OECD, 2014a). This needs to be accompanied by a change in the culture of the public sector that will move it away from a focus on the use of technology to help improve the way the public sector operates and towards the integration of strategic, technology-supported decisions concerning the development of broad strategies and programmes for overhauling and modernizing the public sector.

The governments of the OECD countries are shifting their approach regarding the delivery of digital public services from a government-centred to a people-driven model.

Three digital government strategies (that can be interpreted as representing differing levels of maturity) can be identified that have differing implications in terms of their implementation and outcomes for the population, as shown in diagram II.3:

■ Diagram II.3
Digital government strategies



Source: Economic Commission for Latin America and the Caribbean, on the basis of Organisation for Economic Co-operation and Development. (2014). *Recommendation of the Council on Digital Government Strategies*. https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0406.

In most cases, the relevant institutions in the countries of the region have reached differing stages in the process of implementing government- and people-centred approaches. The biggest differences are seen at the country strategy level and mainly in relation to the introduction of lateral technological solutions.

For illustrative purposes with a view to facilitating the implementation of the steps outlined in this guide, the approaches proposed by OECD will be detailed here (OECD, 2014a):

1. A government-centred approach

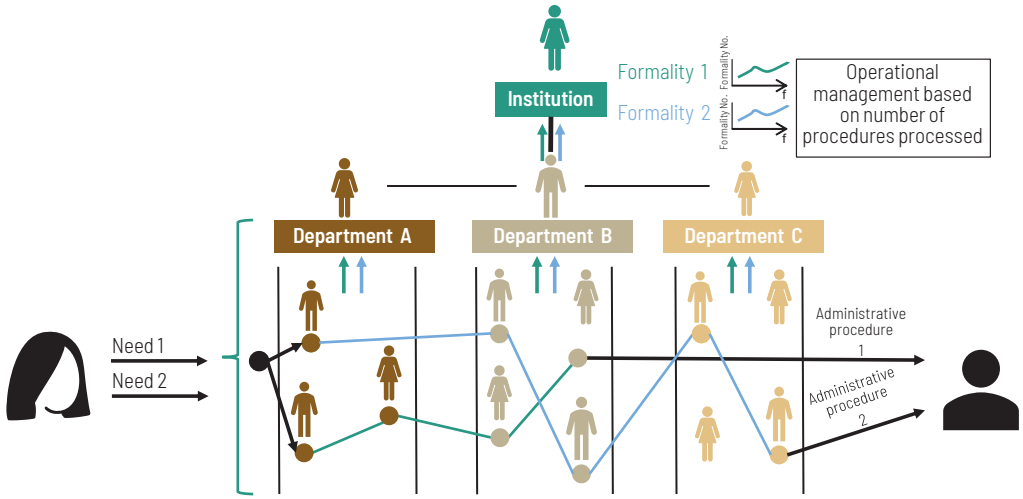
In this approach, each institution provides its own technological support for the administrative procedures[1] for which it is responsible and works (interoperates) with other institutions when necessary in order to optimize its internal processes. In the Commission's experience with the numerous technical assistance and training missions that it has carried out in countries

[1] Usually referred to as "formalities", with the connotation of processing paperwork (rather than resolving issues).

of the region, institutions tend to place priority on the use and acquisition of technologies that will support isolated in-house administrative solutions for internal operational needs or for conducting the procedural formalities for which they are responsible or delivering the services they provide.

Diagram II.4 depicts a departmentalized institution in which the focus is on responding to the needs of senior management (vertical blue and green arrows), and performance indicators are based on the number of administrative procedures completed in a given amount of time. This approach is centred around the civil service's structure, processes and hierarchies involved in attaining internal efficiency, complying with regulations and standards, and keeping things in order. Users have to figure out which institutions they should turn to, what requirements they will need to fulfil and how to communicate their needs to that institution. In other words, the institutions' procedures are not designed to accommodate citizens' specific needs, which can give rise to access barriers and hamper interactions between members of the public and the government service.

■ Diagram II.4
Digital government strategies: a government-centred approach



Source: Economic Commission for Latin America and the Caribbean.

The focus is on institutional governance, where the user is merely one more actor to be accommodated insofar as possible. The institutional fragmentation inherent in this approach means that users have to navigate between agencies on their own, without the benefit of any clear guidance as to how to get their needs met. As a result, users sometimes find themselves cast in the role of a government courier who gathers up documents and forms containing

information already in the hands of the institutions concerned and then takes those papers from one institution to another. In this approach, the formality or procedure as such is the central element and has both vertical components (in-house procedures) and horizontal ones (those related to the user). The former are associated with performance indicators that are generally regarded as being more important than the latter. In other words, performance is measured on the basis of outputs rather than results.

Introducing new technologies into institutions employing this approach tends to simply reinforce the traits just described while not necessarily improving the way the institution deals with users or modernizing its operations. This is known as an institutional digitization process (the same things are done as before, but digitally).

2. A people-centred approach

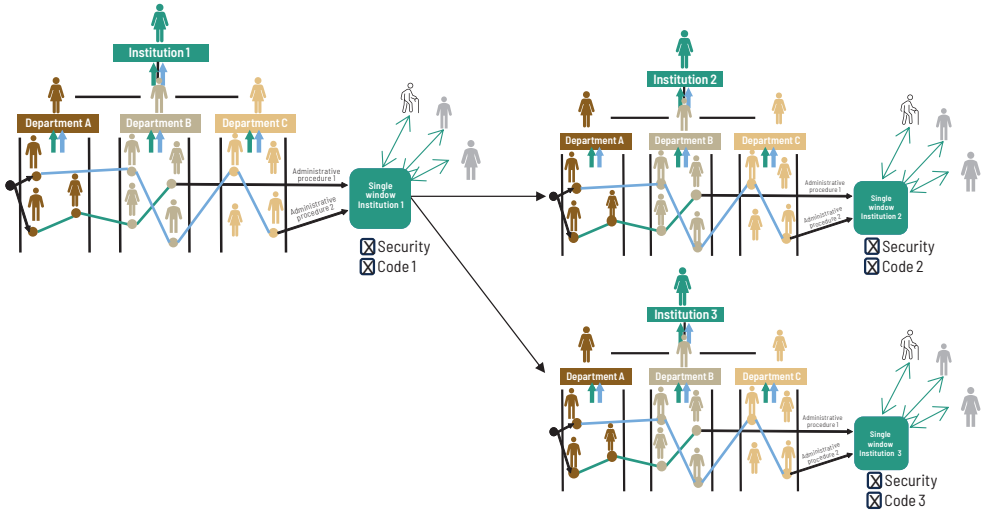
The people-centred approach goes a step further by placing priority on helping users to complete given administrative procedures and on using technology to support these efforts. However, it is still an approach that emanates from the institution concerned (working one-on-one with other institutions) and thus does not take all a user's needs into account but only those that fall within the purview of the particular institution itself. It is clearly a step in the right direction, but it does not necessarily fully meet a user's needs. This approach is mainly found in institutions that produce information (civil registries, tax units and offices of that nature).

Diagram II.5 illustrates the situation in institutions that have joined in the effort to improve user services by providing access to information stored in different institutions and reducing the need for users to go in person to different locations in order to complete administrative procedures. This type of integration is contingent upon the existence of bilateral agreements permitting the inter-agency transmission of information, however, which may take anywhere from a few months to years to conclude. Since this integration mechanism cannot function unless such an agreement is in place, institutions that have not entered into such agreements form bottlenecks in the service delivery pipeline. Unlike the government-centred approach, the institutions using a people-centred approach have created internal (and external, where agreements are in place) coordination mechanisms that enable them to conduct administrative procedures more rapidly and thus provide users with better service.

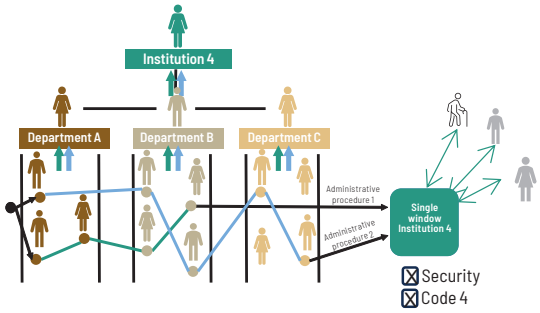
Technological solutions can streamline the internal processing of administrative procedures and make them more accessible to users. Since this is an institutional approach, however, the access and security solutions will be specific to each institution, and users will therefore still have to deal with multiple access codes and security mechanisms. Each institution will also still compile its own data, which may therefore not match up from one institution to the next.

■ Diagram II.5
Digital government strategies: a people-centred approach

A. Institutions with information-sharing agreements



B. Institutions without information-sharing agreements



Source: Economic Commission for Latin America and the Caribbean.

3. A people-driven approach

In this approach, there is an awareness of the fact that members of the public deal with the State when they have needs and/or responsibilities to fulfil (e.g. education, health, housing, identification, benefits and taxes). This approach ensures that different institutions will work with one another to provide people with prompt, efficient service. Government interoperability is therefore especially important so that different government offices can share information and collaborate on joint projects. These linkages are not always institutionalized in the countries of the region, however, and whatever entity takes on the job of coordinating those efforts requires the necessary authority, resources and institutional structures to get the job done.

Countries therefore need to have an established strategy for making this approach work. Since such a strategy has to cover strategic issues, regulatory matters and executory capacity, its implementation constitutes a challenge which will require a sustained effort over the long term in order for it to be met successfully.

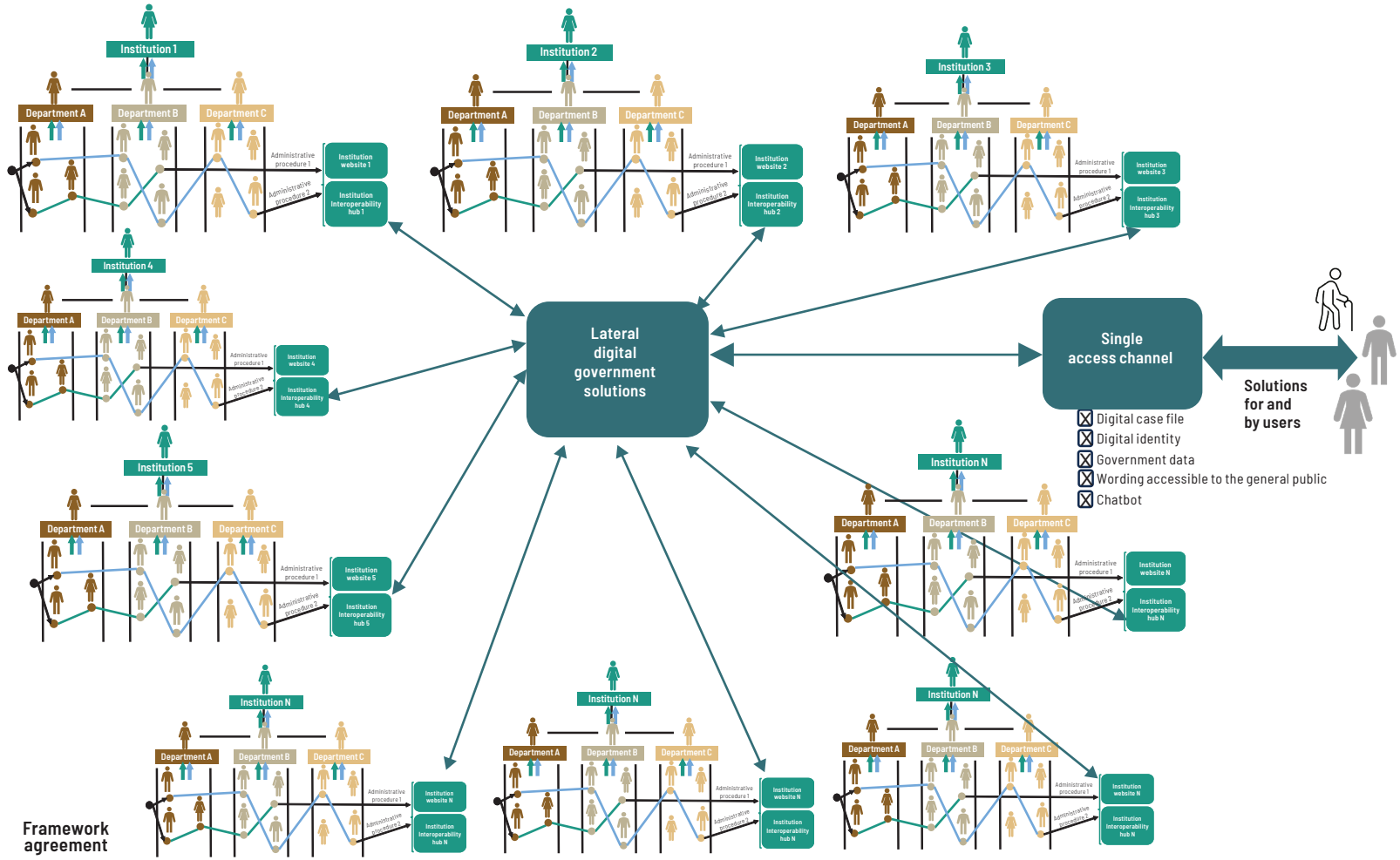
Diagram II.6 illustrates the fact that, in this approach, the emphasis is on arriving at solutions initiated by and serving the interests of the user. It involves an overarching view of the various institutions governed by a given framework cooperation agreement that provides for lateral solutions that are shared by all the institutions concerned (such as digital identification and signatures, a digital case file, interoperability, cybersecurity and a digital mailbox) and vertical solutions within each institution that are underpinned by the lateral solutions.

The centralized model depicted in diagram II.6 is simply a graphic design convention intended to illustrate the links between institutions. Similar models at the sectoral level are also available. What the figure is intended to convey is that the responsibility associated with having an integrated architecture to support cross-cutting solutions should reside in an institutional structure having sufficient authority to produce the desired results.

In order to accomplish this, a hierarchical governance structure is needed that can generate and actuate the necessary inputs and capacities in order to ensure that the necessary entities are in place and that the institutional structure is solid enough to bring about the digital transformation of a State (or civil service), with all the associated benefits that have been discussed in the foregoing pages.

The governance structure proposed by ECLAC is depicted in diagram III.2 and described in chapter III.

■ Diagram II.6
Digital government strategies: a people-driven approach



Source: Economic Commission for Latin America and the Caribbean.

Chapter III
An integrated digital government model

The digital government model proposed here has been designed on the basis of the experience gained by the Economic Commission for Latin America and the Caribbean (ECLAC) in the course of its training and technical assistance activities for countries of the region. This model is still evolving but has thus far been tested in three technical assistance missions[1] to countries having quite different profiles in terms of resources, infrastructure, skill levels, cultural aspects and digital development.

A. The purpose of the model

This model has been designed to provide an integrated, coherent view of the various components of digital government and governance in the context dealt with in this guide. The aim of this effort is to ensure that the digital transformation of the State improves the quality of life of the citizens of the relevant country and of the population in general and that it enhances the country's competitiveness while promoting the creation of public value.

B. Principles of the model

ECLAC has joined with other international organizations in stating that the development and implementation of robust, efficient digital government strategies needs to be conducted as an open process that draws upon the commitment, collaboration and participation of all

[1] Technical assistance missions to Costa Rica, the Dominican Republic and the Province of Córdoba, Argentina.

members of society within the context of a data-based culture and a holistic, inclusive and secure approach. Digital government reforms should also be backed up with leadership and with a political commitment to the strategy and to the coherent use of digital technologies in all areas of policy and at all levels of government. Effective organizational and governance frameworks are also needed to coordinate the implementation of multi-scale, multilevel digital government strategies with the help of broad-based international cooperation. The implementation of digital government strategies also requires people with the ability to develop, manage, monitor and evaluate implementation processes and to ensure that the acquisition of digital technologies is conducted under the proper legal and regulatory frameworks.

Based on these principles, six key drivers of digital government maturity have been identified that include the characteristics that the Organisation for Economic Co-operation and Development (OECD, 2019) has determined are crucial for the design and implementation of effective digital government strategies (see diagram III.1). According to this model, digital government should be:

(i) Digital by design: Digitalization is not seen simply as a technical topic, but as a mandatory transformative element to be embedded throughout policy processes and services.

(ii) Data-driven: Data are used and managed as key strategic assets, to be handled in a reliable and safe manner to create public value throughout the various design, service delivery and public policy cycles.

(iii) Government as a platform: Civil servants, working in an ecosystem that affords them shared, integrated tools and resources, can focus on meeting users' needs for public services.

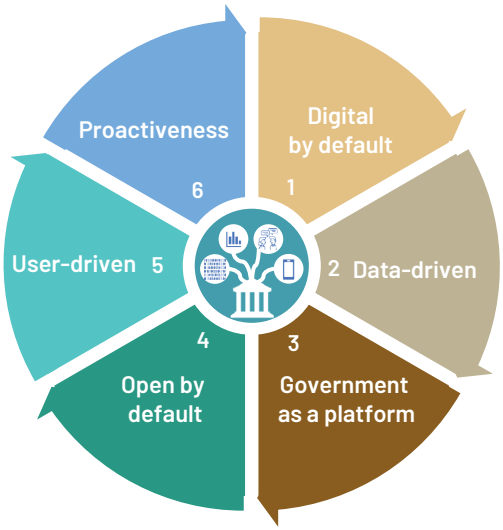
(iv) Open by default: Public policymaking processes and digital tools (including algorithms and government data) are made available to the public within the limits of existing legislation.

(v) User-driven: Processes, services and policies are configured around users' needs and best interests, and inclusive mechanisms that will allow this to be accomplished are used.

(vi) Proactiveness: Civil servants anticipate people's individual and collective needs and take action to respond to them rapidly.

The principles applying to artificial intelligence should also play a part in guiding the model's ethical, responsible implementation. Upholding the principles of transparency and explainability, fairness and equity, and data privacy and protection will promote the development and use of artificial intelligence in ways that will protect human rights and people's privacy and ensure fairness and transparency.

■ Diagram III.1
Digital government principles as identified by the Organisation for Economic Co-operation and Development (OECD)



Source: Economic Commission for Latin America and the Caribbean, on the basis of Organisation for Economic Co-operation and Development. (2019). *OECD Digital Government Index: 2019 results*.

