

Comparative Analysis of Digital Transformation Funding and Financing Models

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Digital Impact Alliance

The Digital Impact Alliance (DIAL) is a "think, do, replicate" tank that investigates digital transformation best practices at the national, regional, and global levels. We combine practical research with evidencebased advocacy to identify which digital efforts work, package them as reusable solutions, and encourage their use.

DIAL is funded through a collaboration among the Bill & Melinda Gates Foundation; the United Kingdom's Foreign, Commonwealth & Development Office (FCDO); and the Swedish International Development Cooperation Agency (SIDA), and is hosted within the UN Foundation in Washington, D.C.

For more information about the Digital Impact Alliance, please visit our website: www.digitalimpactalliance.org.



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#	Case study	Mechanism/ instrument	Uses of proceeds (World Bank 5 pillars)	Stakeholders and financing/scaling pathway (how source of funding would transition over time)	Aid	Taxes	Borrowing	Private sector	Income streams
1	M-TIBA and MomCare	Earmarked donor grant	Digital businesses, financial services	Donor -> private	x			x	x
2	The UP Fund (career impact bonds)	Outcomes-based finance	Skilling	Donor -> govt	x				
3	UNDP BOOST Innovation Fund	Challenge fund	Multiple	Donor -> private	x				
4	Global Broadband & Innovations Program	Pooled procurement/ demand aggregation	Infrastructure	Donor only	x				
5	India Aadhaar digital ID	General taxes	Public platforms	Govt -> govt -> govt & private		x			
6	Morocco Digital Development Agency	General taxes	Multiple	Govt		x			
7	US Technology Modernization Fund	Government shared services fund	Multiple	Govt		x	x		
8	Kenya mobile phone airtime and financial transaction tax	Digital taxation	Multiple	Govt		x			
9	Colombia USF	Universal service fund	Infrastructure, skilling	Govt		x			
10	Ethiopia \$200M Digital Foundations World Bank Ioan	MDB sovereign loan	Multiple or public platforms	Govt			x		
11	Liquid Telecommunications Holdings Eurobond	Commercial bond issuance	Infrastructure	Private				x	
12	Vietnam e-procurement PPP	PPP	Public platforms	Govt/private -> private		x	x	x	
13	Rwanda Innovation Fund	Blended venture capital fund	Digital businesses, financial services	Private		x	x	x	x
14	South Korea KII	Governemnt demand aggregation	Multiple	Govt/private -> private		x		x	x
15	Xchanging	Government incentives for private investment	Skilling	Govt -> private		x		x	x
16	Ethiopia telecoms privatization	Government mandates and licensing	Multiple	Govt -> private	x	x		x	
17	South Africa Broadband InfraCo	State-owned enterprise	Infrastructure	Govt		x		x	x
18	Malaysia Digital Economy Corporation	State-owned enterprise	Multiple	Govt		x		x	x
19	State Bank of Pakistan Raast digital payment system	Income streams and cost savings	Public platforms	Donor -> government	x				
20	Indonesia Investment Authority (INA)	Sovereign wealth fund	Infrastructure	Govt/private -> private	x	x			x
21	M-Pesa	Donor grant/private investment	Digital businesses, financial services	Donor/private -> private	x			x	
22	National Payments Corporation of India (NPCI) - United Payments Interface (UPI)	Income streams and cost savings	Multiple	РРР				x	x

Executive Summary

In recent years, national digital transformation agendas of low- and lower-middle-income countries (LLMICs)—which include a broad range of interventions from connectivity infrastructure to digitizing government services to digital payment systems—have become increasingly critical to inclusive development across all sectors. They have become even more vital as a result of COVID-19.

LLMIC governments face several challenges, however, in effectively executing and financing their digital transformation strategies. The broad and diverse range of programs under the umbrella of digital transformation has led to siloed approaches to both implementation and funding. In recent years, there has been increased focus on creating holistic, crosscutting strategies using a whole-of-government approach, but it remains a challenge for governments to effectively navigate these many sources to secure and deploy funding to achieve their goals. Moreover, there is not yet a clear evidence base on what funding and financing approaches work best to achieve these goals.

In light of these challenges and evidence gaps, DIAL commissioned **Volta Capital**, a development finance advisory firm, to conduct this **comparative analysis of applicable funding/financing approaches** for national digital transformation in LLMICs, including evaluation frameworks, recommendations for use by LLMIC governments, and case studies on each approach. This analysis intends to provide digital transformation actors—particularly LLMIC government officials in charge of implementing the mobilizing resources for national digital transformation agendas—with a specific resource to help develop their funding/financing approaches, which can be used as a guide for development actors to facilitate national digital transformation.

The findings and recommendations of this report build from DIAL's continued work in innovative financing and its research on the challenges of funding and financing for national digital transformation. The Volta Capital team conducted extensive desk research, as well as interviews and feedback rounds with financing experts and practitioners from governments, international organizations and funders, policy institutes and think tanks, and the private sector.

While this analysis provides extensive case studies from a broad range of countries and intervention types, the main unit of analysis is the **financing/funding mechanism**, which focuses on how governments can mobilize capital for their digital transformation agenda. As such, it is not intended to provide guidance across all stages of the planning and execution of a government's digital transformation agenda, nor systematic comparisons related to the use of proceeds.

This analysis is broken down into six key chapters.

Chapter 1 – What Is Digital Transformation?

Chapter 1 outlines a clear set of definitions of digital transformation and the roles of key stakeholders.

Chapter 2 – Funding and Financing of Digital Transformation

Chapter 2 provides an overview of the funding and financing lifecycle, along with key challenges governments face as they seek to mobilize funding for their digital transformation agenda. After these foundational chapters, the report moves into a detailed analysis of the different sources of funding/ financing governments have available to them and the key considerations and tradeoffs of each, along with guidance on how governments can assess these options and mobilize capital, as summarized below.

1 While often used interchangeably, funding and financing mean different things. Funding provides a project with money that does not need to be repaid. This can be done through grants, taxes, or fees. Financing provides a project with money that will need to be paid back, typically with interest if done through debt or via ownership if done through equity. Source: Dhillon, Danielle & Angela Kastner. "What Makes Funding and Financing Digital Technology So Difficult?" *Digital Impact Alliance (DIAL)*. Dec 19, 2019. https://digitalimpactalliance.org/what-makes-funding-and-financing-digital-technology-so-difficult/

Chapter 3 – Sources and Uses of Funding/Financing

Chapter 3 maps and defines the main sources of funding/financing, their characteristics, and key trends of each, as well as frameworks used throughout the rest of the analysis. In general, countries have a diverse array of sources to tap for funding and/or financing national digital transformation activities, which are channeled through various funding instruments and structures. Some may involve blending multiple sources of funding. Such funds are then used to support a variety of functional uses of proceeds, including strategy and planning, capital expenditures, operating expenditures, and capacity building. Sources of government funding for national digital transformation can be categorized into the following groups:

- Grant-based aid: Official/public foreign aid sources, as well as private philanthropic aid sources (grant or non-return-seeking capital providers)
- 2. **Taxes:** A country's own sovereign tax resource base, raised through general or special taxation schemes
- Government borrowing: Sovereign or municipal/local borrowing, either from commercial capital markets or concessionary sources like multilateral development banks
- 4. **Private-sector capital:** Private capital sources including corporates, development finance institutions, and impact investors that provide concessionary but returnseeking capital, and commercial lenders and investors that seek market-rate returns

5. Income streams and cost savings:



Operating revenues, income streams, and attributed cost savings generated by an endowment of funds or by an initiative's operating activities

Each funding source has different costs, timelines, risk/return, and impact appetites, which gives some a comparative advantage over others at different stages of the market development lifecycle.

Chapter 4 - Funding and Financing Models

Chapter 4 does a deep dive into each source, further detailing the many different funding and financing mechanisms associated with each and defining when they are most applicable. This includes case studies and analysis regarding the costs, benefits, tradeoffs, and lessons learned for policymakers and practitioners mobilizing and allocating capital, which are then built upon in the final two chapters of the report.

Given the large number of funding and financing mechanisms, case studies are generally brief but include sources to guide the reader to further information as needed. To support the overall analysis, **three additional in-depth case studies** in Annex 3 examine how a similar use case related to digital payment infrastructure followed different funding and financing pathways.

Chapter 5 – Assessing the Options

Chapter 5 details a framework and key steps for policymakers to use when assessing which funding and financing models to use to achieve their digital transformation goals. Given the diverse array of funding/financing sources, mechanisms, and uses of proceeds for digital transformation programming, there are many factors that must go into assessing options for decision-making. While

it is impossible to devise a single menu that matches specific sources and mechanisms to specific projects, this paper outlines some broad assessment parameters for government decision-makers in developing their funding/financing strategies. They include: **i) the financial profile** of the digital transformation intervention in question and which funding/financing sources/models are actually **fit for purpose**; and **ii**) the **tradeoffs** between different funding/financing sources along several **feasibility and preference parameters**.

- i. Who benefits from the intervention: This determines if/where any revenue streams might be available and how best to capture them. For example, if the main beneficiary will be individual households/customers consuming a largely private good or service, there should be some form of revenue to be captured from providing that good or service. However, if the main beneficiary and user will be the government itself, such as a digital government project, government budget sources should be seen as a key funding source, although a broader array of options may be available for any upfront financing needed.
- ii. Who owns and operates over time: This refers to how different funding/financing models will be needed for interventions with government-owned and operated delivery, such as a public utility, as opposed to purely private ownership and delivery, like an internet service provider or public-private models.
- iii. Likely cashflow profile (inflows/outflows) over time: This refers to what cash outflows will be required in terms of costs to be covered upfront and over time, and what cash inflows are realistic in terms of available revenue/income streams to draw from over time. For example, a national digital payments system may have high startup costs requiring government or development financing, but over time it may transition to private operators that can generate revenue from user fees to help repay the original capital investments. On the other hand, an intervention focused on regulation or policy will likely have no clear revenue stream, and thus donor grants or government budget are the most fit-for-purpose funding sources.

Tradeoffs related to feasibility and preference

There are also tradeoffs along several feasibility and preference parameters for governments to consider based on their individual contexts, capabilities, and existing relationships. These include:

- i. Relative magnitude of funding available from a given source
- ii. Financing cost to secure funding over time
- iii. Flexibility/sovereignty preferences
- iv. Complexity and requirements
- v. Time intensity to secure funding

Chapter 6 - Preparing to Mobilize Capital

Having laid out the various options for funding/financing national digital transformation strategies, the research concludes with some additional steps and final considerations for governments to prepare for mobilizing capital. While it is not possible to provide detailed action plans applicable to each context, several broad measures can help governments better identify appropriate funding sources, craft the right ask for each, and ultimately be more successful in securing funding. These include:

- 1. **Robust upfront analysis** and strategy development for the national digital transformation agenda before initiating any funding requests. This analysis requires an examination of how **fit for purpose** each funding source and instrument is to the uses of proceeds, along with considering feasibility and preference parameters.
- 2. Utilizing a whole-of-government approach from the start to facilitate successful strategy and planning and, by extension, to set up all downstream stages for greater success, including the critical stage of mobilizing capital. This includes creating a healthy enabling environment through regulatory, legal, and policy reforms; building capacity across public-sector and local private-sector stakeholders; and support for establishing or deepening local financial markets and institutions.

Introduction

Digital transformation approaches at local, regional, and national levels have evolved rapidly in recent years, further accelerated by the digitization imperative imposed by the global COVID-19 pandemic. Historically, the diverse array of programs pursued as part of a national digital transformation agenda, which may include everything from connectivity infrastructure to digitizing government services to e-health/agriculture payments, meant that both implementation and funding have occurred in siloes.

A national digital transformation benchmarking study published last year by the Digital Impact Alliance and Smart Africa identified that **funding** (i.e., money that does not need to be repaid, such as grants and taxes) or **financing**² (i.e., money that needs to be paid back) is indeed a determinative factor for governments in their ability to appropriately resource and sustainably implement their national digital transformation agendas.³ Yet lack of evidence and insufficient data on different funding/financing models and related outcomes in low and lower-middle-income countries mean that the options are not fully understood.⁴

Countries have tended to focus on specific projects that had the benefit of achieving short-term goals quickly, and funders allocated funding accordingly. However, over the past few years there has been increased appreciation for and interest in the importance of more crosscutting and holistic digital transformation strategies that have inclusive benefits. Simultaneously, funding and financing strategies must be aligned to these more integrated approaches in order to ensure both scalability and sustainability.