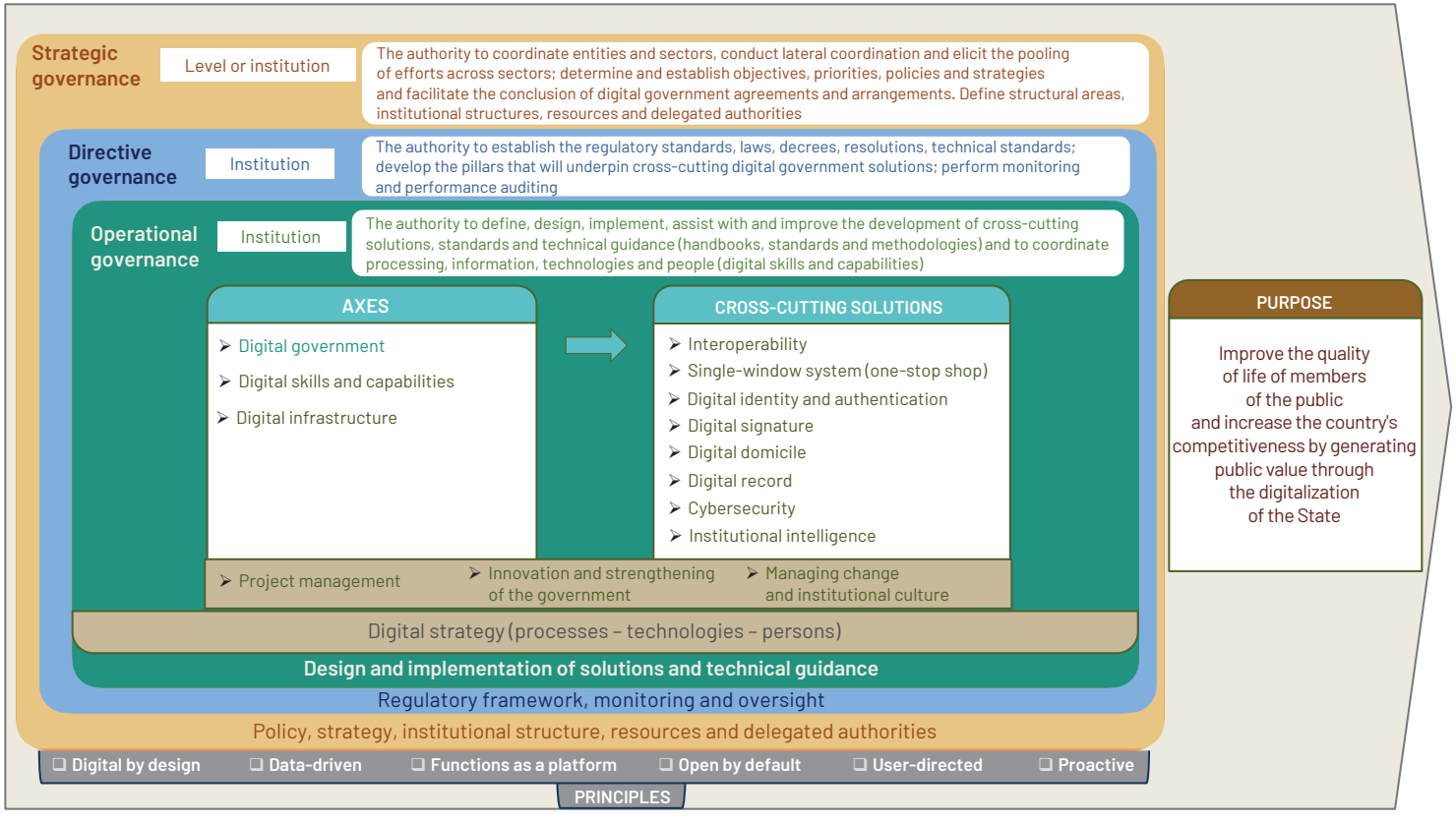
C. Governance framework

The proposed model can be represented by a set of relationships and interdependencies among various elements that will be described below. These elements can be grouped into a single image to illustrate the different dimensions of the concepts of digital government and governance (see diagram III.2).

This model is intended to provide an overview of all the elements that make up the concept of digital government and to facilitate the identification of its various components, the ways in which they relate to one another and their contexts. This will make it possible to identify gaps, interdependencies and the sequencing of measures needed to implement a set of initiatives for bridging those gaps and devising a strategic digital government and governance plan.

In the course of the various technical assistance missions, issues arose that underscored the relationships and dependencies existing among different components of the model. The need to define areas of authority and provide clear frames of reference also became clear. As those issues repeatedly came to the fore and practical solutions for them were found, an effort was made to establish a methodological and technical substructure to serve as the conceptual underpinnings for the proposed model. This process culminated in the definition of the components set out below. This model can then be used to plot out the sequence of the various steps to be taken in order to form a digital governance model for a successful digital transformation effort.

■ Diagram III.2
Digital government and governance model proposed by the Economic Commission for Latin America and the Caribbean (ECLAC)



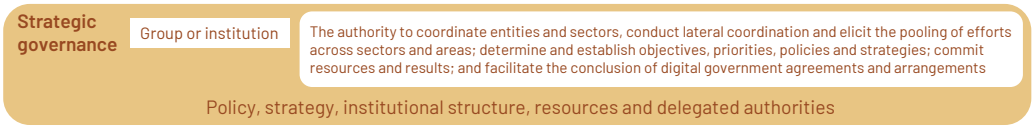
Source: Economic Commission for Latin America and the Caribbean.

1. Strategic governance

(a) Scope

Strategic governance supports the coordination of the various sectors (or related institutions) and thus helps to identify the objectives and elements of shared value that can only be attained through coordinated joint action. In order for this to be accomplished, a regulatory and policy framework is needed that grants the necessary powers and authorities to call upon different entities to pool their efforts, to determine and establish objectives, priorities, policies and strategies, to facilitate the conclusion of agreements and to commit resources and define results (see diagram III.3). The aim here is to achieve a strategic alignment of representative institutions and key actors across all the various spheres of digital government and governance.

■ Diagram III.3
Definition of strategic governance



Source: Economic Commission for Latin America and the Caribbean.

The OECD recommendation (2014) takes an overarching view of government that encompasses the cross-cutting role of technology in public policy design and implementation and in producing results. This entails taking a digital design approach that prioritizes the use of data and technology to overhaul internal processes and improve public service design and delivery. This transition involves the use of digital tools and data to streamline processes, increase the transparency and convenience of interactions with the public and boost efficiency. The transformation process should also empower the public and businesses to play a part in designing services that will meet their needs rather than continuing to employ a top-down approach (OECD, 2014a).

This presupposes that the approach taken to strategic governance should also allow for engagement with representatives of businesses, universities and other organizations that can make their own contributions to the definition of the country strategy for the strategic governance of digital government functions.

The potential economic impact of digital governance at the strategic level can be illustrated by the case of Costa Rica. In 2020, the Office of the Comptroller General of the Republic issued a report on the digital transformation (*Transformación digital: una ruta de eficiencia como base de las reformas del Estado*) that refers to the challenges posed by the coronavirus disease (COVID-19) pandemic, the rapid pace at which technology is evolving

around the world and the need for agile, efficient public services. The report states that the country should seize the opportunity opened up by the digital transformation to improve the design of the institutional structure, rethink the powers and areas of authority established by existing regulatory and policy instruments and strengthen public management models in an effort to boost efficiency as a means of ensuring the continuity and sustainability of service delivery (Office of the Comptroller General of the Republic of Costa Rica, 2020, para. 2). It goes on to state that, according to the Office's calculations, the potential annual savings for the period 2010–2018 afforded by efficiency improvements ranged between 2.5% and 2.9% of GDP under a sectoral integration scenario (that is, one involving the interaction of organizations within the same sector only), while those figures rose significantly (to between 8.3% and 8.5% of GDP) under an integrated —and therefore more efficient— scenario in which the various institutional actors have a shared vision based on a form of digital governance based on common objectives (Office of the Comptroller General of the Republic of Costa Rica, 2020, para. 2).

Emphasis is placed on eight pillars underpinning efforts to strengthen digital governance:

(i) Strengthening the digital governance model

(ii) Transitioning to a more efficient form of public management

(iii) Having a clear definition of functions and commitments

(iv) Strengthening citizen participation

(v) Transparency through open government

(vi) Science-based public policy

(vii) Consolidating the public innovation system

(viii) An adaptable institutional structure

In order for this to be accomplished, an entity is needed at the national level that operates beyond the bounds of successive presidential terms of office, that can oversee the coordination of the structural aspects of the transformation over the long term and that has the necessary powers and authorities to do so.

(b) Institutional structure

In a strategic governance framework, responsibility for coordinating the implementation of the digital transformation of the State needs to be assigned to a specific body in clear and unambiguous terms. That entity's mandate must extend to shaping and guiding the change process and ensuring its strategic coherence. Related institutions should also propose policies and standards to the lead agency for encouraging the adoption of cross-cutting solutions, facilitating synergies and sharing lessons learned (OECD, 2014b).

This strategic institution's substantive function is to identify the country's priorities concerning the modernization of the State and its digital transformation. It should also identify and prioritize structural initiatives and projects to be carried out and ensure that the required resources for their implementation and the necessary level of commitment on the part of the relevant institutions are in place.

The agencies and offices in charge of the transition to strategic governance usually bear such titles as "National Commission for Digital Transformation", High-level Digital Government Commission" (Ministry of Science, Innovation, Technology and Telecommunications of Costa Rica, 2018) or "Ministerial Committee for the Digital Strategy" (Enable, 2016). Such bodies are usually led by sectoral ministers holding the following portfolios or their equivalent:

- Office of the President
- Science, technology and telecommunications
- National planning
- Finance
- Economic affairs
- Industry and commerce
- Communications

(c) Characteristics and functions

The body or institution in charge of the implementation of the strategic governance approach should have a number of specific characteristics and functions, as detailed in table III.1.

■ Table III.1
Characteristics and functions of the body tasked with the transition to strategic governance

	Description
Characteristics Area	Multisectorality: Includes representatives of the public, private and academic sectors, civil society and other sectors, which give it the benefit of a comprehensive perspective. Constitutional or legal rank: Established by law or the Constitution in order to ensure it has the necessary political autonomy and resources. Normative role: Can make proposals and issue opinions concerning regulations and public policies on digital matters. Strategic planning: Develops medium- and long-term national road maps, strategies and plans for the digital transformation. Intersectoral coordination: Coordinates the participation and alignment of different public and private actors. Monitoring and evaluation: Monitors progress, tracks indicators and establishes accountability mechanisms.

	Description
Functions Area	Develops a strategy and tactics for coordinating the definition and development of the digital transformation of the State. Proposes public policy lines for guiding and following up on public sector digital transformation initiatives. Leads the development of the country's digital transformation strategy by establishing clear-cut objectives, well-defined timeframes and metrics of success. Identifies and prioritizes viable projects for inclusion in the country's digital transformation project pipeline. Identifies and defines objectives, targets and indicators for projects in the digital transformation project pipeline and identifies the persons to be in charge of those projects. Develops explicit budget estimates for the resources that institutions and State bodies will need and that they will then allocate and administer for the implementation of projects in the digital transformation project pipeline. Establishes mechanisms for monitoring the implementation of the projects in the digital transformation project pipeline. Identifies needs and recommends what resources will be required to leverage the operations of the institutions participating in the projects in the digital transformation project pipeline, particularly the needs of the executing agencies for the country's strategic, cross-cutting projects. Promotes and helps to further the implementation of measures for facilitating genuine participation by members of the public in relevant processes and for enhancing that participation through the use of digital technologies. Convenes a committee of experts who are able to draw upon their specialized knowledge and training to further the work and the objectives being tracked by that committee. Identifies and proposes the adoption of disruptive technologies for use in defining digital government projects.

Source: Economic Commission for Latin America and the Caribbean.

This model incorporates the recommendations made by the OCED Council on Digital Government Strategies (2014a):

(i) Secure leadership and political commitment to the strategy through a combination of efforts aimed at promoting interministerial coordination and collaboration, set priorities and facilitate engagement and coordination of relevant agencies across different levels of government.

(ii) Ensure coherent use of digital technologies across policy areas and levels of government by:

- Engaging relevant stakeholders and other levels of government and encouraging them to provide input for the development of the digital government strategy.
- Integrating the digital government strategy into overall public administration reforms.
- Identifying the complementarities, alignment and mutual reinforcement existing between the digital government strategy and other relevant sector strategies.
- Providing the institution formally responsible for digital government coordination with mechanisms to align overall strategic choices on investments in digital technologies with technological deployment in various policy areas.

(iii) Establish effective organizational and governance frameworks to coordinate the implementation of the digital strategy within and across levels of government.

(iv) Develop clear business cases for the funding and focused implementation of digital technology projects by:

- Articulating the value proposition for all projects above a certain budget threshold to identify expected economic, social and political benefits in order to justify public investments and to improve project management.
- Involving key stakeholders in the definition of the business case (including owners and users of final services, different levels of governments involved in or affected by the project and private sector or not-for-profit service providers) to ensure buy-in and distribution of realized benefits.

(v) Reinforce institutional capacities to manage and monitor projects' implementation, by:

- Adopting structured risk-management approaches on a systematic basis that increase the amount of evidence and data captured in the course of project implementation, and providing incentives to augment the use of data to monitor projects performance.
- Ensuring the constant availability of a comprehensive picture of ongoing digital initiatives in order to avoid the duplication of systems and datasets.
- Establishing evaluation and measurement frameworks for project performance at all levels of government and adopting and uniformly applying procurement and compliance standards, guidelines and codes with interoperability frameworks for regular reporting and the conditional release of funding.
- Reinforcing the public sector's digital and project management skills and mobilizing collaboration and/or partnerships with private and non-governmental actors, as necessary.
- Conducting early sharing, testing and evaluation of prototypes with the involvement of expected end users to allow for the adjustment and successful scaling of projects.

(vi) Procure digital technologies based on an assessment of existing assets, including digital skills, job profiles, technologies, contracts and inter-agency agreements, to increase efficiency, support innovation, and bolster the objectives as stated in the overall public sector modernisation agenda. Procurement and contracting rules should be updated, as appropriate, to make them compatible with modern ways of developing and deploying digital technology.

(vii) Ensure that general and sector-specific legal and regulatory frameworks allow digital opportunities to be seized by:

- Reviewing them, as appropriate
- Including assessments of the implications of new legislation on the government's digital needs as part of the regulatory impact assessment process.

As noted elsewhere in this document, this governance model leverages the interactions among the various actors that design, implement and evaluate public policies while also helping to ensure the quality of the system and effect on each of its components and on the system as a whole.

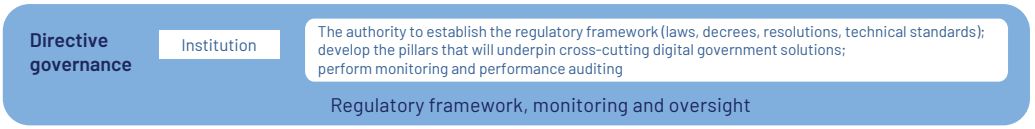
2. Directive governance

(a) Scope

Within a digital government framework, a directive body plays a crucial role in coordinating and orienting the State's digital transformation strategies. This body should promote digital services and ensure that they are accessible, efficient, secure, transparent and inclusive. It should also propose technical standards to systematize the digital actions and affairs of government institutions and ensure their proper performance, as well as proposing digital technology codes to establish minimum levels for the acquisition, development and management of digital services and technologies in the public sector, along with basic technical guidelines for the development of any digital project.

A directive body can help to promote, coordinate, establish and systematize the regulatory framework (laws, decrees, resolutions and technical standards) and set out the foundational regulatory pillars for the definition, design and implementation of digital government solutions. This body serves as a governing authority that has been empowered to monitor and audit the performance of digital government tasks and to propose and grant incentives or take action to promote buy-in for the initiatives that are being launched (see diagram III.4).

■ Diagram III.4
Definition of directive governance



Source: Economic Commission for Latin America and the Caribbean.

(b) Strategy

Based on the structural initiatives and projects proposed by the entity tasked with leading the transition to a strategic governance model, the directive body should promote, identify, define, design, validate, supplement or ensure the implementation of the existing or planned laws, decrees, regulations and standards. It should also make sure that the necessary regulatory or legal and institutional substructure is in place to make those projects' implementation possible. If the required regulatory or legal foundation is not in place, the directive body should call upon the relevant institutions and stakeholders to formulate, reinterpret or establish the required instruments (laws, decrees, regulations or technical

standards). That regulatory or legal foundation is what will establish the necessary powers, authorities and institutional framework that the directive body will need in order to advocate for or establish the incentives or sanctions required to ensure proper compliance.

(c) Institutional structure

The lead agency should drive the digital transformation of the State and be in charge of promoting policies and regulatory instruments to encourage institutions, academia and industry to innovate with digital tools and should provide them with training that will help them deal with new challenges as they arise. This can be done with the help of funding programmes and incentives arranged for by the lead agency, which should have the necessary powers to coordinate and work with other government institutions to further the sector's development.

Generally speaking, when the aim is to organize and coordinate action in one or more areas of public policy, the government agency in charge of planning, designing, implementing and evaluating policies and programmes dealing with that specific area or areas is a ministry (of education, health, justice, security, the environment, economic affairs or others). This is because ministries are the bodies responsible for formulating and proposing public policies to meet the needs and demands of society and to further the country's development. They are also authorized to coordinate and oversee the implementation of these policies at the national level and, in some cases, at the regional or local level as well. This suggests that making the ministry that is in charge of information, technology and telecommunications the lead agency for the digital transformation is likely to give rise to the optimum synergy between the development of the digital sector and digital government. This is not always done in the countries of the region, however, where the lead agency is most often a division, a secretariat, the office of a deputy minister or some other department.

Yet regardless of the institutional rank of that agency, the crucial element is the powers and authorities and the degree of autonomy that this agency enjoys. The lead agency for the digital transformation of the State must have autonomy in order for it to be sufficiently effective and free of influence or pressure from whatever Administration is in office at any given time that might jeopardize its mission. Some of the important aspects of the autonomy that the lead agency will need in order to be effective are listed in table III.2 (OECD, 2015).

■ Table III.2
Types of autonomy required by the lead agency

Area	Description
Operational independence	• The lead agency should be empowered to make operational decisions within the domain of its substantive functions autonomously, without direct interference from the Administration that happens to be in office at any given time. • It should have the authority to design, implement and oversee digital transformation policies and programmes without having its decisions made subject to short-run considerations of the current Administration.

Area	Description
Appointment of its members and the stability of their positions	• The members of the lead agency, including its director, should be appointed by means of transparent, merit-based procedures that will ensure that they have the necessary qualifications and experience in the areas of technology and public policy. • The stability of the agency is also important, and the agency's members should therefore be appointed for defined periods that are longer than those of any one Administration and should be protected from arbitrary dismissals.
Budget autonomy	• The lead agency should have a budget of its own. That budget should be commensurate with its mandate and sufficient for the completion of the plans and programmes defined at strategic governance levels. • The budget should be shielded from arbitrary cuts made at the behest of the current Administration (barring cases of force majeure) and should be managed transparently and responsibly.
Transparency and accountability	• The lead agency must function in a completely transparent manner, providing the public with information about its activities, decisions and results. • It should be subject to effective accountability mechanisms, including independent audits and periodic appearances before the legislature to report on its performance.

Source: Economic Commission for Latin America and the Caribbean.

Structural elements of the lead agency's institutional architecture are detailed in table III.3.

■ Table III.3
Structural elements of the lead agency's institutional architecture

Structural area	Description
Existence of a legal and regulatory structure governing the agency	• Clear definition of the lead agency's responsibilities and areas of jurisdiction in relation to the digital transformation of the State. • Existence of laws and regulations that. underpin and orient the agency's activities, including those relating to digital identities, digital signatures, the protection of personal data, cybersecurity and system interoperability.
Alignment of the agency's organizational structure with its functions, the services to be provided and its responsibilities	• Explicit, consensus-based definition at the public institutional level of the lead agency's value proposition and its powers and authorities. • Definition of the services and outputs that the lead agency is expected to provide. • Internal processes are structured in a way that is geared to the lead agency's functions, outputs and services. • An ad hoc organizational structure is provided for strategic, mission-based and support processes, with the capacities, resource allocations and function-based areas of authority clearly identified and appropriately scaled. • Appointment of a multidisciplinary team of experts in technology, public policy, management and other relevant fields who have embraced the culture of public service required of a lead agency of this type.
Governance for proper operation	• Establishment of mechanisms for coordination with other government bodies at the local, national and regional levels in order to ensure the coherence of the collaborative implementation of the digital transformation. • Establishment of advisory councils that include members of civil society, the private sector and academia in order to ensure the transparency and inclusiveness of strategic decisions.

Structural area	Description
Budget and human capital	• Allocation of the budget needed, on a sustainable basis, to carry out long-term digital transformation initiatives. • Allocation of infrastructure and personnel with the necessary qualifications in areas related to innovation, technology, project management and public administration.
Regulatory or legal and planning strategies that are a good fit for the lead agency for strategic governance	• Regulatory or directive support for the development of the country's digital transformation strategy. • Preparation of detailed action plans for helping to meet regulatory or directive requirements and for monitoring that take into consideration the needs of the various projects and institutions, along with the implementation-related functions, timetables and resource allocations.
Guidance, monitoring and evaluation	• Definition and implementation of guidance, monitoring and evaluation action to measure adherence to technical standards; tracking the progress of cross-cutting projects run by the lead agency's executing agency and identification of areas requiring improvement and areas where adjustments need to be made in technical standards and/or strategies, as necessary. • Regular reporting on technical standards and the status of the digital transformation process, along with the results of its application and implementation.
Security and data protection	• Development of cybersecurity policies and protocols to protect State infrastructure, applications and data. • Measures to ensure full compliance with all data protection and privacy laws in all digital transformation initiatives.
International collaboration	• Formation of alliances, partnerships and cooperative working relationships with international agencies, foreign governments and multilateral organizations to share information on laws and technical standards good practices, knowledge, experiences and resources.

Source: Economic Commission for Latin America and the Caribbean.

(i) Authority

The leadership of the agency tasked with heading up the directive governance effort is of crucial importance in the digital transformation of the State. This agency should be at the helm of initiatives designed at the strategic governance level for increasing the efficiency, transparency and quality of public services through the strategic use of information technologies.

A Chief Information Officer (CIO) should be formally designated (Enable, 2016). This person should be a high-ranking official in the government service (ideally a minister or undersecretary). That official's role should be to lead the implementation of a digital government policy and should entail the formulation of that policy, guidance concerning its implementation, monitoring its progress and evaluating the outcomes of that effort.

It is important for the CIO to be a high-level political authority because that official needs to be able to interact with and influence the rest of the cabinet and the president in order to make sure that the country's digital government policies are a constituent part of the government's agenda. As part of his or her role, the CIO needs to understand the needs of other authorities and to set out the options for using technology to help implement the rest of the public policy agenda. Table III.4 details the functions to be performed by the CIO.

■ Table III.4
Functions of a Chief Information Officer

Functions	Description
Strategic leadership	• Provide strategic leadership for the planning, development and execution of the country's digital government strategy. • Articulate a clear vision of how technology can be used to improve government services and promote innovation in public service delivery.
Provision of technological infrastructure	• Arrange for the necessary technological infrastructure and for access to that infrastructure, which includes networks, servers, data storage systems and information security systems. This should be done in coordination with the officials responsible for the State's telecommunications infrastructure. • Ensure that technological resources are aligned with the State's strategic priorities and objectives and that they are used efficiently and effectively.
Collaboration and coordination	• Work closely with other government leaders, agencies and stakeholders to coordinate strategic initiatives and ensure system coherence. • Promote collaboration among different areas and levels of government in order to maximize the benefits of incorporating technology into public service delivery systems.
Development of policies and regulatory tools	• Develop policies and regulatory tools related to information technology, security, ethics and the protection of government data. • Ensure that policies and regulatory tools are aligned with best practice and international standards.
Innovation and the digital transformation	• Promote innovation and the digital transformation of the government by identifying opportunities for innovating in the use of technology for public service delivery. • Lead initiatives for modernizing and digitalizing government processes and improving the user experience.
Managing change and organizational culture	• Identify and provide for the need to manage change processes. • Lead initiatives for managing change in order to foster the emergence of an organizational culture focusing on technology and innovation. • Advance initiatives for overcoming resistance to change and promote a cooperative and adaptable mindset among government officials.
Management of the project portfolio and resources	• Manage the project portfolio and ensure the appropriateness of its scope, the milestones and benchmarks that are set, the staffing of those projects, the resource allocations and risk assessments. • Manage the available human and financial resources for digital transformation projects (including the associated strategies, processes, personnel and information technologies) and ensure that those resources are used efficiently and effectively.

Source: Economic Commission for Latin America and the Caribbean.

(d) Areas of authority and functions

Because the lead agency has to cover such a wide range of areas, it is helpful to divide the list of its characteristics and functions into those that are cross-cutting and those that are more specific.

(i) Cross-cutting characteristics and functions

- Establish framework agreements: Enabling public institutions to share data, other types of information and documents in order to optimize the use of public resources and improve user relations
- Foster the digital culture and training: Promoting training and awareness-raising programmes for civil servants and members of the public while helping them to acquire digital skills and encouraging them to use digital services
- Monitor and evaluate progress: Establishing monitoring and evaluation systems for tracking and measuring the progress of the government digitalization effort and using that information as a basis for adjusting strategies as necessary
- Promote public-private collaboration: Establishing alliances and partnerships with the private sector and civil society with a view to innovating and improving the suite of government digital services
- Ensure transparency and citizen participation: Implementing mechanisms for promoting transparency in government action and citizen participation in the development and improvement of digital services.

The effectiveness of a lead agency for digital government initiatives will depend on its capacity to exercise leadership and to coordinate and monitor the performance of these functions in order to ensure that it measures up to the expectations of members of the public and addresses their needs. The goal here is to ensure that the digital transformation benefits all of society.

(ii) Specific characteristics and functions

The more specific functions of the lead agency are detailed in table III.5.

■ Table III.5
Areas of authority and functions of the lead agency

Area	Description
Digital government	• Develop the country's national digital government strategy: Defining the objectives, principles and lines of action for the digitalization of public services and the internal digital transformation of government bodies. • Establish regulatory instruments and standards: Devising technical regulations and standards for ensuring the quality, security and accessibility of digital government services.
Government interoperability	• Implement interoperability frameworks: Developing and implementing an interoperability framework that will facilitate the secure and efficient exchange of information among different governmental entities and ensure the compatibility of their systems and databases. • Promote system and service integration: Coordinating efforts to integrate platforms and systems across different branches and levels of government, thereby eliminating information silos.

Area	Description
Digital identity	• Establish the frameworks for a digital identity system: Setting up a secure, reliable digital identity system that will protect the personal data of members of the public who access public services online. • Establish authentication and electronic signature policies: Defining policies and standards for user authentication and for electronic signature use to guarantee the legal validity of digital transactions.
Single, consolidated file	• Implement the framework for a single, consolidated file: Promoting the creation and use of consolidated files for users that centralize the relevant information on a single platform, thereby facilitating access to services and data-based decision-making. • Ensure privacy and data security: Establishing security policies and mechanisms to protect the information in the consolidated files from unauthorized access or misuse.
Single-window system	• Implement the framework for a one-stop service portal: Creating and maintaining a one-stop portal or digital platform that serves as a centralized gateway for all digital public services that will improve the user experience. • Promote accessibility and usability: Ensuring that the one-stop portal is accessible to all users, including persons with disabilities, and that it is user-friendly for users at all digital skill levels.
Digital technology codes	• Furnish the basic technical criteria that need to be met for the implementation of any digital project in civil service institutions (Ministry of Science, Innovation, Technology and Telecommunications of Costa Rica, 2023). • Establish the minimum standards for the acquisition, development and management of digital services and technologies in the public sector. • Objectively assess the value of technology projects of national importance and meet the associated technical standards.

Source: Economic Commission for Latin America and the Caribbean, on the basis of Ministry of Science, Innovation, Technology and Telecommunications of Costa Rica (2023), *Código Nacional de Tecnologías Digitales*. https://www.micitt.go.cr/sites/default/files/GobernanzaDigital/CNTD.pdf.

(e) Incentives and sanctions

In order to ensure the effective implementation of policies and strategies in the areas of digital government, governmental interoperability, digital identity, consolidated user files and a single-window system, the lead agency will need to employ a combination of incentives for institutions and members of the public in order to overcome the natural resistance to change that these solutions will arouse, to spur their use and to encourage participation in these processes. If these incentives do not have the desired effect, then previously announced and clearly explained sanctions for noncompliance will have to be put in place. These mechanisms should be designed to encourage voluntary adoption and compliance, to deter noncompliance and penalize failures to act in accordance with established laws and standards when penalties are warranted.

(i) Incentives

While the use of incentives is not widespread, it has been extremely effective in encouraging both institutions and individuals to make use of digital government solutions. Incentives may be a useful tool for producing changes in behaviour and increasing the adoption of digital technologies in the public sector. This, in turn, can help to modify the

culture around the adoption of new work practices in response to changes in processes and their systematization. Incentives can be differentiated in terms of those tailored for institutions and those geared to members of the public (see table III.6).

■ Table III.6
Incentives for institutions and for individuals

Entity	Incentives
Institutions	• Recognition and certifications: Establishing prizes and programmes for recognizing early-adopter institutions and individual users that make effective use of digital government solutions. • Organization of award ceremonies or other special events to celebrate successes and achievements in the digital transformation of the government. • Access to preferential financing: Providing soft loans or subsidies for projects that further the digital transformation and promote compliance with government standards. • Job training and professional development: Offering training in the use of digital technologies and related professional development opportunities to administrative and technical teams. • Access to online training programmes, workshops, seminars or learning resources on the implementation and use of digital government solutions. • Technical assistance and personalized support: Providing specialized technical assistance and personalized support to institutions having difficulties in adopting or using digital technologies. • Establishment of dedicated support teams to provide guidance, resolve problems and furnish additional resources, as necessary. • Facilitation of collaboration and the sharing of good practices: Facilitating inter-agency collaboration involving the sharing of experiences, lessons learned and good practices in the use of digital government solutions. • Creation of platforms for the exchange of knowledge, professional networks or online communities to allow users to connect with one another, work together and learn from each other.
Members of the public	• Benefits: Promoting the use of digital services by offering tangible benefits such as shorter waiting times, discounts or preferential access. • Educational and training programmes: Launching programmes for upgrading people's digital skills and encouraging and promoting the effective use of digital services. • Awareness-raising campaigns: Carrying out campaigns to make people aware of the benefits and importance of citizen participation in the government's digital ecosystem. • Participation in streamlining processes and reducing bureaucracy: Providing channels for public participation in streamlining administrative processes and reducing the associated bureaucratic procedures through the adoption and use of digital government solutions. • Elimination of barriers and obstacles, such as excessive paperwork or requirements or obsolete standards, that may interfere with the use and implementation of digital technologies.

Source: Economic Commission for Latin America and the Caribbean.

(ii) Penalties

Penalties should be considered only as a last resort in serious situations in which other measures have proven to be ineffective. Before imposing sanctions, an exhaustive analysis should be undertaken in order to determine the underlying causes of the failure to implement digital government solutions and to explore other options for addressing the problem.

The application of penalties for a failure to implement digital government solutions is a delicate and complex issue given the areas it touches upon and its implications. Although the use of penalties may be feasible in theory, in practice there are a number of challenges and important considerations that would have to be taken into account (see table III.7).

■ Table III.7
Considerations relating to the application of penalization mechanisms

Consideration	Description
Context and organizational culture	• Before considering the possibility of imposing sanctions, it is of crucial importance to understand the context and the organizational culture of the public institutions and users involved. Factors that may be hindering the adoption of digital solutions may include a resistance to change, a lack of training or the absence of the necessary infrastructure.
Skills and resources	• It is important to determine whether or not the institutions and users in question have the skills and resources needed to use digital government solutions effectively. The lack of technical skills or access to suitable technologies may limit their adoption.
Incentives in preference to penalties	• In many cases it is more effective to employ positive incentives rather than resorting to penalties. Incentives may include the provision of training, technical assistance, financial incentives or public recognition of those who adopt and use digital solutions effectively.
Ethical and legal considerations	• It is essential to make sure that any form of penalization is ethical and legally justified. Due process and the rights of all parties must be respected, and any sanctions that are imposed must be proportionate to the seriousness of the situation.

Source: Economic Commission for Latin America and the Caribbean.

If a decision is made to impose penalties, the nature of those penalties should be calibrated in order to fit the context and seriousness of the situation. Possibilities include fines, a reduction of funds or resource allotments, negative evaluations in performance reports, exclusions from future programmes or projects or disciplinary action. As in the case of incentives, penalties may be differentiated depending on whether they are being imposed on institutions or individual members of the public (see table III.8).

■ Table III.8
Penalties for institutions and for individuals

Entity	Penalties
Institutions	• Administrative sanctions: Fines or other economic penalties for entities that fail to comply with established regulations and standards. • Limitations on financing or subsidies: Restricting access to public funding for projects in the case of institutions that systematically fail to comply with digital government guidelines.
Members of the public	• Penalties for misuse: Fining or otherwise penalizing individuals who misuse digital services (such as by falsifying digital identities). • Restrictions on access: Limiting access to certain digital services in cases of serious or repeated noncompliance with rules of use.

Source: Economic Commission for Latin America and the Caribbean.

(iii) A combined approach

A combination of incentives and sanctions can be used to balance motivation and deterrence as a way of promoting compliance by both institutions and individuals with digital government policies. These mechanisms absolutely must be fair and transparent and be applied in a coherent manner in order to maintain public trust and foster a culture of responsible participation in digital government affairs. In addition, these mechanisms have to be adapted and updated on an ongoing basis in order to adjust to changes in technologies and to meet the changing needs of society.

3. Operational governance

(a) Scope

Operational governance has to do with the capacity to take action in order to put strategic governance principles and plans into practice. This type of action is taken within the framework of the laws, standards and regulations which fall within the purview of directive governance mechanisms. Operational governance mechanisms also define, design, implement, provide assistance, resolve, guide and support cross-cutting solutions while also using these solutions and the associated specialized services to contribute to vertical solutions in each sector or institution (see diagram III.5).

■ Diagram III.5
Definition of operational governance

Source: Economic Commission for Latin America and the Caribbean.

There are three core areas of work that are of pivotal importance within the realm of operational governance: (i) digital government; (ii) digital capabilities and skills; and (iii) digital infrastructure (see section III.D). For each of these core areas or for some combination of those different areas, there needs to be an institution to address the various disciplines involved. This institution may take the form of an agency, secretariat, division or department that is put in charge of designing, implementing, supporting and providing technical assistance for strategic, cross-cutting solutions.

(b) Institutional structure

Within the strategic governance and directive governance framework described in this guide, effective management at the operational governance level needs to be conducted by a designated agency operating under the authority of the directive governance institution that will have been established. If it is to do its job properly, this agency must have operational independence and a suitably qualified technical team. Staffed with professional and technical personnel with expertise in the requisite areas, it can contribute to the use, feedback cycle and updating of the digital technology code established by the directive governance body.

(i) Possible institutional structure for operational governance

While the scope of each type of institution listed below may vary from country to country, they tend to have certain characteristics in common. The type of institution chosen will depend on the nature of each particular situation.

- Secretariat: A governmental body that is not administratively autonomous but is instead subordinate to a broader government structure (a ministry), a secretariat provides advisory and support services to the superior body in specific areas of public policy. Secretariats usually focus on coordination and collaboration among different areas of government and stakeholders in specific subject areas. They may be assigned specific responsibilities (such as the coordination of certain programmes or the supervision of certain areas), and their authority to make important decisions may be limited by policies or directives established by their ministry. Their budgets may be part of the general budget of their ministry or come from specific allocations for initiatives in their areas of competence.
- Agency: An administratively autonomous government entity tasked with leading and coordinating all the work involved in specific areas (including policymaking, the implementation of solutions and service delivery), an agency has the autonomy to define and execute its strategies and programmes, function as an independent entity of the central government and report directly to the head of the government or to a designated governing board. It has its own budget for the execution of its programmes and projects, which it must manage efficiently and transparently.

- Department: An administrative unit of another governmental entity or ministry, a department is in charge of leading and coordinating activities in its specific area of responsibility. Its degree of independence is subject to numerous restrictions, such as the instructions of its hierarchical superior, the regulatory and policy framework, resource allocations, strategic directives and interdepartmental coordination requirements. Its resource allocations come from the general budget of the government body or ministry to which it belongs, although there is some degree of flexibility in terms of expenditures subject to internal and external approvals.

Of all these different institutional structures, the technical and administrative autonomy, powers and authorities, and budgetary control exercised by an agency appear to be the best fit in terms of the needs and flexibility required of a body in charge of operational governance.