This report offers a comparative analysis of applicable funding/financing approaches for national digital transformation agendas.

The scale of funding needed is just one issue. Cross-government ambitions—such as whole-ofgovernment approaches,⁵ capacity building, digital public infrastructure, and ecosystem building represent large, long-term funding needs that must be aligned with governments' own roadmaps. Fulfilling this need calls for mobilizing and blending funding from multiple sources: public donor/ investment agencies, private donors, domestic resource mobilization, and private commercial capital.

It remains a challenge for governments to navigate these very different sources to identify which to tap for the various components of their strategy, craft the appropriate ask for each source, successfully secure funding, and then effectively allocate and deploy funding to achieve targeted outcomes. Meanwhile, funding sources—whether public or private, concessional or commercial—largely cannot or do not want to be in a position to dictate what governments should be asking for.

Recognizing the knowledge and evidence gaps for how to match supply and demand, this report offers a comparative analysis of applicable funding/financing approaches for national digital transformation agendas. The analysis recognizes that in the context of equitable economic recovery from the COVID-19 pandemic, as well as the associated fiscal constraints for LLMIC governments that see digital transformation as a critical recovery lever, the ability for countries to appropriately fund or finance digital transformation is now more critical than ever to avoid widening the global digital divide.

² Dhillon & Kastner, "What Makes Funding and Financing Digital Technology So Difficult?, 2019.

³ Nyakanini, Grace, Maurice Sayingoza, Nicholas Gates, Erik Almqvist, and Kutay Erkan."Unlocking the Digital Economy in Africa: Benchmarking the Digital Transformation Journey. DIAL and Smart Africa. Aug 2020. https://digitalimpactalliance.org/wp-content/ uploads/2020/10/SmartAfrica-DIAL_DigitalEconomyInAfrica2020-v7_ENG.pdf

⁴ Dhillon, Danielle & Angela Kastner. "What We Learned About Financing Digital Technology. Digital Impact Alliance (DIAL). Feb 27, 2020. https://digitalimpactalliance.org/what-we-learned-about-financing-digital-technology/

^{5 &}quot;SDG Digital Investment Framework: A Whole of Government Approach to Investing in Digital Technologies to Achieve the SDGs." ITU and DIAL. 2019. https://www.itu.int/pub/D-STR-DIGITAL.02-2019.

Methodology and Overview

Building on DIAL's continued work in innovative financing and its research on the challenges of funding and financing for national digital transformation, DIAL commissioned Volta Capital to conduct this comparative analysis of applicable funding/financing approaches for national digital transformation in LLMICs. The Volta Capital team conducted extensive desk research, as well as 18 interviews from October 2021 to January 2022 with financing experts and practitioners from governments, international organizations and funders, policy institutes and think tanks, and the commercial/private sector. A stakeholder reference group composed of digital transformation experts reviewed the key findings and recommendations of this report and provided feedback to refine the final output.

While this analysis provides extensive case studies from a broad range of countries and intervention types, the main unit of analysis is the **financing/funding mechanism** itself rather than a comparison of different countries, government policies, or interventions. In this way, it is not intended to provide guidance across all stages of the planning and execution of a government's digital transformation agenda, nor provide systematic comparisons related to the use of proceeds. Instead, the report presents a comprehensive suite of financing and funding tools for governments to consider when seeking to mobilize capital for their digital transformation agenda, with key frameworks and tools to help them determine which will be the best fit for their particular digital transformation agenda and needs.

The research team welcomes participation and partnership from the community as it explores these themes further following the release of this report.

This report is intended to serve as a useful tool for LLMIC governments, as well as a broader array of digital development actors, including donors, multilateral and regional institutions working on digital transformation, and private-sector funders and NGOs as they seek to collaboratively facilitate national digital transformation. The research team welcomes participation and partnership from the community as it explores these themes further following the release of this report.

The analysis is composed of six chapters. Chapter 1 outlines a clear set of definitions and roles of key stakeholders. Chapter 2 provides an overview of the funding and financing lifecycle, along with key challenges faced by governments as they mobilize funding for their digital transformation agenda. Chapter 3 maps and defines the key sources of funding/financing. Chapter 4 provides a comprehensive analysis of funding/financing mechanisms associated with each source of funding, including key considerations and tradeoffs for policymakers. Chapter 5 details a framework and key steps for policymakers to use when assessing which funding and financing models to use. Chapter 6 concludes with final considerations for governments to take into account as they prepare to mobilize capital. To support the overall analysis, Annex 3 contains three additional in-depth case studies that examine how a similar use case related to digital payment infrastructure followed different funding and financing pathways.

1. What Is National Digital Transformation?

Before diving into the funding and financing models themselves, first we will define digital transformation and the associated key terminology, as well as outline the roles of the main stakeholders involved in funding and financing digital transformation.

1.1 Digital transformation defined

Digital transformation encompasses a broad array of market sectors, functions, and actors, reflecting how rapidly digital technologies have become integrated into all forms of economic activity. According to the Digital Impact Alliance, national digital transformation as an outcome refers to the economic and societal effects of digitalization as it disrupts and reinvents innovative domains across the economy and society of a country, including government institutions.⁶

DIAL has identified six key focus areas for national digital transformation, which combined form the basis for strong and inclusive digital economies. To identify these focus areas, DIAL reviewed more than 50 different frameworks, indices, and assessments-including ones from the World Bank, UN agencies, the African Union, and others-measuring various aspects of digital transformation, digital economy, digital ecosystems, and other related concepts. DIAL believes these focus areas highlight tremendous overlap between complementary frameworks and instruments for evaluating digital transformation and constitute key areas or use cases in which funding/financing can be leveraged for national digital transformation.⁷

- 1. **Regulation:** This is the presence, quality, and enforcement of regulations at the national level that facilitate a sustainable and inclusive digital ecosystem and protect the rights of individuals in both the public and private sectors.
- 2. Governance: This is the vision, coordination, leadership, and accompanying strategies that direct a country's digital transformation journey.
- 3. People: This encompasses the skills, literacy, and aptitude for accessing and leveraging digital in individual everyday lives and societal interactions, including education and work, a key element of enabling digital transformation. It also includes the technical skills for the development of digital products and maintenance of digital infrastructure.

Definitions and understanding

- **Digitization** is the conversion of analog data and processes into a machine-readable format, transforming the physical analog data itself into 1s and 0s.
- **Digitalization** is the process of transitioning existing businesses and services to using digital technologies, as well as the use of digital technologies and data—and the interconnection that results—into new activities.
- **Digital transformation** as an outcome refers to the economic and societal effects of digitization and digitalization. As a process, it refers to the ways digital is disrupting and reinventing traditional services, sectors, businesses, economies, and societies, challenging ideas of how economic and social activities are organized and enacted.
- National digital transformation as an outcome refers to the economic and societal effects of digitalization as it disrupts and reinvents innovative domains across the economy and society of a country, including government institutions.
- National digital transformation agendas are the documented and explicit visions, mandates, goals, priorities, strategies, and plans for how digital transformation will be realized at the national level, as well as the actors, processes, and outcomes involved.

6 "Accelerating National Digital Transformation, Leadership Series Brief #1." Digital Impact Alliance (DIAL). Oct 2020. https://digitalimpactalliance.org/wp-content/uploads/2021/06/DIAL_LeadershipBrief1-DX_v4.pdf

7 More detail provided in Annex 1.

- **4. Infrastructure:** This is the availability of affordable, accessible, resilient, and reliable infrastructure (e.g., networks, power supply, mobile connectivity, internet access) needed for the foundation and operation of an inclusive digital society. It also includes connectivity infrastructure, as well as the physical digital and non-digital infrastructure that supports it.
- **5. Enabling platforms and services:** These are the platforms that enable other applications and services, with additional focus on platforms of ubiquitous importance, such as digital IDs and digital payments. They focus on the use of such technologies and building blocks to specifically enhance public service delivery.
- 6. Business and Innovation: These are the apps and services used for digital trade, digital financial services, digital content, as well as the entrepreneurship ecosystem that supports local firms in the cultivation of world-class digital products and services. This includes the adoption and use of innovations developed by global technology firms, as well as the adoption and use of open source software.

1.2 National digital transformation's role in driving development

In recognition of the importance of digital transformation to the development of low- and lower-middleincome countries (LLMICs), among the 17 UN Sustainable Development Goals (SDGs) is **Goal 9.c**, which aims to "significantly increase access to ICT and strive to provide universal and affordable access to the Internet in least developed countries by 2020."⁸

Internet usage has increased dramatically during the pandemic, with 782 million more internet users coming online since 2019, amounting to 63% of the global population now accessing the internet. Furthermore, the number of internet users in the least developed countries (LDCs) increased by 20% in the same time period, resulting in a modest narrowing of the overall global digital divide. Yet with just nine years remaining to meet the SDGs, 2.9 billion people are still unconnected to the internet. More than 13% of the global unconnected population live in remote, rural locations that are not even covered by a broadband signal, and most are in Africa and South Asia. More men than women use the internet, although the gender digital divide has been narrowing in all regions in recent years. The divide remains wide particularly in LDCs, where women lag behind men in internet usage by 12 percentage points, as well as Africa and the Arab states.⁹

The **COVID-19 pandemic** has only increased the need for accelerating digital connectivity and transformation, while also exposing the risk that already excluded populations will be left further behind.¹⁰ Indeed, leveraging digital transformation for inclusive recovery is key. A recent Oxford University analysis suggests that countries that had the highest internet access in 2019 were more stringent in policy responses to COVID-19 in 2020 (i.e., were able to put in place a greater number and stricter style of lockdowns), potentially highlighting the important role that digital readiness has played in responding to and recovering from the crisis.¹¹

At the same time, digital transformation holds **tremendous potential for boosting economic growth at a relatively modest price tag**. In Latin America, universalizing broadband access over the next decade is estimated to cost just 0.12% of the region's annual GDP; deploying 5G in first- and second-tier metropolitan centers is estimated to cost 0.17% of GDP; and achieving OECD levels of connectivity is estimated to cost 0.62% of GDP.¹² In Africa, investments in digital technology are expected to contribute about \$300 billion to the region's gross domestic product by 2025, according

⁸ "Sustainable Development Goals." The Digital Watch Observer, Geneva Internet Platform. Accessed November 2021. https://dig. watch/processes/sustainable-development-goals.

⁹ Measuring Digital Development: Facts and Figures 2021." International Telecommunication Union (TCU). Dec 2021. https://www.itu. int/itu-d/reports/statistics/facts-figures-2021/#:~:text=Approximately%204.9%20billion%20people%20%E2%80%93%20or,cent%20 live%20in%20developing%20countries

¹⁰ A recent ITU report identifies four main themes that should be addressed globally by regional and national governments supported by national regulatory authorities and industry stakeholders: addressing the digital divide; driving digital deepening; effecting digital transformation; and building digital resilience. Source: "Pandemic in the Internet Age: From second wave to new normal, recovery, adaptation, and resilience." ITU. 2021. https://reg4covid.itu.int/report-pandemic-in-the-internet-age-executive-summary/.

to the McKinsey Global Institute.¹³ In regions that underinvest in public infrastructure, the digital infrastructure gap is cheaper to close than gaps in transport, energy, and other infrastructure sectors. A 1% increase in residential connectivity penetration in sub-Saharan Africa should lead to productivity increases amounting to 5% in manufacturing, 10% in services, and 20% in information sectors.¹⁴ All of these push-and-pull factors have generated a surge in government interest in digital transformation.

1.3 The role of the public and private sectors in digital transformation

A fundamental question that all governments must confront is **defining the rightful role of the public sector in their digital economy**, which has important implications for the funding and financing of national digital transformation strategies. On one end of the spectrum, the rapid global rollout of mobile and broadband infrastructure by private-sector companies across low-income countries may prompt a belief that the market is functioning well and the public sector's involvement can be minimal.¹⁵ At the other end of the spectrum, there are digital transformation strategies that position digital transformation as a special project that needs to be led and majority-funded by the public sector, thereby missing opportunities to leverage much bigger pools of private capital for scale. While neither of these extremes are recommended, **there is also no single equilibrium that can be prescribed for all countries under all market conditions**. Unfortunately, even developed countries may not offer instructive templates for how to provide the right amount of public goods or services, since so many of those economies are also traveling imperfect paths toward inclusive digital development.