The same institution could be put in charge of both directive and operational governance functions provided that those responsibilities and the specific functions associated with them are assigned to different organizational units (in observance of the principle of functional segregation) within that institution.

Some of the characteristics of an institution in charge of operational governance are described in table III.9.

■ Table III.9
Characteristics of institutions in charge of operational governance

Area	Description
Technical and strategic approaches and their coordination	• Having an eminently technical and strategic vision of how digital solutions can improve public service delivery and promote government efficiency. • Having the ability to coordinate and align efforts with the technology units of State institutions in order to ensure the coherence of the technological platforms to be used.
Multidisciplinary experts	• Having a team of multidisciplinary experts in areas such as information technology (technological architectures, tools, platforms and current technologies), public policy, service design, project management and change management. • These experts should have complementary skills and areas of expertise so that they are prepared to deal with the various aspects of the design and implementation of digital government solutions (e.g. managing change, culture, government procurement, budgets, regulations and laws).
Design, procurement and/or development of solutions	• Having an in-house capacity or access to external resources for the design, development and maintenance of technological and data platforms and digital solutions based on the strategy being followed by the institution (in-house software development, purchase of solutions, software development by third parties or a combination thereof). • Using agile, user-centred approaches for ensuring that solutions are effective and meet users' actual needs.
Technical assistance and support	• Providing technical assistance and support for the implementation of cross-cutting solutions and assistance for user institutions with the implementation and use of strategic, cross-cutting solutions within their scope and area of responsibility. • Being available to solve problems, provide guidance and training, and offer additional resources, as necessary.

Area	Description
Monitoring and evaluation	• Conducting ongoing monitoring of the digital solutions being implemented and regular performance assessments using metrics and data to measure their impact and effectiveness in accordance with established service delivery agreements. • Standing ready to adjust and improve these solutions based on the results of the assessments and feedback from users and institutions.
Promotion and dissemination	• Actively promoting the use of digital solutions by institutions and end users by highlighting their benefits and the opportunities that they can open up. • Developing effective communication strategies to disseminate information about the available solutions, training users and helping to create an awareness of the importance of the digital transformation for modernizing the State.
Transparency and accountability	• Operating in a transparent manner and being subject to accountability mechanisms that will ensure responsible resource use and the achievement of results. • Reporting regularly on the work, on progress in the implementation of digital solutions and on the results obtained.

Source: Economic Commission for Latin America and the Caribbean.

(ii) Authority

The leadership role of the institution designated to head up the operational governance process is crucial for the implementation of the strategic cross-cutting initiatives devised by the CIO who is overseeing directive governance operations. These initiatives will provide solutions that will help to boost the efficiency and enhance the transparency and quality of public services. The duties of the CIO should be similar to those of a CTO or the equivalent, which is a high-ranking position in the public administrative structure. It will be the Officer's job to implement the projects approved by the agency in charge of strategic governance under the authority of the CIO.

The CTO is responsible for the efficient and correct implementation of the portfolio of strategic cross-cutting projects and for the associated change management process. The functions of the CTO are detailed in table III.10.

■ Table III.10
Functions of a Chief Technology Officer

Functions	Description
Strategic leadership in technological matters	• Provide strategic leadership in the formulation and execution of the government's technology strategy in line with government objectives and priorities. • Have a deep understanding of technological trends and their possible impact on the public sector.
Management of technological infrastructure	• Manage the State's technological infrastructure (including networks, servers, data storage systems and information security systems) in coordination with the authorities responsible for the nation's telecommunications infrastructure • Ensure the availability, security and efficiency of the technological resources used by the government.

Functions	Description
Development of policies and regulations	• Contribute, on the basis of his or her technical experience, to the development of policies, regulations and standards relating to information technology, security, ethical issues and data protection, along with alignment with best practices and international standards.
Innovation and digital transformation	• Contribute, on the basis of his or her technical expertise, to the implementation of innovative initiatives and the digital transformation of the State, identify opportunities for innovative uses of technology in public service delivery and lead the implementation of initiatives for modernizing and digitalizing government processes and improving the user experience.
Change management and organizational culture	• Contribute, on the basis of his or her technical expertise, to change management initiatives to foster an organizational culture oriented towards technology and innovation. • Provide platforms, tools and working teams to contribute to initiatives for overcoming resistance to change and helping to foster a mindset focused on collaboration and adaptability throughout the organization.
Collaboration and coordination	• Work closely with other national and international technical leaders to ensure that systems are up to date, track technological trends and employ good technological practices in system implementation. • Promote collaboration among different areas and levels of government in order to maximize the benefits of the use of technology for public service delivery.
Project and resource management	• Supervise the execution of technology projects in the project portfolio, ensure they are of the correct scope, oversee their budget, track milestones and benchmarks, and ensure the inclusion of stakeholders and the achievement of results within a risk management framework tailored to each project. • Manage the human and financial resources allocated for technological projects in order to ensure their efficient and effective use.

Source: Economic Commission for Latin America and the Caribbean.

The CTO needs to have technical expertise in order to be able to interact with, propose solutions to and play an influential role in the executive and technical teams of the relevant public institutions in order to ensure the successful implementation of cross-cutting, strategic solutions and the integration of those solutions in projects positioned in vertical workflows in each sector or institution.

(iii) Supplementary authority

The institution in charge of the operational governance process should have a governing board that can contribute a long-term strategic version, exercise greater oversight of risk management functions and of the implementation of cross-cutting strategic initiatives, provide greater transparency and accountability, support inter-agency collaboration, represent various interests and the perspectives of its members and the institutions they represent, support the identification of new opportunities and challenges, boost confidence in the decisions taken by the lead agency and strengthen the legitimacy of those decisions.

As an example, the governing board of the National Agency for Digital Government of Costa Rica (Legislative Assembly of the Republic of Costa Rica, 2021) is composed of:

- The Minister of Science, Innovation, Technology and Telecommunications, which chairs it (in his or her absence, the Deputy Minister is the chair)
- A representative of the Ministry of Finance
- A representative of the Ministry of Economic Affairs, Industry and Commerce
- A representative of the Ministry of National Planning and Economic Policy (MIDEPLAN)
- A representative of the Costa Rican Union of Chambers and Associations of Private Enterprise.

One of the highlights of this configuration is the active participation of the industry through the Chamber of Information and Communication Technology Enterprises (CAMTIC). This adds value and builds a bridge between the State and technology firms, which can contribute expert technical opinions and feedback concerning technologies and project scopes and feasibility.

(c) Areas of authority

The areas of authority of the executing agency are of key importance for the successful implementation of cross-cutting, strategic solutions. Within the legal, regulatory and directive framework provided by the directive governance process under the leadership of the CIO, the executing agency will be able to exercise its powers and authorities and deploy its technical capacities while working with other State institutions on the implementation of those solutions in the three cross-cutting structural areas detailed in section III.D.

The areas of authority and functions of the executing agency are outlined in table III.11.

■ Table III.11
Areas of authority and functions of the executing agency

Domain	Description
Governmental interoperability	Develop or procure, implement and launch an interoperability platform within the terms of reference established by the lead agency at the national level that will enable different institutions to exchange information securely and efficiently. This will also entail ensuring the compatibility of the various systems and databases. Functions within the agency's areas of authority: • Evaluate and procure existing platforms and propose options for their implementation. • Develop interoperability platforms for application at the national level. • Propose and validate viable technological options. • Implement, run and support these platforms.
Digital identity, authentication and digital signatures	Implement a digital identity, authentication and digital signature platform within the terms of reference established by the lead agency; develop or procure, implement and launch a platform at the national level that will provide access to the relevant systems and solutions while ensuring their security and the protection of personal data. Functions within the agency's areas of authority: • Evaluate and procure existing platforms and propose options for their implementation. • Develop digital identity, authentication and digital signature platforms. • Propose and validate viable technological options. • Implement, run and support these platforms.

Domain	Description
Consolidated files	Implement a consolidated file platform within the terms of reference established by the lead agency; develop or procure, implement and launch a platform at the national level that will provide access to user files while ensuring the security and protection of personal data. Functions within the agency's areas of authority: • Evaluate and procure existing platforms and propose options for their implementation. • Develop consolidated file platforms at the national level. • Propose and validate viable technological options. • Implement, run and support these platforms.
Single-window system	Implement a platform for a single-window system within the terms of reference established by the lead agency; develop or procure, implement and launch the platform at the national level to provide access to members of the public to all the information that the government has concerning them, either on a centralized or sectoral basis, while ensuring the security and protection of personal data. Functions within the agency's areas of authority: • Evaluate and procure existing platforms and propose options for their implementation. • Develop single-window platforms at the national level. • Propose and validate viable technological options. • Implement, run and support these platforms.
Digital domicile	Implement a digital domicile solution within the terms of reference established by the lead agency; develop or procure, implement and launch a national solution that will ensure that citizens can be contacted by digital means while ensuring the security and protection of their personal data. Functions within the agency's areas of authority: • Evaluate and procure existing platforms and propose options for their implementation. • Develop a digital domicile solution for citizens. • Propose and validate viable technological options. • Implement, run and support these platforms.
Cybersecurity or security of information and communications technologies (ICTs)	Ensure adherence to the country's cybersecurity strategies and ensure that cross-cutting strategic solutions that are developed, as well as their integration with each institution's vertical solutions, are in compliance with the country's cybersecurity principles, policies and procedures.

Source: Economic Commission for Latin America and the Caribbean.

D. Core areas of operational governance

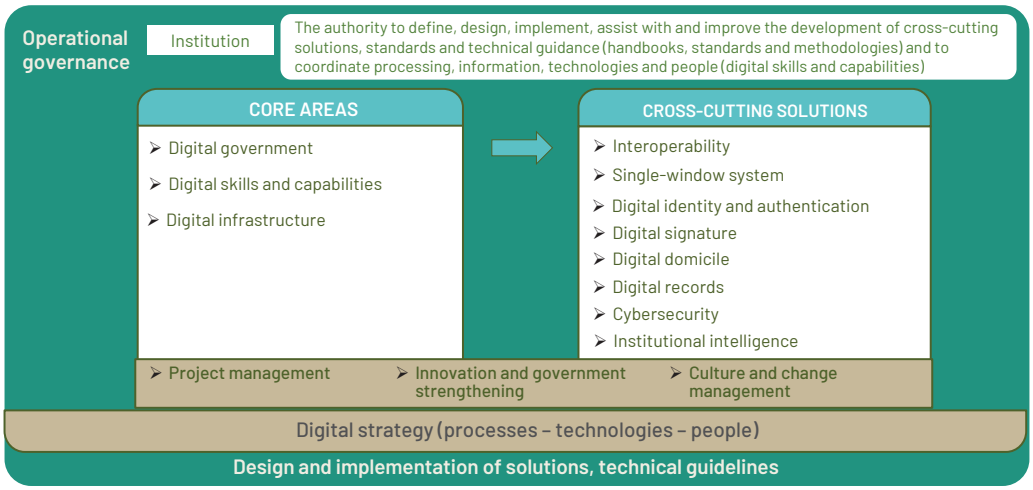
There are three different core areas of operational governance (see diagram III.6), each involving different areas of knowledge. All three contribute in different ways to the achievement of its overall purpose:

(i) Digital government is focused on the digitalization of public services and solutions that are based on users' needs

(ii) Digital skills and capabilities are of fundamental importance in implementing these digital government solutions and in enabling people to make effective use of them

(iii) Digital infrastructure provides access and connectivity throughout the country and between it and other countries, thereby helping to close the digital divide in access.

■ Diagram III.6
Operational governance: transversal solutions and areas



Source: Economic Commission for Latin America and the Caribbean.

1. Digital government

This core area is underpinned by a digital strategy based on strategic governance principles whose implementation is driven by the lead agency for directive governance. This is what defines the future scenario that is being sought and the steps to be taken in order to make it a reality. The institution or institutions tasked with digital government implementation should base its or their action on a holistic view of the situation and should focus on the following components:

- Processes that can be modified as needed in order to adapt to new user demands and needs and to different technologies.
- Technologies that serve simply as tools for achieving a given purpose and that, as they evolve, can be used to streamline the workings of government.
- People, who, because of the need to manage the organizational culture and the changes that the future will bring (for the public at large and for civil servants), will alter their practices and customary ways of relating to others.

The following elements need to be taken into consideration in the implementation of digital government processes:

- Innovation and government strengthening are necessarily a part of people-centred and people-driven solutions and are based on a public value proposition and the substantive functions of each institution. This involves reinforcing processes, information technologies, people and government capacities. They promote creativity, experimentation and the adoption of emerging technologies that can be used to

upgrade public services. Explore working methods are needed to transform and optimize processes, to design, develop and implement efficient solutions effectively and to capture the user experience and measure the impact of such solutions so that this information can be used as inputs for decision-making.

- Culture and change management facilitates the process both for organizations and individuals and can foster an organizational culture that promotes certainty, collaboration, adaptability and innovation. Work in this area needs to be coordinated with the efforts of teams responsible for information technologies and processes in the following areas in order to help ensure the successful implementation of digital government solutions:
  - Communication and dissemination in order to keep the organization itself (on an intra-institutional basis) and external stakeholders informed, to listen to their concerns and to convey messages for all concerned and focused messages for given segments.
  - Support, empowerment and leadership focused on influential individuals and teams or those affected by change initiatives and change processes.
  - Instruction and training so that people can acquire the technical and behavioural skills and capabilities they need to take advantage of change initiatives.
- Project management entails the integrated management of the entire digital government project portfolio, which entails being alert to synergies among the different objectives and project scopes, risks, stakeholders, the efficiency of resource use and the achievement of the established targets. This calls for a holistic perspective and the coordination of cross-cutting projects with each sector's vertical solutions. Correctly timing the supply of funding and of human capital and the completion of the procurement processes necessary for project execution is essential. Tools for tracking the progress and completion of each step in the process are useful, as are dashboards, indicators and infographics for disseminating results and for use in decision-making.

It is often the case that countries conduct the digital transformation of the State at the institutional level without taking account of the government hierarchies that are outlined in this model. Their efforts then result in clusters of strategic, cross-cutting projects that are ultimately not implemented, with all the human and financial costs that this entails. In addition, large amounts of resources are sometimes allocated for projects that the government then decides to withdraw support from or that are absorbed by other projects, which results in the delay or even the suspension of those projects. The responsibility for this falls upon the designated institution, even though it does not have the necessary authorities or sufficient resources owing to the lack of a holistic vision that would permit an accurate evaluation of the relevant initiatives and the provision of the support needed to complete their implementation. It is therefore essential to have a comprehensive model that encompasses the identification, prioritization and coordination of strategic stakeholders, the establishment of a solid normative and legal framework that will provide the appropriate powers and authorities to ensure that projects can be carried out effectively.

The model proposed by ECLAC is designed to resolve these issues and to set out the steps to be taken to give rise to modern States that are at the service of their citizens and all others.

The capacity must exist at the operational governance level, which is the third and final tier in the governance hierarchy outlined in this model, to execute the strategic cross-cutting initiatives developed at the strategic and directive governance levels. This capacity needs to extend to the vertical dimension, which encompasses the strategies associated with each initiative (such as sector-specific projects), their design, development or acquisition, launch, operation and the provision of technical support.

The basic cross-cutting digital government solutions needed for the development of digital government processes are discussed below. This list includes the solutions that have been identified on the ground as the elements that provide the necessary inter-institutional structure for the required technological capabilities.

(a) Cross-cutting solutions

In digital government, there is an explicit need to provide government agencies with cross-cutting solutions in the form of interoperability, a single-window system, digital identities and authentication, digital signatures, digital domiciles, digital records, and cybersecurity and institutional intelligence.

(i) Interoperability

Interoperability facilitates interactions between institutions involving the information in their possession and the knowledge they have gained in the course of their work serving the public. The aim is for institutions to set shared objectives and then achieve those objectives by sharing services, data or documents via information and communications technologies (ICTs). In the proposed model, interoperability necessarily entails the following areas of work:[2]

- Legal and regulatory interoperability, which has to do with the measures required to ensure that organisations operating under different legal frameworks, policies and strategies are able to work together and that the areas of authority have been established and clear agreements are in place that indicate how to cope with these kinds of differences in order to attain a common objective.
- Organizational interoperability concerns business processes and relations between institutions (and their substantive functions)[3] and making services available, easily identifiable, accessible and user-focused.
- Semantic and syntactic interoperability ensures that the precise format and meaning of shared information are preserved and understood in all exchanges between different parties or, in other words, that what is said is what is understood.

2 Based on the European Interoperability Framework (EIF), European Commission, n.d.

3 These functions include the instructions and authorities set out in an institution's mandate that enable it to carry out its mission and other mandatory actions.

- Technical interoperability covers the applications and infrastructure linking systems and services, including interface specifications, interconnection services, data integration services, data presentation and exchange, and secure communication protocols.

(ii) Single-window systems

A centralized access channel allows users to access digitized public services through a single gateway: administrative procedures, applications, digital records (a personal digital file), the delivery and receipt of general and personal information and a personalized interface based on user interests and interactions with different areas or sectors of the State. This centralized channel —whether a single channel or one that is federated or sector-based— must be accessible, efficient and inclusive in order to facilitate people's interaction with the State.

(iii) Digital authentication of identity

Digital identities and their authentication are used to establish and validate a person's or organization's identity in the digital environment and ensure that people who access given services or resources online are who they say they are.

(iv) Digital signature

Digital signatures are a secure and legally binding mechanism for signing documents and messages electronically and ensuring both the authenticity of the signer and the integrity of the information.

(v) Digital domicile

Digital domiciles are the official, legally recognized and secure address of a person or organization. All notifications, citations, summonses and official communications sent to that address are legally valid for the fulfilment of the associated obligations and exercise of rights in relation to the State.

(vi) Personal digital files

Digital files dealing with the various matters of interest to people or organizations should include the records and information frequently used by them and by government agencies, such as academic records, citizenship and residence certificates, employment records, retirement documentation, health and insurance records, social protection and family documents, housing deeds and other related documents, motor vehicle records, tax documents and transparency documentation, as appropriate. Access mechanisms must ensure the protection of personal information.

(vii) Cybersecurity

Cybersecurity, or ICT security, focuses on protecting systems, networks, devices, infrastructure and data against attacks, damage and unauthorized access in the digital environment. This requires coordinated action to ensure the confidentiality, integrity and availability of information and to protect systems, infrastructure and users from cyberattacks.

This kind of protection is closely linked to the development or acquisition, implementation and support of strategic cross-cutting solutions with embedded cybersecurity systems. The aim here is to complement the work of cybersecurity institutions rather than to take their place.

The definition, design, development or acquisition, implementation and support of cross-cutting solutions should include the capacity for assisting public institutions with their vertical solutions in order to develop a harmonious, comprehensive form of digital government through the use of cross-cutting solutions.

(viii) Institutional intelligence

The term "institutional intelligence" refers to an organization's ability to acquire, process and utilize information effectively in order to achieve its strategic objectives. This concept does not refer only to the use of data and the analysis of information; it also encompasses the consideration of the other political, economic, social and environmental contexts in which the organization operates.

(b) Digitalized public services (vertical dimension)

Digitalized public services are part of the vertical solutions introduced in each sector, which can be leveraged by cross-cutting digital government solutions and integrated into their architecture.

This is a gradual process that requires commitment on the part of all the institutions involved. The end result also depends on there being a legal and regulatory framework that makes this process a mandatory one and that monitors compliance. In the case of institutions that are independent from the Administration, such as other branches of government and local governments, good practices and good results will be what will win them over. Sectors that may have vertical solutions of their own include the following:

- Health
- Education
- Labour
- Insurance
- Taxes
- Customs
- Business

- Public works
- Housing
- Social benefits

Each of these sectors develops or acquires its own solutions and, as modelled in this guide, the architecture of their solutions takes the cross-cutting digital government tools and capacities into account as a way of ensuring the coherence and uniformity of data, security and access mechanisms, along with usability. All this helps to create a catalogue of technological solutions for use by the State.

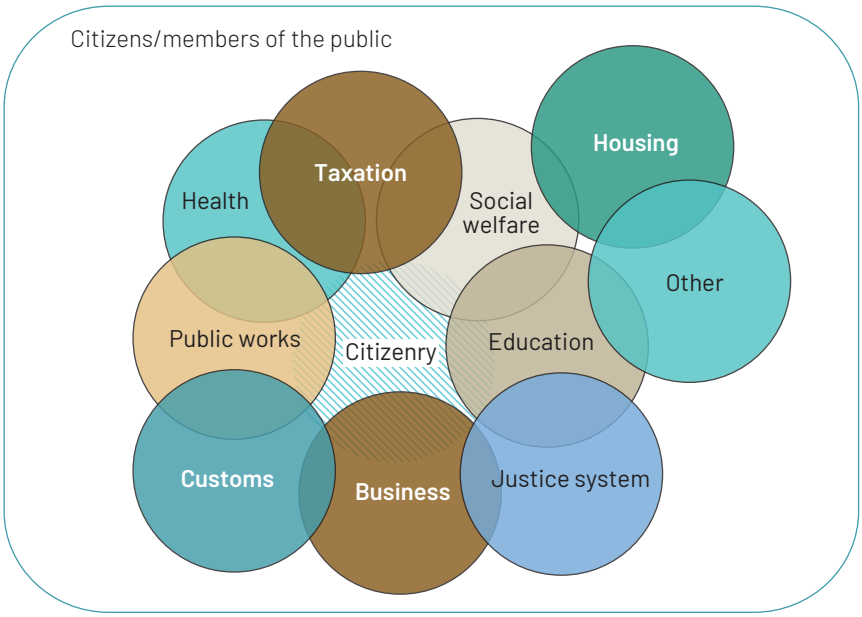
In order to arrive at the point where an entire catalogue of technological solutions can be created, an agency of some sort must be in place that will plan out, over the long term, the integration of services for the public. In doing so, it must approach its task from the standpoint of the State as a whole rather than focusing on the procedures conducted by each institution. This is the role of directive governance, which is put into practice by that agency. This includes the collaboration, interaction or association of different sectors of the public administration, the public and private sectors, the government and society (Kooiman, 2010). A strategic plan for the coverage of digitalized public services (which is distinct from a digital agenda) based on the institutional architecture of the State will be needed, as outlined in phase 4 of the guide created by Naser (2021). In terms of the creation of public value, all the different domains of each institution need to be integrated in order to provide support for the citizenry (or all persons, in a more integrative approach) in their dealings with State institutions at every stage of their lives.

The various domains of the State can be depicted as shown in diagram II.7, where each circle represents an area of specialization that includes certain government institutions and members of the public. There are some areas where different domains overlap, which is where interoperability plays a part. There is a clear difference between taking on the challenge of interoperability for the State as a whole and taking on that challenge domain by domain (or by clusters of domains) on an iterative, incremental basis while allowing some clusters to remain independent from others if that is warranted.

This form of governance is complemented by the management of the knowledge gained in the course of the exchanges made possible by interoperable systems, thereby capturing achievements and lessons learned. As a result, the information is embedded in the institutional framework and becomes available to all interested parties.

One of the key aspects in order to generate impact is the proper publicization and dissemination of the interoperable services at the level of State institutions, companies, and members of the public. This is a two-way form of communication, since it is not only a matter of conveying messages (dissemination); it is also important to determine if messages have been correctly understood and to receive feedback concerning what has been communicated. The monitoring and evaluation of results and of the impact on the community of users and other members of the public are of strategic importance and provide the feedback needed to continue to improve service interoperability.

■ Diagram III.7
Domains within the State architecture



Source: Economic Commission for Latin America and the Caribbean.

2. Digital capabilities and skills

This is a core area of key importance for the success of the digital transformation of the State because citizens —and, in general, all people— need to have certain digital skills in order to use technological solutions effectively. Their acquisition of such skills will not only help to narrow the digital divide but will also ensure that the entire population will be able to use digital technologies and will thus be able to adapt to the major changes being brought about by such technologies.

At first, the digital divide was defined in terms of access to infrastructure, devices and connectivity. As time has passed, however, a new way of looking at the situation has taken hold that goes beyond an instrumentalist view of technology. It is now recognized that the simple availability of these resources or contact with them does not have a linear effect on users; differing levels of skills and specific capabilities —in other words, differing levels of digital skills— matter.

Morduchowicz (2021, p. 6) defines digital capabilities as the sum of knowledge, capacities, skills, attitudes and strategies required in order to use technologies and the Internet. Digital skills can also be divided into fundamental skills and instrumental ones. This differentiation is between the complementary aspects of the technical/instrumental skills that people need to use devices, take advantage of connectivity and utilize software, on the one hand, and, on

the other, the skills needed to use them critically, ethically and creatively to participate on an equal footing in the culture that unfolds in digital environments. Evaluating these skills is of crucial importance in the design of digital inclusion policies.

In the course of the technical assistance provided to the Government of Córdoba Province in Argentina under a cooperation agreement between ECLAC and the Ministry of Coordination and the Federal Investment Council (FIC), a survey was conducted to gauge people's self-perception of their digital skills (García Díaz and Villafañe, 2024). In other words, the survey measured people's awareness of their digital skill levels. This provided valuable information about the level of digital skills of the population of the province of Córdoba.

An ECLAC study (García Díaz and Villafañe, 2024) used the Digital Competence Framework for Citizens[4] methodological database, commonly known as DigComp, which provides a common framework for evaluating and improving the population's digital abilities. Educators, employers and others can use it to understand and evaluate what digital skills people possess and to design training programmes accordingly. This framework, which offers a suite of key digital skills for persons of all ages and levels of ability, can also be used as a frame of reference for the formulation of digital inclusion policies designed to promote digital skill acquisition.

The DigComp framework is divided into five areas of digital competency (see diagram III.8) which are, in turn, composed of a total of 21 specific competencies (see annex III.A1):

(i) Searching for and managing information and data: The ability to search, select and evaluate online information and to manage, share and store data effectively.

(ii) Communicating and collaborating: Skills required for online communication, the use of collaborative tools and participation in digital communities.

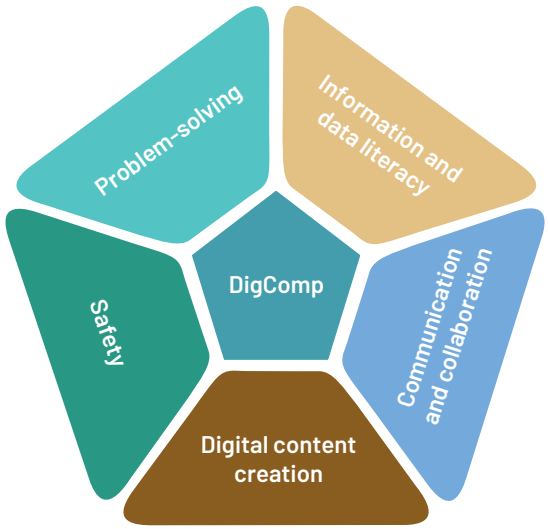
(iii) Creating digital content: The ability to use different types of media and tools to create and edit original digital content.

(iv) Security: Understanding and practising safe online behaviour, including personal data protection, privacy management and the identification of digital threats.

(v) Problem-solving: The ability to address technical problems and challenges in digital environments and to make informed, ethical decisions.

[4] The Digital Competence Framework for Citizens (DigComp) was first published in 2013 to serve as a frame of reference for supporting the development of people's digital skills in Europe. It has been updated periodically to add newer examples of the areas of digital competency that it describes. The latest version (DigComp 2.2) was published in March 2022. DigComp describes what competencies people need today in order to make use of digital technologies securely, critically, collaboratively and creatively in their work, to attain their learning goals, for leisure and for purposes of inclusion and participation in digital society. DigComp is developed by the Joint Research Centre (JRC) of the European Commission.

■ Diagram III.8
Areas of digital competence in the Digital Competence Framework for Citizens (DigComp)



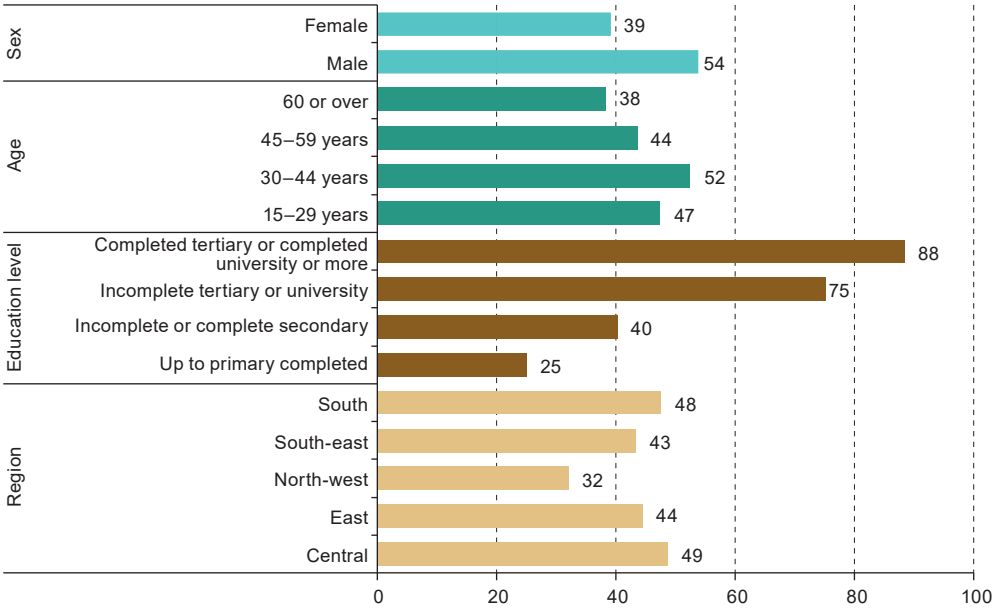
Source: Asociación Somos Digital. (2022). DigComp 2.2. *Marco de competencias digitales para la ciudadanía con nuevos ejemplos de conocimientos, habilidades y actitudes*. https://somos-digital.org/wp-content/uploads/2022/04/digcomp2.2_castellano.pdf.

The Digital Skills Indicator (DSI 2.0) and the methodology proposed by Vuorikari et al. (2022) were used to prepare the questionnaire for the study (García Díaz and Villafañe, 2024), which focused on specific practices using different technologies. It took 12 of the 21 dimensions and described activities that operationalize each of them (see annex III.A2). The survey was conducted in Córdoba Province in Argentina in November 2023 and gathered demographic and socioeconomic information on a total of 2,025 respondents, which was then extrapolated for the total population of the province.

The results of the survey indicate that 46.1% of the respondents had a desktop or laptop computer, while the other 53.9% said that they did not. Since the survey was conducted by phone, all respondents presumably had access to a mobile telephone, while 75.4% said that they had access to the Internet in their home and the other 24.6% did not. When the possession of a desktop or laptop computer and an Internet connection was cross-referenced with income levels, the data revealed a gap between low- and high-income respondents, with it being more common for higher-income respondents to own a computer.

The results also pointed to a positive correlation between levels of education and computer ownership. As the former rose, so did the latter. Figure III.1 shows the results for computer ownership, disaggregated by sex, age, level of education and region. The findings underscore the importance of looking at economic and educational disparities when analysing access to technology and essential services in the home.

■ Figure III.1
Córdoba Province, Argentina: possession of a computer and Internet connection in the home, 2023
(Percentages)

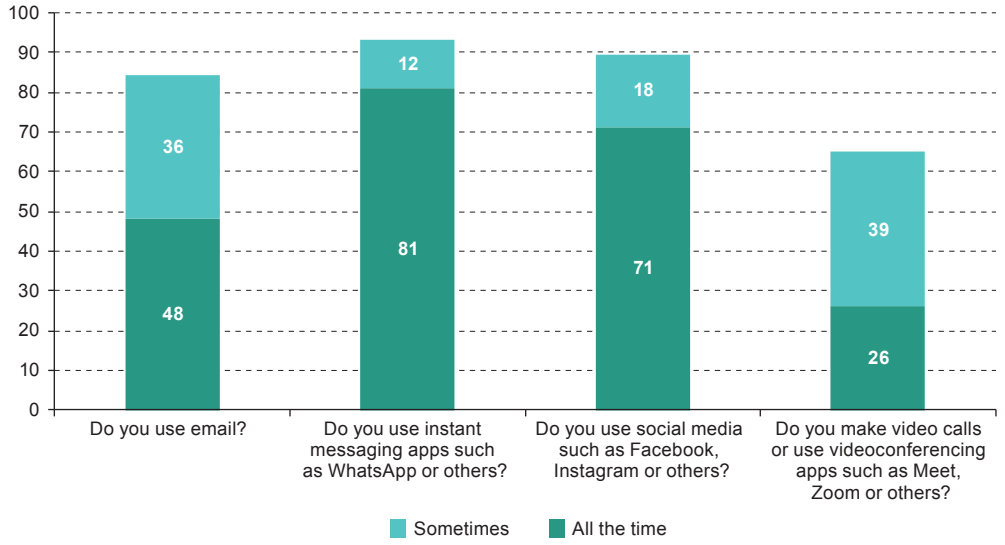


Source: García Díaz, F. and Villafañe, S. (Eds.). (2024). Habilidades digitales en la provincia de Córdoba. *Project Documents* (LC/TS.2024/63). Economic Commission for Latin America and the Caribbean. https://hdl.handle.net/11362/80590.

Figure III.2 provides a detailed view of how the respondents employ communications technologies in their daily lives and shows how frequently they use instant messaging and social media, as well as their ongoing use of email and video calls or videoconferencing apps. The survey results indicate that email and instant messaging apps are used most frequently by people between 30 and 44 years of age. In fact, email use by people in that age group is 10 percentage points higher than for any of the other groups. This may be because of its greater use in work settings than is the case for other more diversified digital communications tools that are common to all age groups. Similarly, the use of video calls or videoconferencing apps may also correlate with employment status, since it is 70% higher among members of the 30–44 and 45–59 age groups than it is among the younger and the older groups.

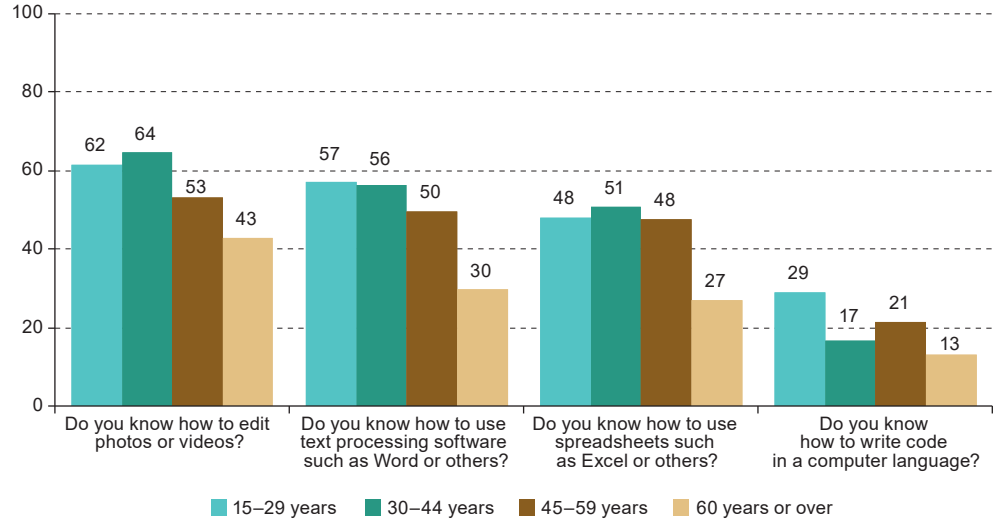
Figure III.3 illustrates how digital content creation skills vary from one age group to another. Younger groups tend to have more of these skills than older ones. These results highlight the need for training initiatives and for the digital inclusion of all generations.

■ Figure III.2
Córdoba Province, Argentina: frequency of use of selected virtual platforms, 2023
(Percentages)



Source: García Díaz, F. and Villafañe, S. (Eds.). (2024). Habilidades digitales en la provincia de Córdoba. *Project Documents* (LC/TS.2024/63). Economic Commission for Latin America and the Caribbean. https://hdl.handle.net/11362/80590.