The reality is that the private sector often can't be relied on exclusively to deliver sufficient, quality goods and services that can reach all population segments equitably. Similarly, the private sector is not always well-positioned to develop open and interoperable infrastructure, take early-stage risk, exercise equitable market power, or coordinate across sectors and industries, as with other examples of typical "market failures."¹⁶ Herein lies the role for the public sector to subsidize universal access to digital infrastructure, provide goods and services that promote social well-being, help spur innovation and R&D to kickstart the digital economy, and lead the coordination of financial regulation and governance across sectors, among other things. But given finite public resources, government funds should be deployed in a way that efficiently targets those specific bottlenecks, while enabling the active participation of the private sector in helping to drive growth and innovation.

Striking that balance remains a challenge. Governments are taking different approaches to defining their role in the digital economy, which has implications for the associated funding and resourcing strategies those governments adopt. Countries with stronger government capacity, more advanced local information communication technology (ICT) sectors, more fiscal capacity, or other such advantages may be in a better position to begin charting their digital transformation pathway. For countries without such advantages, which is the majority of countries, it is important to acknowledge the very real constraints in securing sufficient financing/funding for their digital agendas. While this is true, the problem is often not merely a lack of funding on its own, but rather determining which sources to tap, where to use them, and how to utilize resources efficiently, which is the focus of this analysis in chapters 3-6 below.

11 Banga, K., and Willem D.W. te Velde. "Covid-19 and disruption of the digital economy; evidence from low and middle-income countries." Digital Pathways Paper Series at Oxford Paper Series. No. 7, December 2020. https://pathwayscommission.bsg.ox.ac.uk/ Covid-19-and-disruption-of-the-digital-economy

12 Drees-Gross, Franz & Pepe Zhang. "Less than 50% of Latin America Has Fixed Broadband. Here are 3 Ways to Boost the Region's Digital Access." World Economic Forum. 21 July 2021. https://www.weforum.org/agenda/2021/07/latin-america-caribbean-digital-access/

13 Manyika, James, Armando Cabral, Lohini Moodley, et al. "Lions Go Digital: The Internet's Transformative Potential in Africa. McKinsey Global Institute. Nov 2013.

14 Msimang, Mandla and Thabisa Faye. "Financing Universal Access to Digital Technologies and Services." International Telecommunication Union (ITU). 2021.

15 Only six years ago, one-third of the world used the internet, which has increased to half by 2021. Source: Delaporte, Anne & Kalvin Bahia. "The State of Mobile Internet Connectivity 2021." GSMA. 2021. https://www.gsma.com/r/wp-content/uploads/2021/09/The-State-of-Mobile-Internet-Connectivity-Report-2021.pdf.

16 "Market Failures, Public Goods, and Externalities." Econlib. Accessed Dec 2021. https://www.econlib.org/library/Topics/College/marketfailures.html.

2. Funding and Financing of Digital Transformation

Building off of the key definitions and stakeholders outlined above, we present an overview of the funding and financing lifecycle, delineate the focus of this particular analysis, and highlight key challenges governments face as they seek to mobilize funding for their digital transformation agenda.

As illustrated in Figure 1 below, the funding/financing of any economic development effort occurs along a lifecycle from strategy and planning to funding mobilization to funding allocation to spending and monitoring.

I	FIGURE 1: STAGES IN TI	HE FUNDING LIFECYCI	LE
	FOCUS OF THIS ANALYSIS		
Strategy & planning	Mobilizing funding	Allocating funding	Spending funding
 What economic development goal is being served? What is the public sector's role in digital transformation? What skillsets/assets/ capacity are needed for implementation? What agencies/teams will be involved in planning, budgeting, and implementation? What will all this cost? How long will this take, how should things be 	 What are available sources of funding/ financing? What sources are appropriate for what uses? How to assess tradeoffs and choose among source options? How to craft the right ask to each source? How to position for success in mobilizing from each source? 	 For non-earmarked resources, which agencies/teams/ projects receive how much? Who decides? What key factors drive allocation decisions? What is the process for allocation? What will be budgeting cycles? How is the funding governed? 	 What should the money be spent on to achieve DT goals? What agency/teams will be responsible? What are procurement requirements and processes? How much flexibility in funding deployment? What are KPIs to track how will performance be evaluated?

There are different activities and challenges at each of these stages, yet examining any one stage in isolation would miss the complex interdependencies between the activities and challenges in all the stages. Therefore, while the focus of this analysis is to address questions around the funding mobilization stage, it is important to contextualize the inter-relationships between funding mobilization and other upstream and downstream phases. There are a great deal of other resources and discussions about other funding phases, such as the content and focus of national digital transformation strategies, proper forecasting and budgeting, procurement and resource mobilization, and fiscal oversight and accountability. While it is beyond the scope of this focused research to address all such topics comprehensively, those topics are relevant to the broadest question of how to fund/finance national digital transformation agendas. At each stage of the funding lifecycle, there are specific challenges that affect how effective other stages will be. This is illustrated in Figure 2 below.

	FOCUS OF THIS ANALYSIS		
Strategy & planning	Mobilizing funding	Allocating funding	Spending funding
 Lack of capacity for and interest in rigorous analysis and crafting a sound national DT strategy Personal and institutional incentives to focus on tangible projects/hardware and near-term wins rather than long-term DT impact Focused on inputs rather than outcomes Lack of inter- govt, cross-sector coordination, complexity of designing such cross- cutting strategies 	 Lack of ability to identify appropriate funding source for each DT strategy component Lack of ability to craft an effective ask that the funder is comfortable funding Lack of sufficient volume of funding is an issue in some cases, but not necessarily the primary one Siloed funding sources and lack of funder coordination DT projects are siloed and small ticket sizes 	 Budget allocation tends to be politicized and complex process, ICT ministries may lack lobbying power Change of political administration changes allocation priorities Budget allocation done by central MoF or MoPlanning who may be less familiar with DT needs Budget cycles and processes not conducive to cross- cutting initiatives and flexible funding 	 Procurement procedures not well-suited for digital public goods Siloed govt agencies lack legitimacy to driv change across other agencies Fragmented demand by small LMIC buyers for digital goods/ services Lack of performance mindset and accountability

FIGURE 2: CHALLENGES WITHIN EACH STAGE OF THE FUNDING LIFECYCLE

For example, the strategy and planning phase is often a challenge for governments to do well, because it takes a certain degree of capacity and common vision to design an impactful and long-term national digital transformation strategy using a whole-of-government approach to technology and coordination. But if governments do not create a sound strategy and analysis prior to approaching funders, funding mobilization is impaired due to: i) difficulty identifying what kind of funding is needed and which sources are appropriate to approach, and ii) difficulty crafting a credible funding proposal to secure commitments.¹⁷

In other examples of feedback loops, the traditional interagency governmental budgeting process can be politicized and rigid, creating difficulties in the funding allocation phase and making it difficult to apply a crosscutting and flexible approach to mobilizing funding that may require interagency resource sharing and coordination.¹⁸ Not only that, but by the time it comes to spending the funds, if there are inflexible procurement procedures or a lack of a performance mindset and accountability for the implementing teams, then funding sources may be less forthcoming.

18 Urban, Michael Crawford. "Abandoning Silos: How Innovative Governments are Collaborating Horizontallly to Solve Complex Problems." Mowat Research, no. 178. Mowat Centre, University of Toronto. Dec 2018. https://munkschool.utoronto.ca/mowatcentre/ wp-content/uploads/publications/178_abandoning_silos.pdf.

¹⁷ For further analysis on this topic, ITU and DIAL outline these challenges in depth in their SDG Digital Investment Framework. They also outline how governments can effectively use a whole-of-government approach to invest in digital technologies to achieve the SDGs, which is explored further in the Preparing to Mobilize Funding chapter of this report. Source: SDG Digital Investment Framework: A Whole of Government Approach to Investing in Digital Technologies to Achieve the SDGs." ITU and DIAL. 2019.

Addressing the question of what the specific challenges to funding or financing for digital transformation are requires a system-wide view of the associated interdependencies and feedback loops that ultimately help or hinder each component of the funding cycle, including the different political, bureaucratic, and interpersonal relationships that influence it. In other words, the challenges are more nuanced than merely a lack of funding.

At the same time, there are significant funding needs to close the digital divide globally. ITU's Connecting Humanity report estimates that US\$428 billion is needed to connect the 3 billion people ages 10 and above who are unconnected to the internet by 2030, with 69% of that need coming from low- and lower-middle-income countries, as depicted in Figure 3.¹⁹ According to Boston Consulting Group, however, it will cost five times as much (about US\$2.1 trillion) to merely halve the current connectivity gap and increase the percentage of high-speed internet users from 53% to 80% by 2025 (US\$1.5 trillion for infrastructure and US\$0.6 trillion to drive adoption).²⁰ Meanwhile, the International Finance Corporation (IFC) estimates a \$130 billion investment needed for digital skilling in sub-Saharan Africa through 2030.²¹



FIGURE 3: INVESTMENTS NEEDED TO ACHIEVE UNIVERSAL BROADBAND BY 2030²²

Given the scale of funding needed to achieve digital transformation agendas globally, along with the continuing negative impact of COVID-19 on both public and private funding flows into developing countries, it is worth reminding ourselves of the enormous scale of global financing need to facilitate digital transformation.

21 "Digital Skills in Sub-Saharan Africa: Spotlight on Ghana" International Finance Corporation (IFC). 2019. https://www.ifc.org/wps/ wcm/connect/ed6362b3-aa34-42ac-ae9f-c739904951b1/Digital+Skills_Final_WEB_5-7-19.pdf?MOD=AJPERES

22 Connecting Humanity," International Telecommunication Union (ITU), Aug 2020.

^{19 &}quot;Connecting Humanity: Assessing Investment Needs of Connecting Humanity to the internet by 2030." International Telecommunication Union (ITU). Aug 2020.

²⁰ Rastogi, Vaishali, Wolgang Bock, Maikel Wilms, et al. "A \$2 Trillion Plan to Bring Two Billion More People Into the Digital Age." Boston Consulting Group (BCG). Sep 11, 2020. https://www.bcg.com/publications/2020/plan-to-bring-high-speed-internet-access-to-two-billion-people.

Similar challenges are seen on the supply side, including siloes **across funder segments** (i.e., types of funders such as public/private, development/commercial finance, etc.) as well as **siloes within funding organizations** (i.e., funding initiatives by sector rather than an integrated approach, lack of coordination across departments/sector teams, etc.).

- Siloes across funder segments: Funding open source infrastructure is not a priority for either governments or multilateral and bilateral donors, which makes it a gap that needs to be filled by philanthropists and private foundations.²³ But these are big-dollar and long-term commitments. The need to establish pooled philanthropic vehicles emerged as one key opportunity for funders to address this funding deficit.
- Siloes within funder organizations: Many development finance actors are siloed based on sectors, which prevents an integrated approach to funding, especially critical cross-sectoral initiatives, and core funding for digital capacity building/skilling and digital infrastructure. Like government recipients of funding on the demand side, teams within funder organizations also face institutional constraints and incentives to pursue larger-ticket transactions. They may also lack private-sector experience to envision and enact funding strategies that help catalyze more private capital and longer-term sustainability.

Yet, even as funders see the value in taking a more integrated approach instead of a sector-specific one, they do not necessarily have a clear strategy.

Some organizations, like the World Bank and the Inter-American Development Bank, have recently made organizational changes to address this issue, establishing digital teams with centralized, cross-organizational mandates. Yet, even as funders see the value in taking a more integrated approach instead of a sector-specific one, they do not necessarily have a clear strategy. In a recent survey of digital funders convened by the Harvard Kennedy School and Public Digital, less than 30% of funders expressed confidence in knowing what works and having a clear strategy; 23.5% have an initial hypothesis of what might work; 23.5% say they are learning but still don't have a clear strategy; and 17.6% have been experimenting by funding a range of different interventions.²⁴

23 Eaves, David, Emily Middleton, Claire Bedoui, and Rohan Sandhu. "Funding Digital Government Initiatives." Harvard Ash Center. Feb 4, 2021. https://harvardash.medium.com/funding-digital-government-initiatives-26a96bc23afc 24 ibid.

3. Sources and Uses of Funding/Financing

Having established the challenges of mobilizing capital at sufficient scale and in a coordinated way to address countries' digital transformation agendas, here we map the key sources of funding/financing available to governments, along with some of their key characteristics and recent trends, as well as pathways for transitioning from one source to another. In addition, we map sources to their typical uses in order to further frame the analysis on the key tradeoffs and considerations relative to each source in Chapter 4.

3.1 Sources of funding/financing

In general, countries have a diverse array of sources to tap for funding and/or financing national digital transformation activities. These sources of funding are channeled through various instruments and structures, some of which may involve blending multiple sources of funding. Such funds are then used to support a variety of functional uses of proceeds, including strategy and planning, capital expenditures, operating expenditures, capacity building, and others. Certain funding sources, instruments, and structures are more appropriate to fund certain uses of proceeds than others. These dynamics are outlined in the sections below and summarized in Table 1 and Annex 2.

In general, countries have a diverse array of sources to tap for funding and/or financing national digital transformation activities. These sources of funding are channeled through various instruments and structures, some of which may involve blending multiple sources of funding.

We categorize sources of government funding for national digital transformation as follows:

- 1. **Grant-based aid:**²⁵ Official/public foreign aid sources, as well as private philanthropic aid sources (grant or non-return-seeking capital providers)
- 2. **Taxes:** A country's own sovereign tax resource base, raised through general or special taxation schemes
- 3. **Government borrowing:** Sovereign or municipal/local borrowing, either from commercial capital markets or concessionary sources like multilateral development banks
- 4. **Private-sector capital:** Private capital sources including corporates, development finance institutions, and impact investors that provide concessionary but return-seeking capital, and commercial lenders and investors that seek market-rate returns
- 5. **Income streams and cost savings:** Operating revenues, income streams, and attributed cost savings generated by an endowment of funds or by an initiative's operating activities

²⁵ Note that official development assistance (ODA), commonly called foreign aid, can take the form of (i) grants, where financial resources are provided to developing countries free of interest and with no provision for repayment, or (ii) soft loans, which have to be repaid with interest, albeit at a significantly lower rate than if developing countries borrowed from commercial banks. For the purposes of this comparative analysis, we are splitting out grant-based aid and concessionary borrowing into two separate categories, given grant funding and loans, even concessional ones, come with different considerations and tradeoffs than grants as financing sources. Source: "What is ODA?" OECD. April 2021. https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/What-is-ODA.pdf.

Different funding sources have different costs, timelines, risk/return, and impact appetites, which gives some a comparative advantage over others at different stages of the market development lifecycle, as illustrated in Figure 4 below.



Private commercial funders represent large capital pools and have high cost and risk tolerance as long as they are also compensated with high financial returns within a relatively short timeframe and do not prioritize development outcomes over financial outcomes. LLMIC governments and their budgets are more patient and focused on providing public goods and services relative to private-sector actors but may be more limited in scale of funding and risk tolerance. Impact investors step in to provide more patient funding than commercial actors in the interest of achieving development impact but are also more limited in the magnitude of finance available. Donors have the highest risk and time tolerance, with their priority being to achieve development impact, but their limited resources call for an exit strategy at some point.

Certain funding sources, instruments, and structures are more appropriate to fund certain uses of proceeds than others.

26 "Draft Conceptual Framework for Funding Public Goods by Sector." EPAR Research Paper. Volta Capital. 2016.

3.2 Magnitude of funding sources

Clearly, funding flows to developing countries come from a diverse array of public and private sources. In terms of magnitude, the **largest share—an estimated 54%—of funding for developing countries comes from private-sector sources**. These flows are largely commercial in nature, so may not have an explicit social/environmental impact goal, but they nevertheless contribute to economic development. **LLMIC government spending comprises the next largest source**. Countries' own spending on development goals is expected to increase from US\$0.8 trillion in 2015 to US\$1.9 trillion by 2030, highlighting the increasing importance of domestic resource mobilization as a funding source. Development finance that encompasses aid and investment directed explicitly at development impact goals is a relatively smaller source, encompassing public aid and investment, multilateral development bank lending, private philanthropy, and private impact investment.



FIGURE 5: EST. ANNUAL FUNDING FLOWS TO DEVELOPING COUNTRIES (IN \$BN BETWEEN 2014-19)²⁷

- 27 All figures show annual disbursements of the most recent data ranging from 2015 2020:
- (1): Shows the total deal activities from private markets for year 2018. Private impact capital (\$0.06 trillion) is subtracted to avoid double counting so exact number is \$1.340 trillion. We use \$1.4 trillion as an approximation of that.; source: McKinsey Global Private Markets Review 2019
- (2): Estimated LMICs' spend on SDGs for year 2015; source Global Economy & Development Working Paper Building the SDG economy by Homi Kharas and John McArthur, 2019.
- (3): Shows official development aid commitments by both DAC and non-DAC members as reported to OECD for 2017/2018; source: Aid at a Glance Chart, 2018
- (4): Shows 2018 commitments for the top five MDBs; IFC commitment excluded from the World Bank Group as it has already been included in DFIs to avoid double counting. Source: Concessional Research Service Report Multilateral Development Banks: Overview and Issues for Congress, 2020.
- (5): Estimate may include non-grant instruments from private philanthropy and impact-specific funds from DFIs; shows total allocations in 2019 with 52% dedicated to ag, WASH, health and financial services; source: GIIN -Annual Impact Investor Survey, 2019
- (6): Shows annual private philanthropy disbursements in 2014 consisting of different actors, including private philanthropies, corporates, volunteer organizations, universities/colleges, and religious organizations; source: Hudson Institute Report, Global Philanthropy and Remittances, 2016
- (7): Shows annual investment disbursements in 2017; source: Devex Report -The Rise of Development Finance Institutions, 2019; IFC Annual Report 2017: Creating Markets

(8): Shows total disbursements in 2019 for all program and non-program areas, source: BMGF Annual Report 2019

However, **due to COVID**, **both public and private funding into developing countries is expected to decrease and/or shift in the near term**. In terms of aid, bilateral aid budgets will experience a dip in the near term, while longer-term trends are not expected to change, as shown in Figure 6. However, the combination of (1) reduced funding and (2) available funds diverted to COVID/health-related interventions, means other development priorities will suffer setbacks.



In terms of **domestic resource mobilization in LLMICs**, the COVID-19 pandemic has been highly disruptive to domestic tax revenues for LLMICs. According to the IMF, tax revenues in 22 sub-Saharan African countries are projected to decrease by 1.3 percentage points (10%) of GDP on average between 2019 and 2020, **approximately** double the impact from the 2008 global financial crisis.²⁹ Economic growth in emerging markets and developing economies is expected to fall by 3% in 2020, with growth among low-income developing countries (barring a few large frontier economies) projected to contract by 2.2% in 2020.³⁰

LLMIC governments are also actively deploying fiscal measures to encourage economic recovery at the expense of lower public revenues and higher spending. The OECD Centre for Tax Policy and Administration's tracking of short-term fiscal policy measures in response to COVID-19 shows that LLMICs employ policies such as decreases in tax rates or delayed tax payments. Given the uncertainty around the depth and persistence of the COVID-19-related economic downturn, there is a high risk that both the amount of tax forgone and the cost of COVID-19 expenditures to public finances³¹ will be higher than anticipated.

²⁸ Morozkina, Aleksandra. "Impact of COVID-19 on International Development Assistance System." Observer Research Foundation (ORF). Sep 21, 2020. ORF Report, Impact of COVID19 on International Development Assistance System, 2020.

^{29 &}quot;The impact of the Coronavirus Crisis on Development Finance." OECD Report. 24 June 2020. https://www.oecd.org/coronavirus/policy-responses/the-impact-of-the-coronavirus-covid-19-crisis-on-development-finance-9de00b3b/

³⁰ Banga & te Velde. "Covid-19 and disruption of the digital economy; evidence from low and middle-income countries." Digital Pathways Paper Series at Oxford Paper Series. No. 7, December 2020.

³¹ According to Corporate Finance Institute, public finance is the management of a country's revenue, expenditures, and debt load through various government and quasi-government institutions.

Additionally, the onslaught of the COVID-19 pandemic left most LLMICs grappling with increasing debt pressures. By the end of 2019, according to the International Monetary Fund, eight African countries were already in debt distress, and 11 were at high risk of being in debt distress. By 2020, African governments had already increased their debt level to the highest since 2002. In 2020, after South Africa's credit rating was downgraded, only Botswana, Mauritius, and Morocco had investment-grade credit ratings.³²

In terms of **private capital flows**, COVID-19's influence on reducing those flows into developing economies will be far greater than that experienced after the 2008 financial crisis. Contributing factors include flight to safer assets by investors, decreases in cross-border merger and acquisition activity, slowdown in foreign direct investment, reduced greenfield investments, and reduced reinvested earnings. Remittances to LLMICs have also decreased by 20% due to economic pressures/job losses in host countries.³³



Regarding **flows into the digital economy** specifically, data shows an upward shift in the rate of digital investment in recent years. Notably, the rate of investment in both advanced and developing economies began accelerating in 2012. Figure 8, based on analysis by Huawei and Oxford Economics, illustrates this shift by showing the growth in digital investment as a share of GDP since 2010 (solid line) compared to what it would have been if the earlier 2000-2010 trend (dotted line) had continued. Even having controlled for factors such as the global financial crisis and longer-term drivers of investment such as urbanization, there is an observable uptick in the rate of digitalization since 2010 across all economies.

33 "The impact of the Coronavirus Crisis on Development Finance." OECD Report. 24 June 2020.34 ibid.

^{32 &}quot;Africa's Development Dynamics 2021: Digital Transformation for Quality Jobs." African Union's Commission for Economic Affairs and the OECD Development Centre. 2021.



FIGURE 8: DIGITAL INVESTMENT AS A % OF GDP, ACTUAL & TRENDED³⁵

As far as quantifying the breakdown of those flows from various funder segments, historical data across all funder segments is difficult to aggregate. However, looking ahead, the ITU posits indicative cost sharing for digital transformation investment will come 75% from the private sector, largely directed at infrastructure capital and operating expenditures. The remaining 25% will come from public sources (government, aid, and development bank investment) to fund digital skills and content, and regulation and policy needs.

FIGURE 9: PROJECTED COST-SHARING FOR DIGITAL INVESTMENTS NEEDED³⁶



35 Digital investment refers to gross fixed capital formation in information and communications technology assets, including hardware, software, and telecommunications equipment. Source: "Digital Spillover: Measuring the True Impact of the Digital Economy." Huawei and Oxford Economics. 2017.

36 "Connecting Humanity," International Telecommunication Union (ITU), Aug 2020. Note: These amounts and percentages were calculated based on the same rationale proposed by the World Bank Group's Mobilizing Finance for Development (MFD) approach, which assumes that public resources should be targeted at areas that are not perceived as viable to the private sector.

3.3 Scaling and financing pathways

For many digital transformation initiatives, or any initiative targeting impact objectives in a developing economy context, funding sources for the initiative can and should transition over time. There are a variety of scaling and financing pathways over an initiative's lifecycle as it transitions from piloting to scaling to maturity. The aim should be to **craft a scaling and financing pathway that moves the initiative toward a sustainable steady state**. Some interventions will only be appropriate for donor funding within a finite period to achieve a specific objective. Others may involve some combination of donor, government, and/or private funding over time. These potential scaling pathways to sustainability and the types of financing approaches to facilitate each one are illustrated below in Figure 10. Case studies featured throughout this report will further illustrate the possibilities to facilitate different scaling and financing pathways towards sustainability.