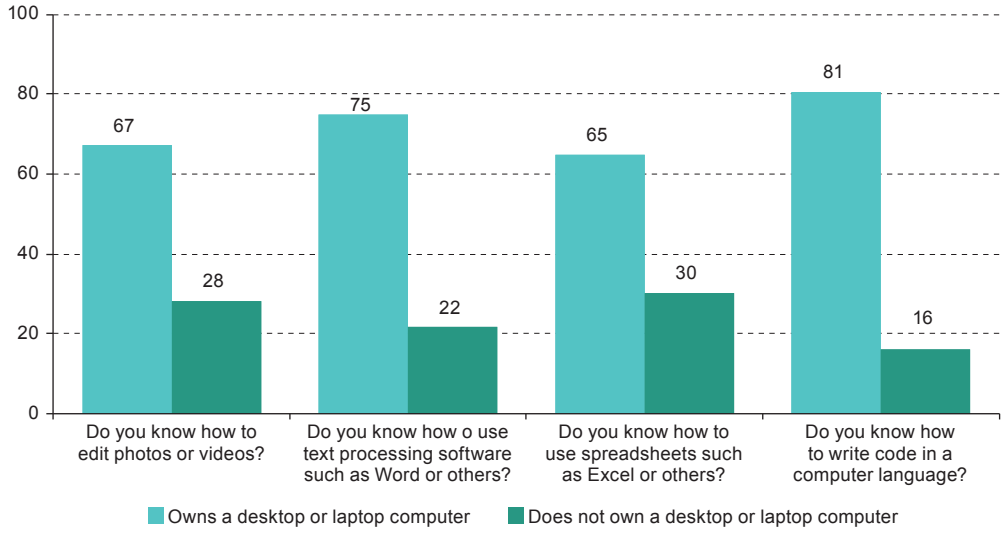
■ Figure III.3
Córdoba Province, Argentina: digital content creation competence, by age, 2023
(Percentages)



Source: García Díaz, F. and Villafañe, S. (Eds.). (2024). Habilidades digitales en la provincia de Córdoba. *Project Documents* (LC/TS.2024/63). Economic Commission for Latin America and the Caribbean. https://hdl.handle.net/11362/80590.

When digital content creation competence is cross-referenced computer ownership, the results give a more detailed picture of the relationship between computer ownership and respondents' specific digital skills. Generally speaking, people who have a computer tend to be more highly skilled in the use of software and other digital tools. than those who do not (see figure III.4). This underscores the importance of having access to technology for the development of digital skills.

■ Figure III.4
Córdoba Province, Argentina: competence in digital content creation of persons who own a computer and persons who do not, 2023
(Percentages)



Source: García Díaz, F. and Villafañe, S. (Eds.). (2024). Habilidades digitales en la provincia de Córdoba. *Project Documents* (LC/TS.2024/63). Economic Commission for Latin America and the Caribbean. https://hdl.handle.net/11362/80590.

These results for this smaller sample provide a picture of the respondents' digital skills in areas ranging from editing multimedia content to using productivity and programming tools. These skills are indicative of people's ability to work with digital technologies in various settings and so provide information about people's ability to make use of digital government solutions if they have access to a computer. The results also provide information about those people's age ranges. In some cases, these groups represent more than 50% of the population. This indicates that, when developing any digital government solution, it should be borne in mind that something more than 50% of the population will not have access to it or will be unable to use it. The results also indicate that the most commonly used digital tools are communications platforms and social media, which suggests that these are the tools that users see as having the greatest value and as being the easiest to use.

3. Digital infrastructure

The term "digital infrastructure" refers to the technological resources, components and systems needed to facilitate communication, data processing and the exchange of information in digital environments. This infrastructure provides the technological substructure for the operation of digital services, applications and platforms in a variety of settings, including the government, businesses and society in general. The term therefore encompasses a wide range of elements, including everything from communications networks and data centres to cloud computing platforms, cybersecurity systems and content management systems (CMS).

Key digital infrastructure components for digital government solutions include the following:

- Communications networks: A robust, secure communications network is essential in order to ensure connectivity among the various government bodies and the public. This may include cable and/or wireless network infrastructure, such as fibre optics networks, local area networks (LANs), wide area networks (WANs) and mobile networks.
- Data centres: Data centres are physical facilities that host servers, data storage systems and other informatics equipment needed to support digital government operations. These centres need to be designed to meet strict security, redundancy and disaster recovery capacity standards. An explicit policy should be in place that spells out the options for using local, foreign, private and public data centres, or a combination of all or some of these options, depending on the types of applications and data that are to be processed.
- Cloud computing platforms: Cloud computing platforms offer scalable, flexible computer resources that government bodies can use to implement and execute applications and digital services efficiently and profitably. The cloud can also provide storage, backup and data recovery capacities. An explicit policy should be in place that spells out the options for using local, foreign, private and public cloud computing platforms, or a combination of all or some of these options, depending on the types of applications and data that are to be processed.
- Cybersecurity or ICT security: The digital transformation process cannot move forward without a proper cybersecurity strategy. Policies and measures need to be put in place for the protection of computer and communications assets and for ensuring their resilience in the event of vulnerabilities or malfunctions (Órdenes et al., 2023, p. 38).

Other components include digital identity platforms, application programming interfaces (APIs), CMS and the infrastructure needed to ensure accessibility and usability. These are all part of the cross-cutting applications discussed in section III.D.1.

With regard to the importance of this infrastructure and the bearing that it has on people's rights, Agudelo et al. (2020) have noted that today's robust, innovative and ever-changing telecommunications infrastructure is a mainstay of economic and social activity in the modern world. Access to it, to the Internet and to telecommunications services and information technologies is a human right and enables people to exercise other rights, such as their rights to health, education, culture, security, freedom of expression and mobility. This infrastructure is also of strategic importance because, in crisis situations such as the one created by the COVID-19 pandemic, it makes it possible for people to continue to exercise those rights and is governments' and society's best ally in buttressing economic activity.

As observed by ECLAC (2020), access to sufficiently fast broadband service and to Internet-ready devices is of decisive importance for the exercise of basic human rights such as the right to health, education and work, while a lack of connectivity can heighten social and economic inequalities. In the same report as cited above, ECLAC draws attention to the significant difference between urban and rural areas in Latin America in this respect, inasmuch as data for 2018 indicate that 67% of urban households were connected to the Internet, whereas only 23% of rural households were (ECLAC, 2020).

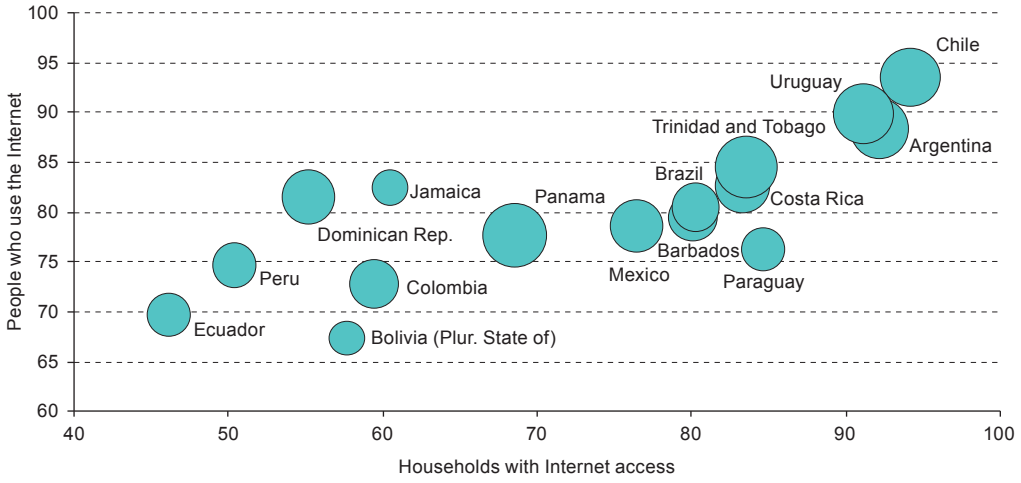
Providing Internet access for everyone, regardless of where they live, is a challenge that the State must play an active part in meeting. People living in rural or marginated areas often have difficulty gaining access to online resources that could improve their quality of life. Without good digital infrastructure, universal Internet access is not actually attainable.

Connectivity is essential for the smart manufacturing and industrial processes that will be part of "industry 4.0" (also known as the fourth industrial revolution), in which smart governments 4.0 will be able to govern in new contexts without stifling innovation, use technological tools to promote predictive metrics without lowering standards of legal certainty and predictability, and use big data and more highly qualified human resources to broaden and personalize policies without losing an overarching perspective (Basco et al., 2018). Modern factories use automation, robotics and the Internet of Things to increase the efficiency and quality of their production processes. Real-time connectivity between machines and management systems affords greater flexibility and the ability to swiftly adapt to changing market demand.

A study by the Organisation for Economic Co-operation and Development and Development Bank of Latin America and the Caribbean (OECD and CAF, 2024) provides an overview of connectivity in Latin America and the Caribbean and traces a positive correlation between per capita income level and access to and use of the Internet in the region. However, the situation in terms of Internet access and actual use is quite mixed, with use being less unequal across the countries of the region than access. Figure III.5, which is based on the

OECD and CAF study (2024), illustrates the variability and inequality of Internet access in the different countries, with access rates ranging from a low of 45% to a high of over 90%. Greater strides have been made in the countries of the region in terms of the number of persons actually using the Internet, however.

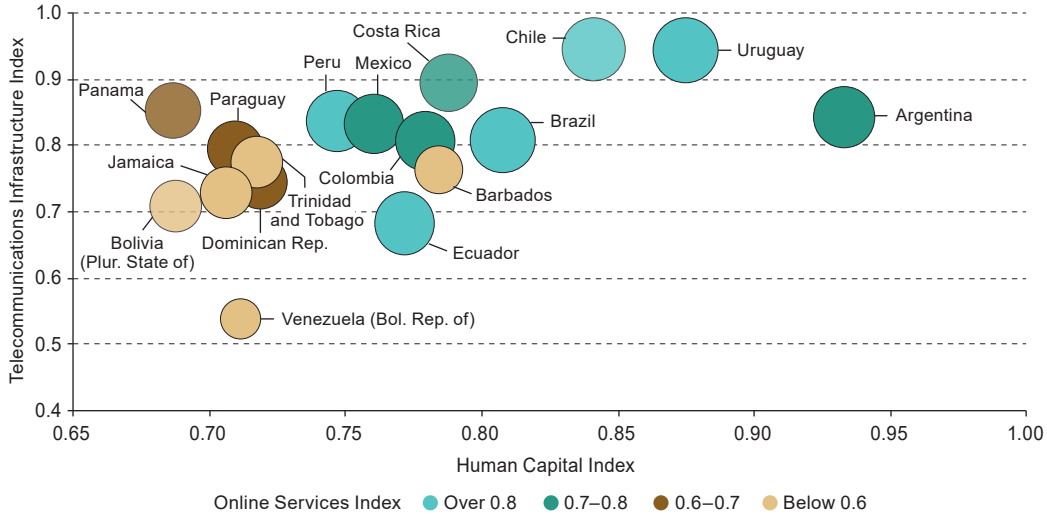
■ Figure III.5
Latin America and the Caribbean (16 countries): Internet access and use in relation to income levels, 2022[a]
(*Percentages*)



Source: Economic Commission for Latin America and the Caribbean, on the basis of International Telecommunication Union. (2022a). *Households with Internet access at home*. https://datahub.itu.int/data/?i=12047; (2022b). *Individuals using the Internet*. https://datahub.itu.int/data/?i=11624; World Bank. (2022). *GNI per capita, PPP (current international $)*. https://databank.worldbank.org/source/world-development-indicators/preview/on; Organisation for Economic Co-operation and Development and Development Bank of Latin America and the Caribbean. (2024). *Digital Government Review of Latin America and the Caribbean: Building Inclusive and Responsive Public Services*. https://doi.org/10.1787/29f32e64-en.
Note: The size of the circles indicates the level of per capita gross national income.
[a] The countries appearing in the figure are those that are members of OECD and CAF (2024).

Based on data from that same study (OECD and CAF, 2024), the metrics for the Latin American and Caribbean countries of the three core indicators for the United Nations E-Government Survey —the Telecommunications Infrastructure Index, the Human Capital Index and the Online Services Index— are shown in figure III.6. They indicate that the countries of the region have made more progress in the area of human capital than they have in the development of infrastructure. A comparison of the information given in figures III.5 and III.6 shows that countries with higher per capita incomes tend to perform better on both the Telecommunications Infrastructure Index and the Human Capital Index.

■ Figure III.6
Latin America and the Caribbean (17 countries): United Nations E-Government Survey indicators, 2024



Source: Economic Commission for Latin America and the Caribbean, on the basis of United Nations. (2024). E-Government Survey 2024: Accelerating Digital Transformation for Sustainable Development with the Addendum on Artificial Intelligence. *United Nations E-Government Surveys*. (13)(ST/ESA/PAD/SER.E/218); Organisation for Economic Co-operation and Development and Development Bank of Latin America and the Caribbean. (2024). *Digital Government Review of Latin America and the Caribbean: Building Inclusive and Responsive Public Services*. https://doi.org/10.1787/29f32e64-en.
Note: The size and colour of the circles represent the Online Services Index.

It is thus essential to install and build digital infrastructure in areas where it does not yet exist or is of poor quality in order to provide greater equality of opportunity and to increase industrial and agriculture productivity. Some of the aspects of this infrastructure that need to be taken into account are as follows:

- Speed: The speed and type of technology are indicators of the quality of service. They also provide information on differences in the quality of network cabling. Fibre optics provide faster speeds and more bandwidth than copper cables, coaxial cables and wireless technologies, and they also provide greater signal fidelity because the signal is not affected by interference from external sources.
- Network technology: This term refers to the combination of components, protocols and systems that permit the different devices in a network to communicate and to transfer data from one to another. Some of the main features of network technology are its topology, communications protocols, network devices, transmission media, network services and applications, network security and network management.
- Availability: This term refers to the amount of time that the services are operational and accessible for use by network clients. Network availability is a critical aspect of Internet service quality, since users depend on uninterrupted connectivity in order to conduct their online activities.

- Connectivity capacity: A high-quality Internet service offers users a smooth, fast, reliable, secure experience that is backed by robust customer service. Users should be able to know that their Internet connection will be available whenever they need it and that it will meet their expectations in terms of speed and performance. This is why the proper scaling of connectivity capacity is so important.
- Autonomous systems: Networks are organized and managed by what are known as "autonomous systems". These systems are a collection of Internet protocol (IP) networks and routers that are managed by a single entity which is governed by a shared routing policy. These systems are essential for the operation of the Internet because they route traffic within each system's network and between different networks. Each system is assigned an autonomous system number (ASN).
- Network classification: This refers to the process of understanding and organizing different network technologies into meaningful categories, which makes it easier to study, compare and apply them in various contexts. For example, networks can be classified as local area networks (LANs), wide area networks (WANs) or metropolitan area networks (MANs), depending on their geographical scope. They can also be categorized as wired or wireless, depending on the transmission medium used.

These characteristics of digital infrastructure are listed here in order to highlight the fact that good governance and a good digital government are not sufficient in themselves but must instead be supported by access to high-quality digital infrastructure.

Annex III.A1
Competence areas of the Digital Competence Framework for Citizens (DigComp 2.2)

Competence area 1: information and data literacy.

(i) Browsing, searching and filtering data, information and digital content.

(ii) Evaluating data, information and digital content.

(iii) Managing data, information and digital content.

Competence area 2: communication and collaboration.

(i) Interacting through digital technologies.

(ii) Sharing through digital technologies.

(iii) Engaging citizenship through digital technologies.

(iv) Collaborating through digital technologies.

(v) Netiquette.

(vi) Managing digital identity.

Competence area 3: digital content creation.

(i) Developing digital content.

(ii) Integrating and re-elaborating digital content.

(iii) Copyright and licences.

(iv) Programming.

Competence area 4: safety.

(i) Protecting devices.

(ii) Protecting personal data and privacy.

(iii) Protecting health and well-being.

(iv) Protecting the environment.

Competence area 5: problem-solving.

(i) Solving technical problems.

(ii) Identifying needs and technological responses.

(iii) Creatively using digital technology.

(iv) Identifying digital competence gaps.

Source: Vuorikari, R., Kluzer, S. and Punie, Y. (2022). *DigComp 2.2: The Digital Competence Framework for Citizens- With new examples of knowledge, skills and attitudes*. Publications Office of the European Union.

Annex III.A2
Dimensions of the Digital Competence Framework for Citizens (DigComp 2.2) covered in the survey conducted by the Economic Commission for Latin America and the Carbbean (ECLAC) in the Province of Córdoba, Argentina

As one component of the technical assistance that ECLAC provided to the government of the Province of Córdoba, Argentina,[5] a survey was conducted to assess the population's digital skills based on people's self-perception of the knowledge they have acquired. That survey incorporated the 12 dimensions that are shown below in boldface type. The activities associated with each dimension are also listed.

Competence area 1: information and data literacy.

(i) Browsing, searching and filtering data, information and digital content.

(ii) Evaluating data, information and digital content.

(iii) Managing data, information and digital content.

Activities used to measure information and data literacy:

- i1: Finding information on goods or services.
- i2: Searching for health-related information.
- i3: Reading news websites, newspapers or magazines online.
- i4: Checking the accuracy of information and its sources online.

Competence area 2: communication and collaboration.

(i) Interacting through digital technologies.

(ii) Sharing through digital technologies.

(iii)Engaging citizenship through digital technologies.

(iv) Collaborating through digital technologies.

(v) Netiquette.

(vi) Managing digital identity.

Activities used to measure communication and collaboration skills:

- c1: Sending/receiving e-mails.
- c2: Making phone or videophone calls over the Internet.
- c3: Using instant messaging.

[5] See García Díaz and Villafañe (2024).

- c4: Participating in social networks.
- c5: Expressing opinions about civic or political issues on websites or in social media.
- c6: Participating in online consultations or voting on civic or political issues.

Competence area 3: digital content creation.

(i) Developing digital content.

(ii) Integrating and re-elaborating digital content.

(iii) Copyright and licences.

(iv)Programming.

Activities used to measure digital content creation skills:

- d1: Using text processing software.
- d2: Using spreadsheet software.
- d3: Editing photos, videos or audio files.
- d4: Copying or moving files (documents, data, images or videos) from one folder or device to another (via email, instant messaging, a USB flash drive or a USB cable) or via the cloud.
- d5: Creating files (documents, images or videos) that incorporate various elements, such as text, images, tables, figures, animation or sound.
- d6: Using advanced features of spreadsheet software (functions, formulas, macros and others) to organize, analyse, structure or modify data.
- d7: Writing code in a programming language.

Competence area 4: safety.

(i) Protecting devices.

(ii) Protecting personal data and privacy.

(iii)Protecting health and well-being.

(iv) Protecting the environment.