DONOR ONLY	DONOR -> GOVT.	GOVT. ONLY	DONOR or GOVT. -> PRIVATE	PRIVATE ONLY	PRIVATE -> GOVT.	
 Solution is initiated and led by a donor Primary financing objective is to crowd in other donors At maturity, solution may be multi-donor initiative or phased out after market failure is addressed and intervention is no longer needed 	 Solution may be donor initiated, but in partnership with government Primary financing objective is to transition solution to public sector ownership and funding TA side-car is often applied to build govt. capacity to offtake at donor's exit 	 Solution is a public sector initiative and primarily funded through public financing Private actors may co-finance downstream delivery Donor support may include enablers like institutional and systems strengthening, policy advocacy, etc. 	 Solution has commercial market viability but requires donor/govt catalyst/subsidy Core financing objective is to crowd in private funders and delivery partners At maturity, solution is a scalable and market-based solution catalyzed with public/donor support 	 Solution is a market-based initiative led and funded by private market actors Donor/govt support may include enablers like infrastructure investment, consumer education, favorable policies, etc. 	• Solution involves private sector initiating public- private partnership or nationalization of private assets	
Financing approaches						
• Non-return seeking instruments e.g. Grants, P4P, Pooled outcome funds, etc.	 Non-return seeking instruments Public finance 	Public finance	 Non-return seeking /public finance Return-seeking instruments Retained earnings 	 Return-seeking instruments Retained earnings 	PPPs State-owned enterprises	

FIGURE 10: VARIOUS SCALING AND FINANCING PATHWAYS OVER TIME TOWARDS SUSTAINABILITY

3.4 Uses of funding

As highlighted earlier, there is an upward trend in digital investments, which is true across almost all sectors.³⁷ Not only has investment steadily increased for traditionally information-intensive sectors that were early adopters, such as telecommunications and finance, but investment in the last ten years has been strongly driven by more traditional sectors like mining, agriculture, utilities, and construction.³⁸ This underscores that a new era for the digital economy is underway, wherein digital transformation drives growth across the entire economy rather than with narrow segments of it.

The literature review and key informant interviews conducted as part of this analysis also highlight some discernable trends in which funding sources are supporting which uses of proceeds across the World Bank's categorization of the five key pillars of digital transformation (as indicated in Figure 11 and further described below).

37 "Digital Spillover: Measuring the True Impact of the Digital Economy." Huawei and Oxford Economics. 2017.38 Ibid.

FIGURE 11: CURRENT TRENDS IN SOURCES SUPPORTING DIGITAL TRANSFORMATION PILLARS³⁹

Digital Transformation pillar	Donors	MDBs	LLMIC Govts	Private capital	
Digital infrastructure (fixed and mobile broadband, fiber-optic cables)	\bigcirc				
Digital public platforms (e-government, national ID)				\bigcirc	
Digital financial services (access & usage)					
Digital business (digital business models, entrepreneurship)		\bigcirc			
Digital skills (connected schools, digital skilling)					
Relative intensity of funding focus for each source					

Digital Infrastructure can generally be the remit of private capital, given there are key revenue streams for private actors and a large paying market. However, the public sector still has a strong role to play in ensuring equity and inclusion and, therefore, should focus on building the enabling environment and filling access gaps through targeted measures like universal service funds (USFs) and user subsidies, as outlined further in Chapter 4.

Public digital platforms like e-governance initiatives and national IDs are a common entry point for LLMIC governments in their digital transformation journey and can help enable and motivate adoption of other digital transformation pillars. Given these platforms are offering government services, they need to be owned and funded by the public sector but can be supported by donors and/or government borrowing.

Digital financial services⁴⁰ such as digital payment systems have been funded predominantly by private capital to date but are subject to market failures like inequitable access and monopolies. As such, donors have been focused on building digital payments systems as a public good/utility, given many LLMIC governments may lack capacity to drive the development of these in the near term.

Digital businesses are also important players in the digital transformation journey of a country and are largely funded by private capital like private equity and venture capital sources. Still, there is a key role for public funding for digital businesses in that it can be used to de-risk businesses and crowd in further private financing that otherwise would not invest yet. While some of these businesses could be appropriate for multilateral development banks to fund directly, they're typically too small to attract these investments. As such, more government-backed innovation funding mechanisms would be useful to help incubate and launch viable businesses.

39 Source: Key informant interviews and Volta Capital analysis.40 See Annex 3 for further case studies on digital financial services.

Digital skilling initiatives tend to be in the core remit of governments and donors, given that a more digitally literate society is a key public good. Both donors and governments do fund education quite extensively, but there are gaps in funding for edtech initiatives and school connectivity. There is growing innovation from education-to-employment business models, but this largely remains a public good that requires public funding and support.

Within these specific pillars, uses of proceeds are devoted to specific functional uses, such as:

- Strategy, planning, R&D
- Capital expenditures for infrastructure, hardware, software
- · Operating expenditures for service delivery and adoption scaling
- Private investment stimulus
- Capacity strengthening, governance/regulation, monitoring/evaluation/learning

While this has provided a general overview of the different sources of funding/financing available, high-level trends, and how these tend to be used for certain broad uses, a detailed analysis of how governments can assess which sources are most relevant for particular uses is outlined in chapters 4-6 below.

4. Funding and Financing Models

With the general characteristics of each source of funding/financing outlined in Chapter 3, Chapter 4 delves into an analysis of each source, further detailing the many different funding and financing models associated with each and comparing how they are currently being used in the market. This includes case studies and deep analysis regarding the costs, benefits, tradeoffs, and strategic considerations for policymakers and practitioners mobilizing and allocating capital.

A summary of the key funder segments and associated funding/financing models is provided below in Table 1 and further elaborated on throughout this chapter. Table 1 is also outlined in more detail in Annex 2.

Sources of funding	Funding/financing model*	Applicable when	Example use cases
1) Grant-based aid	 Unrestricted grants Earmarked grants Challenge funds Pooled procurement funds AMCs and volume guarantees Debt buydowns Outcomes-based aid 	 Public goods and/or utilities features Reach to Bottom of Pyramid (BoP) Government lacks near-term fiscal capacity For capacity-building to improve absorptive capacity for other funding sources Elements of innovation and high risk 	 Government capacity building Regulation and policy frameworks R&D for new technology Infrastructure / service expansion to marginalized/rural areas Building user demand and digital literacy for marginalized populations Private investment stimulus User fee subsidies
2) Taxes	 General tax revenue Special tax revenue Digital goods/services income tax revenue Universal Service Funds 	 Public goods and/or utilities features Reaching BoP Limited monetization avenues/ revenue streams Government is user of good/ service Interventions that cut across multiple sectors 	 Regulation and policy Strategy, planning, intra- governmental coordination Infrastructure / service expansion to marginalized/rural areas Building user demand and digital literacy for marginalized populations Private investment stimulus User fee subsidies e-Government infrastructure and services
3) Government borrowing	MDB borrowingCommercial borrowingRisk hedging	 Public goods services with high upfront costs and benefits that accrue over time, e.g. infrastructure Concessionary or affordable cost of borrowing and feasible debt burden 	• Similar use cases to taxes
4) Private sector	 Commercial bank loans Private debt/equity investment funds Public capital markets Corporate Social Responsibility Corporate balance sheets 	 Monetization avenues/revenue streams are available Interventions within single sectors/industries 	 R&D and innovation Operating expenditures for service delivery and adoption scaling Digital skilling and employment Building downstream digital infrastructure and distribution channels
5) Income and cost savings	 Service fee income Bundled utility fee income Endowment investment return income (e.g. Sovereign Wealth Funds) Attributed cost savings 	 Monetization avenues/revenue streams are available Attributable cost savings are available 	Similar to taxes and borrowing

TABLE 1: SUMMARY OF KEY FUNDER SEGMENTS AND FUNDING MODELS

* Note: Specific instrument types are not necessarily an exhaustive list under each category.

Comparative Analysis of Digital Transformation Funding and Financing Models | 27

4.1 Grant-based aid

Grant-based aid includes grant-based official development assistance from government donors, which can come from bilateral or multilateral donor agencies, as well as non-ODA grant contributions from private development philanthropies. The top bilateral donors include the United States, Japan, and several Western European countries, which account for more than 60% of ODA. Roughly 25% of ODA is provided by multilaterals, such as the EU, World Bank, UN agencies, and other regional development banks like the African Development Bank (AfDB). As noted earlier, ODA technically encompasses concessionary lending and grants. For the purposes of this report, we separate these two sources due to their differing characteristics rather than including concessionary lending under the category of government borrowing.

Generally, grant-based aid is desirable given it comes at a very low cost to governments. However, the overall amount of funding available is small relative to other funding sources, and it can come with conditions, extensive reporting requirements, and geopolitical considerations.

Private donor contributions were about 3% of total ODA in 2017, with the largest amounts coming from the Bill & Melinda Gates Foundation and Mastercard Foundation. These organizations, along with others like the Rockefeller Foundation, have made supporting the strengthening of digital economies in developing countries a major priority, and they often collaborate closely with public-sector donors.⁴¹

Generally, grant-based aid is desirable given it comes at a very low cost to governments. However, the overall amount of funding available is small relative to other funding sources (see Figure 5 above), and it can come with conditions, extensive reporting requirements, and geopolitical considerations, which are explored below and in Chapter 5.

Bilateral government-to-government aid and lending has long been available from developed countries, but the more recent entry of players like China, India, and Russia presents new opportunities and considerations. These newer sources of aid are substantial relative to traditional donors, providing a large amount of potential financing for LLMIC governments. In 2019, China's ODA-like flows (i.e., flows of grants or concessionary loans that fit the general terms for ODA) amounted to nearly US\$6 billion, making China equivalent to the sixth-largest provider of ODA.⁴² These new players offer more options and allow countries looking for funding/financing to avoid becoming overly reliant on a handful of high-income countries and the traditional development finance organizations they created, facilitating a new South-South cooperation model of aid and development assistance. Of course, there are new geopolitical implications to working with funding sources that operate outside the traditional development finance institutions, and these are outlined in more depth in Chapter 5.

Development donors generally offer non-return-seeking grant capital (i.e., grant funding without the expectation of a financial return), but there are still a variety of instruments and mechanisms through which this capital can be channeled. Funding may be provided as unrestricted or earmarked grant contracts. There may also be features for the grant to be partially or fully recoverable by the donor based on certain conditions.

^{41 &}quot;Donor Support to the Digital Economy in Developing Countries: A 2018 Survey of Public and Private Organizations." UNCTAD. March 2019. https://unctad.org/system/files/official-document/tn_unctad_ict4d13_en.pdf

⁴² Johnson, Zoe & Raimund Zuhr. "A New Era? Trends in China's Financing for International Development Cooperation." Donor Tracker Insights. May 10, 2021. https://donortracker.org/insights/new-era-trends-chinas-financing-international-development-cooperation

Case study: Earmarked donor grant⁴³

M-TIBA is a health financing technology platform in Africa that facilitates financing and payments between consumers, insurers, health care providers, and governments (national health insurance funds) operating on Safaricom's M-Pesa mobile payments platform. PharmAccess Foundation initially mobilized donor funding to research digital health services for low-income groups. The foundation then partnered with Safaricom and CarePay to develop the M-TIBA platform itself. M-TIBA's business model is meant to be sustainable from transaction fee income from platform users and revenue from health insurance and financing products. Other donors (Merck for Mothers, Pfizer Foundation, the Netherlands government, the M-Pesa Foundation, Gilead) funded the development of another product within M-TIBA to target one specific underserved demographic: expectant mothers. The introduction of **MomCare** within M-TIBA provides pregnant women with subsidized maternal health insurance as well as tracking the maternal health care journey and health outcomes. Given the public benefit of the initial research and the focus on reaching underserved populations, this use was a fitting use case for grant funding.

Traditional grant contracts provide upfront funding that is governed through specific tracking and reporting requirements to the donor on spending and outputs. However, this may be insufficient to ensure that the donor can achieve the outcomes and impact through funding inputs and outputs. In response, there is now **outcomes-based aid**, which seeks to further drive implementer accountability for achieving outcomes by making financial payments contingent upon achieving pre-agreed outcomes. This allows the donor, which is ultimately paying for the outcomes, to share the performance risk with third-party investors or the implementers themselves, rather than bearing the full risk of funding interventions that cannot deliver targeted outcomes.

Another advantage of this approach is that it can drive greater accountability for implementers and funders alike by measuring the actual outputs and outcomes that are the goal of an intervention rather than the inputs or milestones that many traditional grant contracts measure. In turn, this can provide deeper learnings of what works to achieve desired outcomes and how best to measure them, which can be applied to improving interventions across the sector more broadly.