Activities used to measure safety skills:

- s1: Managing access to the respondent's own personal data by verifying that the website on which the respondent provided personal data is safe.
- s2: Managing access to the respondent's own personal data by reading privacy statements before providing personal data.
- s3: Managing access to the respondent's own personal data by restricting or denying access to the respondent's geographical location.

- s4: Managing access to the respondent's own personal data by limiting access to the respondent's profile or content on social networking sites or shared online storage applications.
- s5: Managing access to the respondent's own personal data by denying permission to use the respondent's personal data for advertising purposes.
- s6: Changing the settings on the browser being used by the respondent in order to prevent or limit the use of cookies on any of the respondent's devices.

Competence area 5: problem-solving

(i) Solving technical problems.

(ii) Identifying needs and technological responses.

(iii) Creatively using digital technology.

(iv) Identifying digital competence gaps.

Activities used to measure problem-solving skills:

- p1: Downloading or installing software or applications.
- p2: Changing settings on software, applications or devices.
- p3: Making purchases online (within the last 12 months).
- p4: Selling items online.
- p5: Using online learning resources.
- p6: Using online banking.
- p7: Looking for work or sending a job application online.

Source: Vuorikari, R., Kluzer, S. and Punie, Y. (2022). *DigComp 2.2: The Digital Competence Framework for Citizens - With new examples of knowledge, skills and attitudes*. Publications Office of the European Union.

Chapter IV
Implementation of the model: suggestions and considerations

This chapter will offer some suggestions and discuss some factors that should be taken into consideration in connection with the implementation of the model proposed by the Economic Commission for Latin America and the Caribbean (ECLAC), which has been described in the preceding chapters.

A. An assessment mechanism

1. Maturity metric

It is suggested that countries wishing to apply this model undertake an assessment of the current status of each of the model's features in order to gauge its degree of completeness. This can be done using a checklist or a scoring system. Table IV.1 describes different levels of maturity associated with the various areas, components and variables of digital government and assigns a score (from 1 to 4) to each.

■ Table IV.1
Digital government maturity levels

Level	Description	Score
Level 1: Not present	• The feature does not exist, is not being addressed on an institutionalized basis, is being addressed reactively or tends to be addressed on an isolated, case-by-case basis. • There is, however, an awareness that it needs to be addressed.	1
Level 2: Emerging	• The institution has begun to work on this feature in a specific area or in a piecemeal way. • The work is being done in response to a specific request rather than because a need is seen for an integrated effort.	2

Level	Description	Score
Level 3: Intermediate	• The institution has formalized a process for working on the feature. • The basic arrangements for pursuing this process on a regular basis are in place. • The application of this process shows that headway is being made in this area.	3
Level 4: Advanced	• The relevant processes have reached an advanced operational level. • A follow-up and continuous improvement process is in place. The management of this feature has become systematized, automated or digitalized. • A high degree of efficiency and effectiveness has been attained, and the results reflect that.	4

Source: Economic Commission for Latin America and the Caribbean.

2. Classification of the model's variables

For each area and component of the model, each variable should be given a score from 1 to 4 as described in table IV.1 (see tables IV.2, IV.3 and Iv.4). The average scores for each component and area should then be calculated.

■ Table IV.2
Area: governance and institutionality

Area	Component	Code	Variable	Score (from 1 to 4)	Average score for the component	Average score for the area
1. Governance and institutionality (governance framework)	1.1. Strategic governance	1.1.1.	A specific government group or entity has been designated as the lead agency for the strategic governance of digital government processes and tasked with applying the strategy on an ongoing, regular basis.	2	1.5	2.6
		1.1.2.	The authority and powers have been established for coordinating entities and sectors; conducting lateral coordination and pooling efforts; setting objectives, priorities, policies and strategies; earmarking resources and committing to producing results; and facilitating digital government agreements.	1		
		1.1.3.	There is strategic cross-cutting alignment and representation of key institutions and stakeholders in the areas of digital government and governance.	1		
		1.1.4.	The regulatory framework supports the purpose, authority and powers, and decisions of the strategic governance group or entity.	2		

Area	Component	Code	Variable	Score (from 1 to 4)	Average score for the component	Average score for the area
1. Governance and institutionality (governance framework)	1.2. Directive governance	1.2.1.	A permanent government agency has been assigned to direct the digital government process.	4	3.0	
		1.2.2.	The authorities and powers have been conferred upon the directive authority to establish the regulatory framework (laws, decrees, resolutions, technical standards); develop the pillars that will underpin cross-cutting digital government solutions; and perform monitoring and performance auditing.	3		
		1.2.3.	Technical standards have been integrated with the frames of reference and models to be used for the implementation of digital government solutions.	2		
		1.2.4.	The regulatory framework has been established that will underpin the purpose, areas of authority and decisions of the agency designated as the directive authority.	3		
	1.3. Operational governance	1.3.1.	A permanent government agency has been assigned responsibility for the operational governance of the digital government process.	4	3.3	
		1.3.2.	The authority and powers have been established for the operational authority to define, design, implement, assist with and continuously improve the development of cross-cutting digital government solutions and to integrate them with the vertical solutions of each government body, taking into consideration innovative government components, processes, information, technologies and the people involved.	3		
		1.3.3.	The technical and methodological manuals, methods, standards and procedures have been prepared to guide the correct implementation and use of digital government solutions.	3		
		1.3.4.	The regulatory framework that will underpin the purpose, areas of authority and decisions of the agency designated as the operational authority.	3		

Source: Economic Commission for Latin America and the Caribbean.
Note: The scores shown in the table are simply examples.

■ Table IV.3
Area: digital government

Area	Component	Code	Variable	Score (from 1 to 4)	Average score for the component	Average score for the area
2. Digital government	2.1. Interoperability	2.1.1.	The regulatory and legal framework has been established for institutions' interoperability and integration as part of the digital government system.	2	2.75	3.0
		2.1.2.	An organizational working model has been established for the associated processes and alignment of institutions to facilitate people-centred interoperability.	3		
		2.1.3.	Semantic and syntactic interoperability ensures that the precise format and meaning of shared information are preserved and understood in all exchanges between different parties.	2		
		2.1.4.	The integrated technical interoperability model covers the applications and infrastructure linking systems and services, including interface specifications, interconnection services, data integration services, data presentation and exchange, and secure communication protocols.	4		
	2.2. Digitalized public services	2.2.1.	Digital solutions have been developed for meeting users' needs online via a readily accessible, efficient and inclusive centralized (federated or sector-based) channel that facilitates people's interaction with the State.	3	3.0	
		2.2.2.	A single-window system for citizen access to digitalized public services is in place and includes administrative procedures and applications, digital records (a personal digital file), the delivery and receipt of general and personal information and a personalized interface based on user interests and interactions with different areas or sectors of the State.	3		

Area	Component	Code	Variable	Score (from 1 to 4)	Average score for the component	Average score for the area
2. Digital government	2.2. Digitalized public services	2.2.3.	Digital files dealing with the various matters of interest to people or organizations have been set up. These files include such documents as academic records, citizenship and residence certificates, employment records, retirement documentation, health and insurance records, social protection and family documents, housing deeds and other related documents, motor vehicle records, tax documents and transparency documentation, as appropriate.	2		
		2.2.4.	The digital domicile is the official, legally recognized and secure address of a person or organization. All notifications, citations, summonses and official communications sent to that address are legally valid for the fulfilment of the associated obligations and the exercise of rights in relation to the State.	4		
	2.3. Digital authentication of identity, digital signature and cybersecurity	2.3.1.	Digital identities and their authentication are used to establish and validate a person's or organization's identity in the digital environment and ensure that people who access given services or resources online are who they say they are.	3	3.3	
		2.3.2.	Digital signatures are in use as a secure and legally binding mechanism for signing documents and messages electronically and ensuring both the authenticity of the signer and the integrity of the information.	4		
		2.3.3.	Cybersecurity systems are in place that focus on protecting systems, networks, devices, infrastructure and data against attacks, damage and unauthorized access in the digital environment. This requires coordinated action to ensure the confidentiality, integrity and availability of information and to protect systems, infrastructure and users from cyberattacks	3		

Source: Economic Commission for Latin America and the Caribbean.
Note: The scores shown in the table are simply examples.

■ Table IV.4
Area: general capacities

Area	Component	Code	Variable	Score (from 1 to 4)	Average score for the component	Average score for the area
3. General capacities	3.1. Innovation and. strengthening of the government	3.1.1.	A strategy for promoting innovation and strengthening the government is in place that focuses on people-centred and people-driven solutions based on a public value proposition and the substantive functions of each institution that will reinforce processes, information technologies, people and government capacities. These solutions will promote creativity, experimentation and the adoption of emerging technologies that can be used to upgrade public services.	1	2.3	2.2
		3.1.2.	Systematized working methods have been established for transforming and optimizing processes and for designing, developing and implementing efficient solutions effectively that are focused on meeting users' needs.	2		
		3.1.3.	Systematized working methods have been established that focus on capturing the user experience, detecting new needs or opportunities for improvement and measuring the impact of solutions so that this information can be used as inputs for decision-making and prioritization.	3		
		3.1.4.	Coordinated innovation initiatives have been established that are focused on encouraging people to explore and develop new solutions, promote intersectoral partnerships and conduct incubation programmes and events.	3		
	3.2 Culture and change management	3.2.1.	The culture and change management strategy within a digital government framework focuses on facilitating change processes at the organizational and personal levels, fostering an organizational culture that promotes certainty, collaboration, adaptability and innovation, and taking into consideration such areas as communication and dissemination, training, support, empowerment and leadership as part of a joint, coordinated effort with the teams responsible for information technologies and processes.	1	2	
		3.2.2.	Systematized working methods for communication and dissemination have been established that focus on the organizational alignment of change initiatives; keeping all stakeholders, both within and outside the organization, informed on a timely basis; listening to their concerns and conveying messages for all stakeholders and focused messages for given segments, as appropriate, in order to help ensure the successful implementation of digital government solutions.	3		

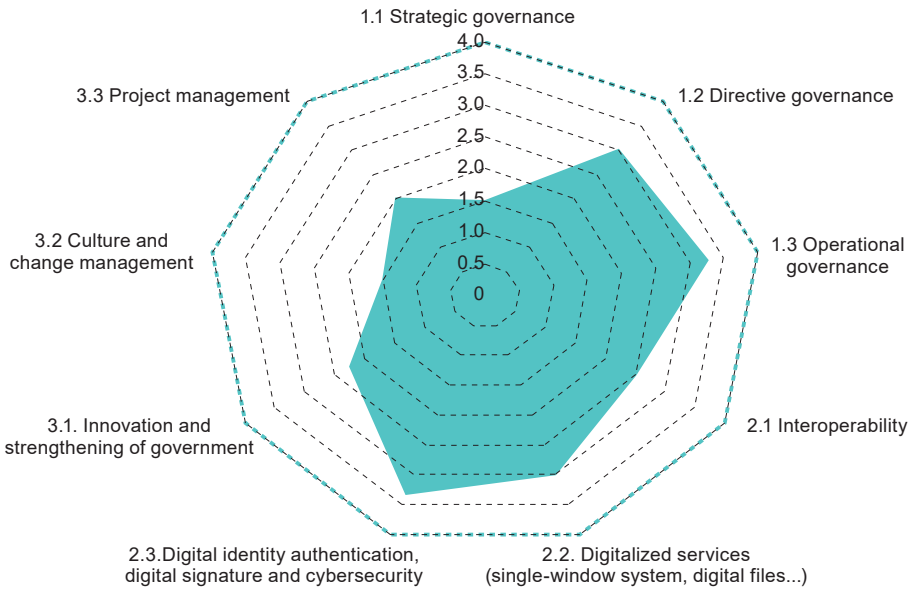
Area	Component	Code	Variable	Score (from 1 to 4)	Average score for the component	Average score for the area
3. General capacities	3.2 Culture and change management	3.2.3.	Systematized working methods have been established for providing support and fostering empowerment and leadership focusing on influential individuals and teams or those affected by change initiatives and change processes in order to help ensure the successful implementation of digital government solutions.	1		
		3.2.4.	Systematized working methods have been established for providing instruction and training so that people can acquire the technical and behavioural skills and capabilities they need to take advantage of change initiatives.	3		
	3.3. Project and resource management	3.3.1.	An integrated system has been established for the management of the digital government project portfolio, which entails the detection of synergies among strategic objectives, stakeholders, risk management and mitigation measures, efficient resource use and the achievement of the established targets.	2	2.25	
		3.3.2.	Tools have been developed for tracking the progress and completion of each step in the process, such as dashboards and indicators, as well as infographics for disseminating results and for use in decision-making.	2		
		3.3.3.	The management of budget execution ensures the timely allocation and availability of funds, the implementation of the procurement operations necessary for execution of digital government projects and their transition to a regular operational basis once their implementation is complete.	3		
		3.3.4.	The management of human capital and human resources ensures the timely deployment and availability of the human resources needed to execute digital government projects and manage their transition to a regular operational basis following implementation.	2		

Source: Economic Commission for Latin America and the Caribbean.
Note: The scores shown in the table are simply examples.

3. Gap identification

It is recommended that this tool be used regularly (for example, once a year) in order to have a baseline and obtain an overall picture of what progress is being made in closing the gaps that have been identified. The averages of the scores for the different variables of each component can be used to produce a graphic representation such as the one shown in figure IV.1. The amount of progress that is being made will be observable as the shaded area in the figure gradually expands as targets are reached and as the variables approach the top score (4).

■ Figure IV.1
Example of the measurement of progress in the digital government and governance process using the model proposed by the Economic Commission for Latin America and the Caribbean (ECLAC)
(Scores from 1 to 4 for each component)



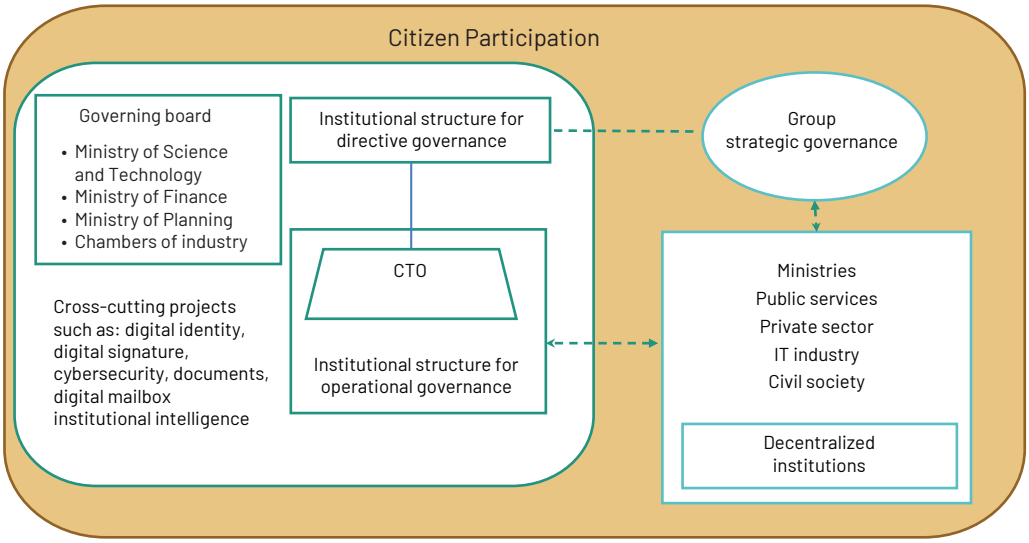
Source: Economic Commission for Latin America and the Caribbean, on the basis of the survey performed on the counterparty team of the province of Córdoba, Argentina.
Note: The example shown here corresponds to the measurements taken in 2023 during an ECLAC technical assistance mission in support of the Ministry of Coordination of the Government of the Province of Córdoba, Argentina.

B. Structure of the digital government and governance model

Diagram IV.1 outlines the general structure of the various actors involved in implementing the digital government and governance process and their interrelationships. A distinction is drawn between the governance components actuated by a group or cluster of stakeholders (strategic governance) and those whose implementation requires the action of specific institutions or agencies (directive and operational governance).

The institutional structure for operational governance, which may be entrusted to a government department, agency, division or some other unit as the lead agency, is in charge of implementing cross-cutting projects in coordination with the vertical solutions of sectoral institutions and decentralized bodies such as local or municipal governments, autonomous agencies or others.

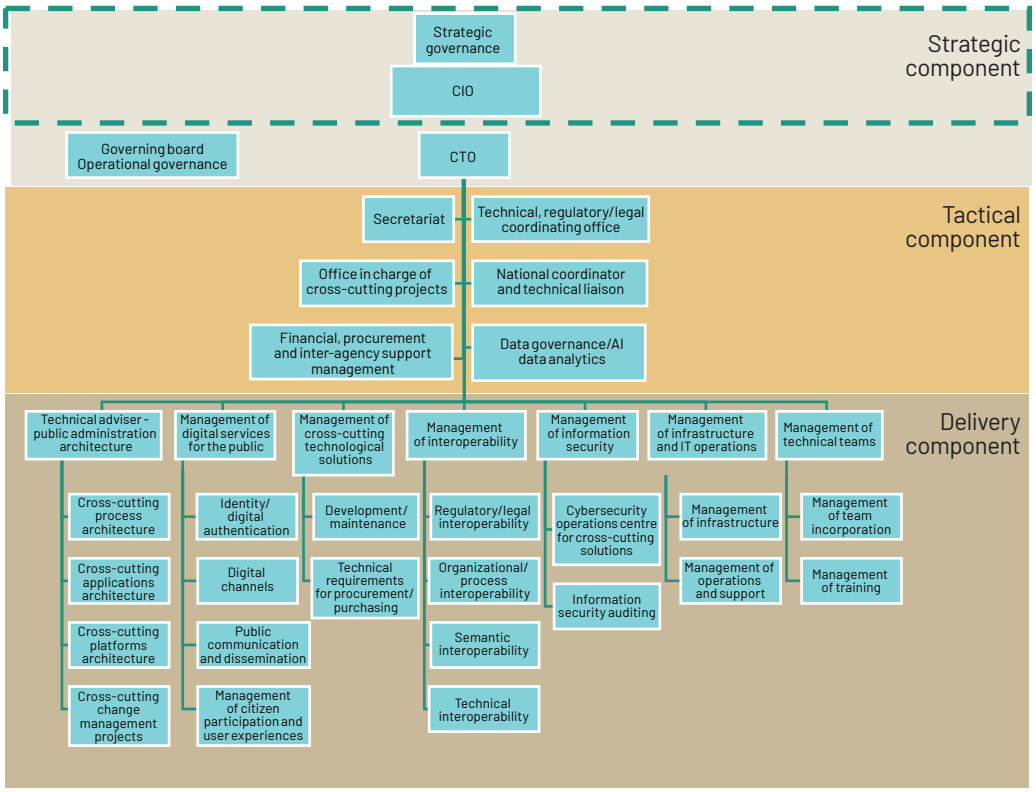
■ Diagram IV.1
General structure of digital government and governance actors



Source: Economic Commission for Latin America and the Caribbean.