While this can improve value for governments by allowing them to only pay for outcomes that are achieved and not those that were not met, outcomes contracts are typically more complex to create because they require multiple stakeholders to agree on outcomes targets that are meaningful but still measurable and how to measure them. Since most parties are not familiar with outcomes contracting, this often requires lengthy negotiations and additional layers of legal and other support. Doing this also incurs further costs for monitoring and evaluation, since accurately measuring progress against outcome metrics through an independent third party becomes critical to transparency.⁴⁴

44 "Outcomes-based Contracting." Oxford University Government Outcomes Lab. Accessed Dec 2021. https://golab.bsg.ox.ac.uk/the-basics/outcomes-based-contracting/

^{43 (}i) M-Tiba Homepage. Accessed 15 Jan 2022. https://mtiba.com/ ; (ii) PharmAccess Homepage. Accessed 15 Jan 2022. https://www.pharmaccess.org/; (iii) Morgan, Lisa. "Case Brief: M-Tiba Digital Health Platform." International Labour Organization (ILO). 2019. http://www.impactinsurance.org/sites/default/files/CB24%20-%20EN_1.pdf; (iv) "A Digital Revolution for Quality Maternal Healthcare: MomCare." Merck for Mothers. March 2020. https://www.merckformothers.com/docs/MFM_MomCare.pdf

Case study: Outcomes-based finance⁴⁵

The **UP Fund** is a \$50 million pool of catalytic capital investing in eight to 12 career impact bonds (CIBs) in the United States to help low-income students secure good jobs in a changing economy. The CIB is a student financing model (income share agreements (ISAs)) that provides access to career training for underserved students and includes wraparound support services to help students graduate and pursue in-demand career pathways. In this model, private-impact investors provide catalytic capital to training providers to cover upfront training costs and critical support services for low-wage earners. Students enroll free of charge, and those who gain meaningful employment repay program costs as a fixed percentage of their income, capped at a set dollar amount and for a certain period of time. Those who don't obtain and maintain meaningful employment following graduation pay nothing.

Impact investors and training providers share any payments received from students who find good jobs and achieve increased economic mobility. This aligns incentives and ensures all parties are focused on student success. This is currently being done only in the United States but could be applied to other contexts as a way to leverage private capital to fund disadvantaged students to increase marketable skills—including digital skills and skills needed by ICT employers—while maintaining its financing terms in the best interest of the student. Outcome funders are currently private donors but could also be governments that would otherwise pay for publicly funded skilling programs.

Donors can also fund **challenge funds** or innovation funds that run competitive processes to award grants to applicants who offer the best solution for a particular challenge. This approach offers a way for a limited amount of grant funding to incentivize innovative ideas for solving particular development challenges that the private sector and others are not yet sufficiently addressing. This approach is also results based in that it only provides funding and support to concepts that it deems most worthwhile based on pre-agreed upon criteria following a competitive process.

Case study: Challenge fund⁴⁶

United Nations Development Programme (UNDP) and the Slovak Ministry of Finance hosted the BOOST Innovation Challenge Fund for innovative approaches in three key areas to support COVID-19 recovery: digitalization, wellbeing, and low-touch economies. An open tender invited nonprofit organizations, startups, and academic institutions to submit proposals that were then selected by a jury. Winners are provided \$15,000 in funding and a spot in a six-month accelerator program for training on topics including digital transformation and tech, and business and impact. Winners include a telemedicine platform, a digital skilling platform, and flood forecasting/mitigation technology. Challenge funds like these are generally donor funded, but awardees are meant to be supported to launch, scale, and attract other funding sources.

One promising donor mechanism for digital transformation is demand aggregation mechanisms such as pooled procurement funds and volume guarantees. This responds to the problem of fragmented demand by many small LLMIC economies that need to procure similar, commoditized goods and services for their digital transformation but also have difficulty interesting providers in serving them and securing favorable pricing. In the health sector, this has been used to great effect with pooled procurement funds like GAVI and COVAX, which have helped address this problem for getting vaccines to LLMICs.

^{45 &}quot;UP Fund." Social Finance. Accessed 13 Jan 2022. https://socialfinance.org/up-fund/

 ^{46 (}i) "UNDP Announces the Winners of BOOST's Innovation Challenge Fund." UNDP Europe and Central Asia. July 27, 2021.
 https://innovation.eurasia.undp.org/undp-announces-the-winners-of-boosts-innovation-challenge-fund/; (ii) "Innovation Challenge Fund
 Application Page." UNDP. Accessed 12 Jan 2022. https://boostimpact.org/challenges/innovation-challenge-fund/

In 2019, DIAL commissioned research that showed that pooled procurement of the development sector's spend on mobile communication channels could be used to secure better pricing and quality of service from the private sector.⁴⁷ Similar to how vaccines are considered global public goods, donors posit that pooling aid resources for global public goods in the digital space could be particularly beneficial for uses such as: 1) funding open source software libraries for sector-specific applications for agtech, edtech, fintech, etc., 2) funding for technical assistance to support countries on implementing best practices, and 3) implementation and risk-mitigation measures such as comprehensive cybersecurity programs.⁴⁸

Case study: Pooled procurement⁴⁹

The **Global Broadband and Innovations Alliance** (GBI) is a 10-year cooperative agreement between NetHope and USAID that pools the procurement of broadband for NGOs at discounted access rates. As NGOs, donors, and other stakeholders increasingly rely on digital tools and platforms to deliver on their missions, connectivity has become a vital part of their approach. However, they often experience poor signal coverage, slow speeds, and high costs of access. A significant reason for this is that private-sector network operators often view areas where NGOs operate as too rural, too poor, and too isolated to justify investment in the network infrastructures needed to deliver quality service at reasonable costs.

In response, NetHope embarked on a connectivity demand aggregation approach to identify, consolidate, and leverage demand for access services at key field offices and points of presence within target countries across its NGO members. By bundling the needs of its NGO stakeholders and presenting them to connectivity service providers, NetHope is able to facilitate new solutions, including optimized pricing, extended network coverage, and improved quality of service. This approach was successfully demonstrated in Uganda to improve connectivity for NGO clusters responding to an acute refugee influx, where NetHope negotiated significantly discounted broadband access rates for member facilities that had previously experienced poor quality of service and high access costs. It is now being replicated in other USAID focal countries.

These mechanisms and several of the other grant-based and public-sector funding models outlined in sections 4.1 and 4.2 that specifically stimulate private-sector capital are further elaborated on in section 4.4, where we outline how they can specifically be used as incentives for attracting private capital.

Donors can also blend their funds into a mechanism with other sources/types of capital using their concessionary capital to reduce risk or enhance returns for other capital sources to attract their entry. For example, donors may contribute capital into a blended fund, where their grant funding can be used to absorb the first losses to mitigate risk for return-seeking investors, or to fund a discounted interest rate of debt (interest rate buydown) if certain milestones are achieved to enhance returns for other capital sources. This type of funding can help crowd in other sources of development finance, such as development finance institutions (DFIs) and private investors by allowing them to finance initiatives that otherwise would be deemed too risky or early stage to invest in. The use of donor and public funds to incentivize the private sector is further explored in section 4.4.

^{47 &}quot;Pooling Aid Sector Demand for Digital Public Goods: Lessons from Sizing Mobile Channel Demand in Sub-Saharan Africa". DIAL Research. July 22, 2019. https://digitalimpactalliance.org/research/demandaggregation/

⁴⁸ Interview with the Bill & Melinda Gates Foundation, Financial Services for the Poor (FSP) and Development Policy and Finance (DPAF) teams. Nov. 2021.

^{49 (}i) "Demand Aggregation for Improved Connectivity." NetHope Solutions Center. Accessed 12 Jan 2022. https://solutionscenter. nethope.org/program-areas/connectivity-infrastructure/demand-aggregation-for-improved-connectivity; (ii) Pooling Aid Sector Demand for Digital Public Goods: Lessons from Sizing Mobile Channel Demand in Sub-Saharan Africa". DIAL Research. July 22, 2019.

4.2 Taxation

Taxation is the primary, sovereign, and most directly controllable funding source for governments. However, this does not necessarily make it an easy source from which to mobilize funding for digital transformation. Under traditional, siloed government budgeting approaches, funding for digital transformation initiatives drawn from **general tax revenue** or government borrowing sources must compete for budgetary allocations alongside all other government budget line items.

This poses a challenge for mobilizing digital transformation funding, since government budgeting is a siloed and political process. A digital transformation initiative may find itself at a disadvantage if, for example, it is sponsored by an ICT ministry that was created less than 10 years ago and is competing for priority with a transport ministry that has been honing the art of appropriations for the past 60 years.⁵⁰ Another limiting factor would be if a ministry championing a digital transformation needs to drive change across multiple ministries/agencies to achieve targeted outcomes but lacks the institutional ability to do so.

For this reason, digital transformation experts advocate for reimagining institutional boundaries and creating cross-ministry funding and implementation capabilities, also known as **whole-of-government approaches** (WGAs). There are some emerging success stories of national or local governments experimenting with these approaches to create central digital transformation teams, specialized agencies, or crosscutting platforms and projects that coordinate across government siloes, while also aligning budget allocation and governance practices to be flexible, crosscutting, and performance driven.⁵¹ India's national digital ID program, Aadhaar, is an oft-cited example of a special agency created to drive a specific digital transformation service across India.

Case study: General taxes, central government agency⁵²

Aadhaar is India's national ID system and the world's largest biometric ID system. At the time it was created in 2009, the idea to give every citizen a unique, biometrically verifiable identification number was very new. Those biometrics (iris scans and fingerprint records) would be linked to a person's Aadhaar number, which would be used in all interactions with the state. Officially launched in 2009, the government of India created a dedicated, cross-sectoral agency to launch and operate Aadhaar. The co-founder of a major IT company was recruited to lead the agency, empowered by cabinet minister rank and enabling legislation. The initiative incurred low costs to develop and operationalize, relative to the benefits it facilitated in terms of weeding out fraud, making taxation more efficient, and ultimately saving money for the government. Aadhaar remains government owned and funded, but also benefits from fee income with a multitiered fee model of retail and commercial customers who can pay for certain services.

While Aadhar is widely noted as a successful case of a whole-of-government approach to digital transformation, it faced multiple challenges prior to launch that are important for policymakers to consider. India had been publicly discussing ways to create a national ID up to 15 years before Aadhar was launched, and prior to its launch there were multiple digital ID pilots at the state level that failed to get to scale, struggled to reach vulnerable populations, and/or generally were hamstrung by issues like corruption and inefficiency. It was through this long process that the central government was able to learn key lessons and generate sufficient political will to lead to the formation of a centralized agency that took this to scale in a coordinated way.

50 Interview with Nicholas Williams, Head of ICT, African Development Bank (AfDB). November 2021.

51 Interview with David Eaves, Harvard Kennedy School. November 2021; Mann, Robin, Raijve Mathur, et al. "Fixing Digital Funding in Government." Boston Consulting Group (BCG). 2021. https://www.bcg.com/publications/2021/fixing-digital-funding-in-government

52 (i) Interview with Devesh Sharma, Country Officer Development Policy & Finance, Bill & Melinda Gates Foundation, December 2, 2021 ; (ii) Perrigo, Billy. "India Has Been Collecting Eye Scans and Fingerprint Records From Every Citizen. Here's What to Know." Time. Sep 28, 2018. https://time.com/5409604/india-aadhaar-supreme-court/ ; (iii) "Unique Identification Authority of India – Government of India." Accessed: Feb 2, 2022. https://uidai.gov.in/; (iv) "Aadhar." Wikipedia. Accessed Feb 2, 2022. https://en.wikipedia. org/wiki/Aadhaar# ; (v) "Aadhaar: Inclusive by Design: A Look at India's National Identity Programme and its Role in the JAM Trinity." GSMA. March 2017. https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/03/gsma-aadhaar-report-270317.pdf

Of course, India may be unique among LLMICs in terms of its economic strength in the ICT sector and its government capacity. Another instructive example is Morocco's Digital Development Agency, a self-described strategic and cross-functional public entity for national digital transformation. It oversees an innovative Digital Factory team that acts as an internal consulting team to other government agencies to drive cross-sector digital transformation.

Case study: General taxes, central government agency⁵³

The **Morocco Digital Development Agency** (ADD) is the Moroccan strategic public entity responsible for implementing the kingdom's strategy for digital development, digital tools, and digital adoption among citizens. Several cross-functional missions are assigned to the ADD to structure the digital ecosystem and support real operators in the digital economy. Its mandate includes reducing the digital divide, driving societal training and awareness, encouraging R&D, and encouraging social and entrepreneurial innovation. The ADD oversees the Digital Factory team, which operates like an internal consultancy for the government, partnering with other government agencies to drive various digital transformation innovations.

While there are many benefits to moving towards a centralized agency to facilitate a whole-ofgovernment approach to digital transformation as outlined above, there are also multiple challenges that can arise in the process. As noted in the Aadhar case study above, the path from initial concept to successful implementation was not nearly as smooth as is often assumed, and its success was hardly preordained. A critical mix of elements were required, including the right champions in the central government alongside the right mix of technical expertise and an overall enabling environment to allow it take root. Because Aadhar was a pioneer in many ways, it offers a proven model that other countries can use to adapt and replicate, including the Moroccan government with the support of the World Bank, as described in the ADD case study above.⁵⁴

The United States government's **Technology Modernization Fund** is a more recent experiment in aligning fiscal approaches with a whole-of-government philosophy. It was created to solve for the constraints that annual budget cycles placed on digital initiatives that operate across sectors and need multiple years to develop.

While there are many benefits to moving towards a centralized agency to facilitate a whole-of-government approach to digital transformation...there are also multiple challenges that can arise in the process.

53 (i) Interview with Claire Bedoui, Principal Consultant, and Joanne Esmyot, Digital Transformation Director – Africa, Public Digital. Dec 3, 2021 ; (ii) "The Moroccan Digital Development Agency and GrowIN Portugal Launch an Initiative to Support Startups Internationalization." PR Newswire. Jun 4, 2021. https://www.prnewswire.com/news-releases/the-moroccan-digital-development-agency-and-growin-portugal-launch-an-initiative-to-support-startups-internationalization-301306195.html

54 "Aadhaar's Success Inspires Russia, African Countries to Give Their Citizens Digital Identity. Yourstory. July 9, 2016. https://yourstory.com/2016/07/aadhaar-global/amp.

Case study: Government shared services loan fund⁵⁵

In 2017, the United States Congress passed the Modernizing Government Technology (MGT) Act, which aimed to create greater funding flexibility so that government agencies could engage in multiyear digital transformations without repeatedly having to seek new funds through traditional annual budget cycles. The MGT Act created the Technology Modernization Fund (TMF) with an initial funding amount of \$100 million, then increased in 2021 to \$1 billion in response to the COVID pandemic. TMF is administered by the Office of Management and Budget, an executive branch agency of the U.S. government. TMF provides loans to government agencies for digital transformation projects that are intended to be repaid within five years, but repayment terms have become more flexible over time. The TMF has a board that screens and approves funding applications based on impact, cost-effectiveness, and other criteria. Examples of funded projects include the Department of Agriculture using a TMF loan to consolidate and modernize 10 public websites into farmers.gov, resulting in improved, centralized services such as financial assistance and payment. The Department of Labor led a multi-agency effort that began in 2018 to streamline and digitize the U.S. visa application system for employers. While this was meant to operate in a budget neutral way as projects repay the loans over time, the program continues to cost more than it collects in fees due to unreliable cost estimates and insufficient fee collection mechanisms.

In addition to increased coordination across siloed government departments, WGA also can pertain to technologies themselves in terms of delivering government services digitally. For example, the GovStack Initiative, a collaboration between DIAL, ITU, and GIZ, utilizes a building blocks approach that emphasizes building reusable software components that provide key functionality facilitating generic workflows across multiple sectors. Through this approach, governments can easily create or modify their digital platforms and services as they go. While this is still an emerging area of research, and one in which funding/financing models are still not clearly defined, it is a promising one for practitioners to tap into as it develops further.⁵⁶

Besides general tax revenue sources, special **earmarked tax revenue sources** can also serve as a source for digital transformation initiatives. In fact, taxation of the digital economy itself is an increasing area of attention, whereby digital transformation may in part help pay for itself via lucrative new tax revenue streams. Indonesia's booming digital economy is expected to generate revenues of \$130 billion by 2025,⁵⁷ prompting it to recently add a 10% value-added tax (VAT) on digital products sold by foreign companies to help offset a projected 10% drop in state revenues due to COVID-19. Malaysia had already introduced a 6% digital tax before COVID-19. Going forward, the Philippines government is reviewing a proposal that would tax online shopping, social media advertisements, and video and music streaming, and similar proposals have been advanced in Kenya.⁵⁸

56 Note that this type of approach could be funded using government tax revenue, grant-based aid, or potentially other sources of funding, which will be determined as this approach becomes more established.

57 "E-Commerce Provides Economic Boost for Indonesia as Shoppers Migrate Online During Covid-19 Pandemic." Oxford Business Group. Mar 16, 2020. https://oxfordbusinessgroup.com/news/e-commerce-provides-economic-boost-indonesia-shoppers-migrate-online-during-covid-19-pandemic

58 "Can Digital Taxes Help Fund the Covid-19 Recovery in Emerging Markets?" Oxford Business Group. 24 Jun 2020. https://oxfordbusinessgroup.com/news/can-digital-taxes-help-fund-covid-19-recovery-emerging-markets

^{55 (}i) Mann, Robin, Raijve Mathur, et al. "Fixing Digital Funding in Government." Boston Consulting Group (BCG). 2021 ; (ii) Interview with David Eaves, Harvard Kennedy School. November 2021 ; (ii) "The Technology Modernization Fund." Accessed Nov 26, 2021. https://tmf.cio.gov/; (iv) "The Tech Modernization Fund Continues to Fully Recover Its Operating Expenses." https://www.gao.gov/blog/ tech-modernization-fund-continues-lack-plan-fully-recover-its-operating-expenses

However, countries need to exercise caution in balancing short- and long-term revenue objectives. Over-taxation of a nascent digital economy can stifle the pace of digitalization and lead to the loss of economy-wide productivity growth and efficiency. This would lead to the loss of potential growth in the tax base, which some studies estimate to be larger than the forgone short-term revenue.⁵⁹ Indeed, sector-specific taxation policies have tended to be distortionary and regressive, resulting in a double whammy challenge: discriminating against the very digital activities and investments that will drive growth while excluding low-income users and further widening the digital divide.⁶⁰

Case study: Digital taxation⁶¹

A study of **Kenya's taxation of mobile phone airtime and financial transactions** showed that such taxation may not expand the tax base significantly. Rather, it may reverse the gains on retail electronic payments and financial inclusion. A higher tax rate on low-level retail electronic transactions may discourage the use of mobile phone transactions, especially for low-income earners who are sensitive to transaction costs, incentivizing them to revert to cash transactions and resulting in less tax revenue. The contribution of mobile-money-related taxes is less than 1% of total tax revenue, a negligible contribution to Kenya's total tax income, and has a high economic opportunity cost for Kenya. This and similar fiscal studies conclude that the design of an efficient tax structure in the digital space calls for avoidance of discriminatory and distortive sector-specific taxation. Governments should consider positive discrimination of low-income users, and selectively provide exemptions to facilitate investment in infrastructure and promote adoption by end users.

Another frequently utilized mechanism for mobilizing digital transformation funding is **universal service funds**. Funded primarily through levies imposed on digital infrastructure and service providers, USFs are used to finance projects that seek to close gaps between rural and urban areas, the rich and the poor, and men and women—both among and within countries. Examples of USF-supported access initiatives include rural broadband connectivity, national fiber network buildouts, devices for low-income households, and ICT in schools.⁶²

The concept of the fund has been embraced in about half of all countries around the world—100 in total. Most of the established funds (67) are relatively mature, in that they were already established and operational by 2010. Today, Africa (35), the Americas (22) and Asia and the Pacific (22) have the highest number of funds.⁶³ Fund performance has been mixed, with many criticized for over-collection, misuse of funds, underutilization, distortionary effects, or lack of accountability for impact.⁶⁴ However, as featured in the Alliance for Affordable Internet (A4AI) 2021 Affordability Report, USFs are still considered an essential part of any successful, comprehensive broadband policy and have been the most effective policy area in driving down the cost of connectivity.⁶⁵

59 Ndulu, Benno, Cornel Joseph, and Karline Tryphone. "Fiscal Regimes and Digital Transformation in Sub-Saharan Africa." Oxford University Digital Pathways Paper Series, Paper 11. March 2021.

60 Thao Hong Interview, Policy, Advocacy and Communications. Bill and Melinda Gates Foundation (BMGF), Financial Services for the Poor Team. 17 Nov 2021; Ibid.

61 (i) Ndulu, B., et al. "Fiscal Regimes and Digital Transformation in Sub-Saharan Africa." Oxford University Digital Pathways Paper Series, Paper 11. March 2021; (ii) Katz, R., Flores-Roux, E., & Mariscal, J. "The impact of taxation on the development of the Mobile broadband sector." GSMA and Telecom Advisory Services LCC. 2010; (iii) Ndung'u, N. "Taxing Mobile Phone Transactions in Africa: Lessons from Kenya." Brookings Institution, Africa Growth Initiative Policy Brief. 2019.

62 Muluk, Turhan. "Intel's Role in Digital Transformation." Intel. 19 Mar 2018. https://www.itu.int/en/ITU-D/Regional-Presence/Europe/ Documents/Events/2018/WSIS/Sess4_Muluk_Intel_ITU%20WSIS%20-Digital%20Transformation.pdf.

63 Msimang, "Financing Universal Access to Digital Technologies and Services," ITU, 2021.

64 "Universal Service Fund Study." GSMA. 2013. https://www.gsma.com/publicpolicy/wp-content/uploads/2016/09/GSMA2013_ Report_SurveyOfUniversalServiceFunds.pdf

65 Woodhouse, Teddy. "2021 Affordability Report." Alliance for Affordable Internet (A4AI). 2021. https://a4ai.org/affordability-report/ report/2021/#universal_service_&_access_funds_are_an_essential_part_to_a_successful_comprehensive_broadband_policy_ strategy. The ICT and digital landscape have changed drastically over the last 20 years, calling for updated fund strategies. In particular, there is scope for USFs to leverage their funds by blending and co-investing with similar or complementary capital providers, wherein concessionary funds from USFs are used to mitigate risk or enhance returns for private capital debt or equity investors. In addition, other policy measures to promote universal access besides reforming USFs have been increasingly utilized.⁶⁶ This topic is beyond the scope of this research, but has been explored in depth by organizations such as the World Bank, ITU, and A4AI.⁶⁷

Case study: Universal service fund⁶⁸

In a study of 64 universal service funds used in countries around the world conducted by the GSMA, Colombia is one country that currently epitomizes best practice in the development and administration of USFs. **Colombia's USF** has been structured to be financially autonomous, and fund projects are awarded in a highly transparent manner via a public bidding process open to all interested parties. Projects to be addressed by the fund are identified and clearly spelled out in a four-year planning cycle in which a project budget is also allocated. Many initiatives have been implemented to significantly improve Colombian citizens' access to telephone and internet services, including the installation of 12,797 rural community telephony lines/access points that cover all of the country's municipalities, low-population areas, police headquarters, and villages with more than 100 inhabitants that were previously unconnected. As a result, it has been addressing and resolving the challenges of providing telecommunications services, including internet, to around 5.2 million hard-to-serve' inhabitants.

Besides infrastructure, the internet program also includes a training component that focuses on a basic introduction of: (1) the use of computers, faxes, scanners, web cameras, etc., (2) use of computer tools such as spreadsheets, word processors, etc., and (3) the use of e-mail and internet navigation. Another notable accomplishment is the "computadoras para educar" ("computers to educate") initiative, in which there is one computer for every 15 students in public schools. The government's target is to increase the number of computers to reach a ratio of one computer for every 10 students, funded by a USF budget of US\$45 million.

4.3 Sovereign and non-sovereign borrowing

Multilateral and bilateral development bank lending

In addition to official tax revenues, governments also finance through borrowing, from multilateral development banks (MDBs), bilateral aid and lending agreements, and commercial finance sources.

For middle-income countries, the share of multilateral borrowing as a percentage of total public borrowing has declined over the last decade, resulting from a concerted move of the international development finance community to focus on Africa and low-income countries rather than middle-income countries and regions like Latin America. For MICs more borrowing options are increasingly available, such as higher exposures to private and bilateral Chinese debt.⁶⁹

69 Fleiss, Pablo. "Multilateral Development Banks in Latin America: Recent Trends, the Response to the Pandemic, and the Forthcoming Role." Economic Commission for Latin America and the Carribean (ECLAC). Studies and Perspectives Series, No 21 (2021). https://repositorio.cepal.org/bitstream/handle/11362/46916/1/S2100262_en.pdf.