An ad hoc organizational structure is required for the implementation of the relevant services. Diagram IV.2 provides an example of a structure of the scale required to perform the wide range of institutional functions to be carried out by the lead agency for the implementation of cross-cutting digital government solutions.

■ Diagram IV.2
A digital government structure



Source: Economic Commission for Latin America and the Caribbean.

Key areas of responsibility and the associated roles include:

- Cross-cutting service-based activities involving two-way communication between members of the public and institutional actors:
  - Identify inputs for the lead agency to inform the digital government policy development process.
  - Provide support and technical advisory services to civil service institutions and members of the public.
  - Create opportunities and specific mechanisms, in coordination with the lead agency, for members of civil society, academia and industry, business associations and others to enable them to be a part of the digital government process and identify cross-cutting solutions that generate value and support the digital transformation of the State.

  - Monitor and publicize usage statistics on cross-cutting projects and services.
  - Provide support and guidance on the way to use and effectively apply cross-cutting services, and collect feedback as inputs for the design and/or redesign of solutions for government institutions and users.
  - Arrange for the use and effective operation of the single-window system for accessing digital government solutions. (See, for example, Costa Rica's Pura Vida Digital portal: https://puravidadigital.gob.go.cr/.).
- Cross-cutting digital government solutions:
  - Develop (or acquire), execute (launch) and administer (provide support and maintenance for) cross-cutting or strategic digital government projects and services to ensure the delivery of digital services by State institutions.
  - Define, monitor and manage the necessary service levels of cross-cutting solutions.
  - Manage the necessary platforms (for processing, storage, licensing and communications) for the models included in the strategy (private or public cloud computing).
  - Maintain relations with counterparts in user institutions (technical and service areas) regarding user training and the receipt of feedback as inputs for solution development and improvement.
  - Administer the security features protecting access to solutions and their use.
  - Develop (or acquire), execute (launch) and administer (provide support and maintenance for) the single window for accessing the State's digital government solutions.
- Governance of digital identities and digital authentication:
  - Manage (develop, contract for and provide support services for) the digital government digital identity platform.
  - Make the infrastructure and resources available that are needed to permit the large-scale use of digital identity and digital authentication features by institutional and individual users.
- Governance of interoperability:
  - Develop (or acquire), execute (launch) and administer (provide support and maintenance for) the regulatory/legal, process, semantic and technology components of the interoperability platform.
  - Maintain relations with counterparts in the institutions involved in interoperability functions (commitments and applications) to ensure that the platform and the interoperating services or solutions function properly.

- Culture and change management:
  - When cross-cutting projects are selected for implementation, identify the staff members and other persons who will be affected by them and who will influence their chances of success and then develop tailored plans for providing them with support and training and for conducting communication and dissemination activities.
  - Provide institutions with coaching and support to help them implement cross-cutting solutions and put in place culture and change management plans.
  - Evaluate, supplement or correct any measures that may have an impact on the successful implementation of projects and their use.
- Legal (informatics) management:
  - Identify and catalogue laws, resolutions and any other regulatory instruments that would restrict or prevent the implementation of cross-cutting solutions, and then propose enabling interpretations of those provisions or propose and secure modifications that will allow the implementation of the cross-cutting solutions in question to go ahead.
  - Maintain relations with legal experts in counterpart institutions who can assist with arriving at consensus-based interpretations of legal instruments having a bearing on cross-cutting solutions.
- Management of cross-cutting projects (project management office):
  - Design cross-cutting projects as part of the office's project portfolio and ensure that sufficient funding for their execution and the necessary resources to permit stakeholder participation are in place
  - Manage and determine the scope, time frames, arrangements for stakeholder participation, milestones, communications channels and resources of these projects to help ensure their successful implementation.

C. Considerations regarding the implementation of the model

The technological advances discussed in this guide pose formidable challenges for public policy and digital governance but also open up important opportunities in these same areas. There are consequently a number of structural aspects that have to be taken into consideration if the proposed model is to be implemented successfully.

1. Data and information asset governance, fuel for artificial intelligence

Disciplines such as data governance and cybersecurity, along with high-quality information assets, must have been incorporated by public institutions if they are to have the necessary inputs to fuel artificial intelligence (AI) initiatives. When data are treated as strategic assets in alignment with an institution's substantive functions and are subject to governance processes that ensure their accuracy, coherence, integrity and currency, they become a reliable input for AI models. This makes it possible to improve decision-making, optimize operational processes and automate services more efficiently. It also enables the user institution to ensure transparency, its compliance with regulatory standards, the observance of high ethical standards and the maintenance of a strong sense of responsibility regarding the use of AI within the framework of a model such as the one proposed here, which is designed to coordinate and build upon data governance policies and strategies together with the relevant stakeholders (the State, civil society and the private sector). The aim is to promote skill acquisition and cooperation focusing on the generation of public value (Naser, 2021) for the countries of Latin America and the Caribbean (ECLAC, 2024a) through data processing, resource optimization and the use of digital technologies. An open data architecture is needed that also makes it possible to safeguard personal data and its confidentiality, ensure its integrity, availability and authenticity, and maintain control over the data.

As a corollary of this form of data governance, the design, consensus and integration of the information and data domain[1] models of the various public institutions involved in the digital government process are of fundamental importance. An essential part of this process is the definition and assignment of responsibilities for identifying, safeguarding and exchanging information both within each institution (in accordance with its substantive function) and in the domains it shares with other bodies. This kind of coordination not only makes a significant contribution to the process as a whole but also is essential in order to generate the necessary inputs for managing information assets (the data which serves as the basic material for cybersecurity operations)[2] since it entails the identification, prioritization and protection of those information assets and the assignment of the responsibility for processing them to given persons or units.

The output of this entire process is the most valuable kind of input for AI: data. Data are fed to AI systems to power machine learning. This is different from traditional programming. In simple terms, programming a computer consists of giving it instructions about how to process inputs in order to produce the desired results. If the relationship between the inputs

1 An "information domain" is defined as the aggregate information possessed by an institution which it uses to perform its substantive functions and which the institution is responsible for generating and ensuring that it is up-to-date, consistent and complete. Other institutions use these information domains by maintaining access to the data at source. State institutions can also be segmented by functional domains (data communities or specialized groups) such as health, education, benefits, housing or pensions.

2 Information assets are any type of information that has value for an organization and that needs to be protected. This may include confidential information, information subject to intellectual property restrictions, financial information, clients lists, employee information, etc.

and the output is known (for example, it is known how to convert temperatures measured in Celsius degrees into measurements in Fahrenheit degrees), then the traditional sort of programming works very well. The difference with AI systems is that they can resolve problems in which the exact relationship between, for example, the impact of corporate finance, on the one hand, and economic factors and share prices, on the other, is not known. A list of possible input variables may be drawn up, but it is not known what values should be assigned to them or how they should be combined to come up with the result. Data are needed to train AI systems to model the relationship between these inputs and outputs. The greatest hurdles to the effective use of AI in public organizations are thus the poor quality of their data and the existence of data silos.

2. Data and artificial intelligence: critical factors

Data governance, information assets and AI are all closely linked and are complementary components of digital government. The first two of those elements play an essential role in ensuring data quality, data security and the ethical, responsible use of data in the AI era. Given their interdependence, they have to be dealt with as an integral whole in order to achieve an effective and ethical form of digital government.

Some of the ways in which these elements relate to one another and the critical factors involved in creating that interrelationship are outlined below.

- Data quality: Data quality is vital for the success of AI systems. These systems rely on accurate, complete, reliable data in order to train models and support intelligent decision-making. Information assets and data governance perform a crucial role in ensuring the quality, integrity and trustworthiness of the data used in AI systems.
- Data privacy and security: Protecting data privacy and ensuring data security is of fundamental importance both for data governance and the ethical use of AI. Data governance systems establish policies and control mechanisms to safeguard personal and sensitive data, while AI systems need to be designed to incorporate considerations of privacy and security in order to ensure that data are handled and used responsibly and to prevent unauthorized access.
- Transparency and explainability: Both of these attributes are important for data governance and AI. In data governance, ensuring transparency in data compilation, use and management are very important. In AI, it is crucial for models to be transparent and, insofar as possible, explainable, which means that users need to be able to understand how decisions were arrived at and what information was used for that purpose.
- Ethics and responsibility: Considerations relating to ethics and responsibility must be a part of both data governance and AI systems. These considerations have to do with ensuring equity, avoiding biases in data and algorithms, and making certain that AI is used ethically and responsibly for the benefit of society as a whole.

- Interdisciplinary collaboration: When dealing with data governance, information assets and AI, experts in a range of different fields —including data science, ethics, the legal field and politics— need to work together. An interdisciplinary approach is essential in order to cope with the complex challenges faced in the areas of data management and AI development.

If the countries of the region are to use AI properly and ethically, they need to attain a certain level of preparedness in order for their institutions to be able to place AI at the service of society. The Government AI Readiness Index (2024 version) rates the extent to which 188 countries are prepared to integrate the use of AI into their public services (Agencia de Gobierno Electrónico y Sociedad de la Información y del Conocimiento [AGESIC], 2025). In Latin America and the Caribbean, the top-ranking countries are Brazil, Chile and Uruguay, while the lowest-ranked countries are the Bolivarian Republic of Venezuela, Nicaragua and Haiti (Oxford Insights, 2024). In terms of subregions, the Caribbean has the lowest average rating (39.43) followed by Central America (40.12) and then South America (48.46).

A study by Alexander et al. (2024) analyses the level of AI integration readiness of the countries of the Caribbean subregion. That study measured those countries' readiness in terms of three dimensions: (i) government readiness; (ii) digital readiness; and (iii) considerations of sustainability for small island developing States (SIDS). With regard to the first of these dimensions, the governments of the subregion are participating in talks on AI integration at the world, subregional and local levels with a view to establishing a strategic direction for subregional efforts in the absence of comprehensive legal frameworks for AI. As for the second dimension, the Caribbean countries are not well positioned to integrate AI into their systems, and they therefore need to upgrade broadband access and quality in their countries. Wide gaps in terms of the digital skills of members of the population are also a factor in the Caribbean. Lastly, AI can contribute to the sustainable development of SIDS by facilitating better environmental management planning, monitoring and projections (Alexander at al., 2024). The study provides a series of recommendations concerning AI integration in the Caribbean countries.

3. The benefits of advances in artificial intelligence

The State and the officials in charge of digital governance have a responsibility to take advantage of advances in AI in order to ensure that technological innovation translates into tangible benefits for the population and paves the way for greater prosperity. Some of the principal lines of action to be considered in this respect include the following:

- Promoting inclusion and equity: The State should make sure that the benefits afforded by technology are accessible to all, regardless of place of residence, socioeconomic status, age or level of ability. Doing so will require investing in connectivity infrastructure and promoting digital literacy in order to close the digital divide and create a more inclusive society.

- Safeguarding privacy and security: The implementation of technologies such as those involved in digital identities and trust architectures requires a solid data protection and data privacy framework to shield personal information from possible misuse or cyberattacks. It is the State's responsibility to develop and maintain regulations and policies that will protect people while also protecting national security and public welfare.
- Promoting innovation and competitiveness: The development of next-generation software, quantum computing and immersive reality technologies are key areas of economic and scientific progress. Governments should create environments that are conducive to innovation by offering tax incentives, supporting research and development, and facilitating collaboration among the public and private sectors and academic institutions.
- Ensuring ethical conduct in the field of AI and technology: Given the power of applied AI, machine learning and generative AI, ethical principles must be agreed upon to guide their development and use. Governments should lead the way in efforts to create ethical and legal frameworks for fostering the responsible use of AI to ensure that these technologies are used for the benefit of society in ways that do not run counter to respect for human rights and personal autonomy.
- Advancing governments' digital transformation: The use of cloud computing, edge computing and mobility technologies can transform the way in which governments offer services to the population by making them more efficient, accessible and personalized. The digitalization of government services improves the user experience, increases transparency and reduces bureaucratic snarls.
- Preparing for the future of work: Emerging technologies are redefining the employment landscape. The state should play an active role in preparing people to be part of the workforce of the future by updating school curricula, offering training and digital reskilling and fostering a culture of continuous learning.
- Developing a strategic vision for bioengineering: The State should establish regulations to balance the interests of scientific progress with the corresponding ethical, social and environmental considerations. This includes measures to further responsible research and development of therapies and technologies that can improve public health and welfare without jeopardizing genetic integrity or biodiversity.

4. Required skills and talent

Certain skills, capabilities and types of talent are needed to carry out the digital and technological transformation that countries aspire to see. Without a solid approach for developing the right types of skills and attracting talent, the results of efforts to integrate advanced technologies and forward-looking public policies may not be as successful as they could be.

A country's capacity for innovation and for adaptation to new technologies is intrinsically linked to the quality and availability of human capital. A number of the crucial aspects of these kinds of capacities and talent as they relate to technology and public policy will be detailed here. Having these elements in place provides the foundation for making headway towards a smart government system.

- Education and training: Education systems have to be adapted so that they can prepare students for the digital and technological future by focusing on key abilities such as critical thinking, problem-solving, creativity and adaptability, as well as on specific technical areas of knowledge in fields such as informatics, software engineering, data science and AI. This means that curricula will need to be revised, innovative teaching methodologies adopted and steps taken to ensure that educators have the proper training.
- Continuous training and reskilling: Learning does not end when formal education does. Continuous professional development and reskilling programmes are essential in order for the existing labour force to adapt to technological changes. Governments, in collaboration with the private sector and educational institutions, must facilitate and promote access to training opportunities that allow workers to update their skills and transition into emerging roles.
- Talent attraction and retention: In order to nurture and expand the talent ecosystem, governments should introduce policies for attracting and retaining highly qualified specialists. These policies may include incentives such as tax breaks, professional development opportunities, access to cutting-edge research tools and resources, and a high-quality living environment. The creation of an inclusive, diverse environment is also crucial in order to accommodate the wide range of perspectives and skills that talented people from around the world can offer.
- Cross-sectoral collaboration: It is vital for the government, industry, universities and research institutes to work together to foster the creation of an innovation-rich ecosystem. These kinds of partnerships can facilitate knowledge transfers, promote applied research and experimental developments and ensure that educational programmes are aligned with the needs of the labour market.
- Innovation and entrepreneurship policies: Promoting a culture of innovation and entrepreneurship can spur the development and application of emerging technologies. Governments can support this process by creating start-up incubators and accelerators, offering subsidies and financing for emerging companies, and streamlining the regulatory process for the creation of new businesses.
- Ethical considerations and social responsibility: Ethical considerations and a sense of social responsibility must be incorporated into the education received by technology professionals. Education and training programmes should include content on the social, ethical and environmental implications of different technologies in order to prepare future professionals to make conscientious, responsible decisions in their work.

Chapter V
Conclusions

Recent technological advances are posing formidable challenges and, at the same time, opening up new opportunities in the areas of public policy and digital governance. It is imperative for the countries of Latin America and the Caribbean to find ways to bridge the gap between their public institutions and their citizens, who already have access to these technologies. The State is thus called upon to take a holistic approach focusing on the intra- and inter-institutional generation of public value by placing people at the centre of its policies and actions.

There is no question that digitalization can boost productivity, enable access to new markets, improve service delivery and enhance people's well-being. It can also, however, create new sources of social exclusion and wealth concentration, as well as pose data security and protection risks.

Digitalization is not simply a matter of making use of technological infrastructure; it also involves thoroughgoing changes in production models, education systems, public services and social structures; in other words, in the way people experience and organize their day-to-day lives. Access to the Internet, the advent of artificial intelligence and the integration of new technologies can provide the mobilizing force for extricating the region from the three development traps in which it has been mired, as noted by the Economic Commission for Latin America and the Caribbean (ECLAC),[1] by helping to helping to close the region's long-standing gaps in terms of inequality and by promoting more productive, inclusive and sustainable growth. This process will, however, require a strategic, systemic approach to ensure that the digital transformation will increase well-being rather than widening the gaps that already exist (ECLAC, 2024a).

[1] Low capacity for growth; high inequality combined with low social mobility and cohesion; and weak institutional capacities and ineffective governance (ECLAC, 2024b).

This is the point where public policy and advanced technology converge to create a unique opportunity for promoting development. In order to seize that opportunity, a strategic, integrative approach will be needed, along with active citizen participation in steering technological innovation towards the generation of public value and prosperity for the region's countries. It is of vital importance for the officials responsible for digital governance and government to work together with the industrial and academic sectors in order to achieve these objectives.

Having a robust, applied model of digital governance is essential in order to bring about the necessary transformations in public service delivery and in the driving forces behind innovation and productive development. Ensuring that this model can be applied successfully will require visionary leadership, however, as well as a solid institutional structure and suitable regulatory frameworks.

A digital governance model has many benefits that can fundamentally transform the way in which governments operate and interact with the public. These benefits include a reduction in the operating costs of public services and an increase in their efficiency. The model also promotes transparency and greater citizen participation in the design of public services. This will help to support better decision-making around service delivery and bolster public satisfaction and trust, which, in turn, will set the stage for more collaborative, efficient and sustainable systems.

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The Economic Commission for Latin America and the Caribbean (ECLAC) has pointed out on numerous occasions that information and communications technologies (ICTs) are not enough in themselves to make public systems more efficient and effective but must instead be paired with other key elements in order to achieve those objectives. The Commission has therefore been underscoring the importance of the institutional, cultural, policy, organizational, leadership and technical elements that can help to consolidate governments' digital development process. This guide outlines a robust, applied model of the type of digital governance needed to bring about vital transformations in the areas of public service delivery, innovation and productive development.

The *ECLAC Methodologies* collection describes the conceptual principles, technical specifications and applications of the quantitative and qualitative tools developed and used by the Economic Commission for Latin America and the Caribbean (ECLAC). The collection's main aim is to offer better and new policymaking tools, thus contributing to evidence-based public policymaking that fosters sustainable development with equality.

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