^{66 &}quot;Universal Service Fund Study," GSMA, 2013.

^{67 (}i) Muente-Kunigami, A. & Juan Navas-Sabater. "Options to Increase Access to Telecommunications Services in Rural and Low-Income Areas." World Bank Working Paper, No. 178. 2010. ; (ii) Msimang, "Financing Universal Access to Digital Technologies and Services," ITU, 2021; (iii) Foditsch, Nathalia and Barbara Marchiori de Assis."Universal Service and Access Funds in Latin America and the Carribean." A4AI and Internet Society. Dec 2021. https://1e8q3q16vyc81g8l3h3md6q5f5e-wpengine.netdna-ssl.com/wp-content/ uploads/2022/01/USAF-Report-English.pdf

^{68 (}i) "Universal Service Fund Study." GSMA. 2013 ; (ii) Woodhouse, Teddy. "2021 Affordability Report." Alliance for Affordable Internet (A4AI). 2021.
For smaller and lower-income countries, multilateral development bank borrowing remains the main source of public finance. With the onslaught of the COVID-19 pandemic, most LLMICs are grappling with increasing debt pressures and limited fiscal space. Going into 2020, African governments had already increased their debt level to the highest since 2002. By the end of 2019, according to the International Monetary Fund (IMF), eight African countries were in debt distress and 11 were at high risk of being in debt distress. By 2020, after South Africa's credit rating was downgraded, only Botswana, Mauritius, and Morocco had investment-grade credit ratings.⁷⁰

In response, MDBs and their funders are being called to increase counter-cyclical lending (i.e., lending that increases during economic downturns rather than vice versa⁷¹) for the type of structural lending they were originally created to do (i.e., upgrading inadequate infrastructure, addressing social needs, improving institutional frameworks), as well as help ease mounting pressures associated with external debt. Moreover, the future of these institutions is increasingly focused on the provision of global and regional public goods, including digital public goods.⁷²

Because of the need for both sides to align rather than one dictating the terms to another, the process to secure an MDB loan can often be lengthy, taking anywhere from two to seven years, and conditions are usually attached to protect project and lender interests after disbursement.

Until recently, MDBs approached the digital sector much as they did other sectoral lending, through a lens of siloed projects. This has led to a bias against prioritizing digital investments in loan packages because many digital projects were small compared to large transport or power infrastructure lending. In recent years, some MDBs such as the World Bank have been migrating to more holistic digital transformation funding strategies and crosscutting loan packages that fund a more diverse package of capital expenditures, regulatory/policy support, and institutional capacity-building measures, thereby also increasing the digital transformation loan size.⁷³ The mindset of both lenders and borrowers (countries) has thus seen dramatic shifts—even over the last four years—in terms of increasing appetite and political will to transact for the sake of holistic national digital transformation strategies.

Today, the World Bank's digital finance teams express preference to originate loans that address multiple digital transformation pillars holistically, including infrastructure, digital government, digital financial services, digital business, and digital skills. For these types of loan packages, a typical World Bank loan for digital transformation is US\$100 million to US\$200 million for five years, particularly in low-income countries. Infrastructure remains the highest cost and major component of this lending, typically absorbing half of a loan budget, with connectivity infrastructure a significant portion of that.⁷⁴ At the same time, there is focus on supporting enabling and policy environment reforms in the belief that structuring the right enabling environment can unlock far larger amounts of private investment in digital infrastructure. Digital government or GovTech initiatives where the government is the user or provider of digital goods or services is also an area of focus for MDB lending, given that this pillar of digital transformation sits clearly with public-sector funding.

74 Paul Nguyen interview. World Bank - Digital Development/Governance Specialist. November 19, 2021.

^{70 &}quot;Africa's Development Dynamics 2021: Digital Transformation for Quality Jobs." African Union's Commission for Economic Affairs and the OECD Development Centre. 2021.

⁷¹ Avellan, Leopoldo and Arturo Galindo. "The Challenge of Countercycliality for Multilateral Devleopment Banks." Interamerican Development Bank (IDB). Dec 13, 2018. https://blogs.iadb.org/efectividad-desarrollo/en/the-challenge-of-countercyclicality-for-multilateral-development-banks/

⁷² Fleiss, "Multilateral Development Banks in Latin America," 2021.

⁷³ This was affirmed from interviews from the World Bank, noting that its digital foundations loans are ones that take a holistic approach to financing across sectors. Sources: (i) Paul Nguyen interview. World Bank - Digital Development/Governance Specialist. November 19, 2021; (ii) Ed Hsu interview. World Bank - Senior Adviser, Infrastructure and Digital Development. November 11, 2021.

MDB lending usually entails a bank supporting a government to diagnose gaps and structuring a tailored loan package in a way that aligns with that country's specific digital transformation priorities. **A top challenge is the need for better upfront analysis and strategy development by the country in order to inform a financial ask of lenders that truly optimizes for long-term digital transformation outcomes**. Because of the need for both sides to align rather than one dictating the terms to another, the process to secure an MDB loan can often be lengthy, taking anywhere from two to seven years, and conditions are usually attached to protect project and lender interests after disbursement. For example, given that MDBs have often been criticized for focusing too much on capital expenditure funding without accounting for the operating expenditure funding that is needed to maintain infrastructure and deliver services, some loan packages come with conditions around political willingness and budgetary commitments to match capital expenditure (capex) funding with operational expenditure (opex) funding from the government.⁷⁵

Case study: MDB sovereign loan⁷⁶

The World Bank provided a \$200 million concessional loan to Ethiopia to implement the **Ethiopia Digital Foundations** project, a multi-pillar package of digital transformation initiatives. The implementing agencies of the project are the Ministry of Innovation and Technology (MInT) – Ethiopia and the Ministry of Finance and Economic Development – Ethiopia. The project aims to increase access to affordable, high-quality internet services for government, businesses, and citizens, and to promote digital entrepreneurship and the creation of digital jobs. There are three main components for uses of proceeds: 1) enabling legal and regulatory environment for the digital economy, 2) extending affordable broadband coverage, and 3) supporting digital entrepreneurship and industry.

Some MDBs like the Asian Development Bank and African Development Bank also have the ability to do non-sovereign lending to private companies, special purpose vehicles, private equity funds, financial institutions, and state-owned enterprises.⁷⁷ In such cases, they would generally offer market rates of financing to avoid crowding out commercial capital sources but bring the unique benefit to borrowers of helping them build and navigate relationships with public-sector entities. From a private borrower perspective, there are benefits to this type of financing because it can provide connections between government and the private sector that otherwise did not exist, facilitating important conversations related to how to provide the best mix of regulation and policy to create a robust enabling environment for the private sector. However, policymakers need to safeguard against undue influence from industry and ensure policy and regulation is in the best interest of those it intends to protect against market failures and undue influence.

Debt capital markets

For those countries that have the option, commercial debt capital markets serve as an alternative public finance source to multilateral and bilateral lenders. As mentioned earlier, not all countries have access to these capital markets, particularly low-income countries. Even for those LLMICs whose economic fundamentals are sound, the government in the country may often be the only or the primary entity that is able to issue any bonds. In such cases, placements largely remain restricted to local,

⁷⁵ Nicholas Williams Interview, African Development Bank (AfDB). November 2021; Paul Nguyen interview, World Bank, Nov 2021; Ed Hsu interview, World Bank, Nov 2021.

^{76 (}i) Tesfaye, Bethel. "World Bank Funds the Ethiopia Digital Foundations Project with \$200M." Shega Weekly – Issue 25. May 17, 2021. https://shega.co/post/world-bank-funds-the-ethiopia-digital-foundations-project-with-200m/; (ii) World Bank interviews ; (iii) "Ethiopia Digital Foundations Project - Project information Document." The World Bank. Sep 23, 2019. https://documents1. worldbank.org/curated/en/650161570436992486/pdf/Concept-Project-Information-Document-PID-Ethiopia-Digital-Foundations-Project-P171034.pdf.

^{77 (}i) "AfDB - Private Sector – How to Work With Us." African Development Bank (AfDB) https://www.afdb.org/en/private-sector/how-work-us; (ii) Interview with Don Lambert. Asian Development Bank, Head of Private Sector Development, Vietnam mission. December 6, 2021.

private placements rather than international public offerings in hard currency. Local regulated banks, insurance companies, and sometimes pension funds would invest in government bonds or large local corporate issuances as private placements, generally holding such government bonds to maturity rather than trading them in an active secondary market. Lack of deep and liquid debt capital markets means that the cost of issuing such debt for the government will also be relatively high.

Below the national government level, municipalities and localities in LLMICs would generally be reliant on their own tax revenues, the central government, and donors for public finance support. Some larger municipal/local government entities may be statutorily permitted to borrow from the private sector in the same way as the central government, while their actual level of access depends on their revenue collection, financial management capacity, and resulting credit profile.

Many countries have national development banks to finance national and local economic development projects, often established and capitalized with the help of international aid and lending organizations. These banks, which may be wholly or partially state owned, otherwise operate as any private commercial depository and lending institution. They may be specialized in certain sectors, such as agricultural, industrial, or infrastructure lending. Digital transformation and ICT infrastructure would be on the agenda for many such institutions.

Case study: Private debt⁷⁸

Liquid Telecommunications, Africa's largest independent fiber, data center, and cloud technology provider, issued a **Eurobond** listed on Euronext Dublin, Ireland's main stock exchange, on February 25, 2021. The issuance raised \$620 million. The IFC, as a multilateral development finance institution, played an anchor role and subscribed to US\$100 million of the bond. The offering was 5.5 times oversubscribed, reflecting high investor demand for exposure to African digitalization opportunity. Liquid has installed more than 70,000 kilometers (43,500 miles) of fiber across Africa to meet increasing demand for higher-speed internet links and data storage as hundreds of millions of people get connected, mostly using their mobile phones. It operates five data centers in South Africa, Kenya, and Rwanda.

4.4 Private sector

The private sector is the largest and most important source of economic development funding for any country, including LLMICs. For the purpose of this research, private-sector sources include corporates (investment and grants in the form of corporate social responsibility donations); development finance institutions, which are publicly funded but mandated to provide capital to the private sector to achieve specific development impact goals; private-impact investors; and commercial lenders and investors.

In terms of the interaction between public and private funding, **one function of the public sector is to enable and attract larger volumes of private capital**. As applied to the digital transformation context, the public sector can do this in several ways:

- 1. Directly contracting, co-investing with, or partnering with the private sector
- 2. Funding incentives to attract private capital and filling remaining gaps
- 3. Creating an enabling environment for private capital flows
- 4. Imposing government mandates and concessions/licenses

In terms of **directly partnering with or getting funding from the private sector**, there are several models often used in other sectors that are being increasingly applied to digital transformation.

78 "Africa's Largest Fiber Company Raises \$840 Million in Bond Sale." Bloomberg. Feb 25, 2021. https://www.bloomberg.com/news/articles/2021-02-25/africa-s-largest-fiber-company-raises-840-million-in-bond-sale.

Examples include:

- Utilizing private government contractors: In this case, the government pays for goods and services that are delivered by a private for-profit company. For example, a government might pay a private company to design and implement a cybersecurity system for an online government service platform, ideally selecting the service provider through a transparent and fair procurement process to get the best provider at the lowest cost.
- Public-private partnership (PPP) financing models: This is most often used for infrastructure projects requiring large capital investments, such as transport infrastructure, water and sewage, and hospitals. PPPs typically involve private capital financing public infrastructure and services upfront, then drawing revenues and profits from users/taxpayer funding over the course of the PPP contract. The exact division of public versus private responsibilities in terms of financial risk-sharing, ownership, building, operating, and maintaining differs, depending on the needs and negotiations for each project. An example is Vietnam's first PPP financing structure with the Asian Development Bank.

Case study: Public-private partnership (PPP) financing⁷⁹

The Asian Development Bank issued a project loan of \$20 million to fund the establishment of a project development facility (PDF) that would help bring bankable PPP projects to the market, a first for ADB in Vietnam. Among the PPP projects funded is an e-government procurement system that consists of three main components: e-bidding, user management, and a portal. It allows advertising of procurement plans, invitation for bids and contract award notices, issuance of bidding documents, receipt of bids, and bid opening. The ADB-funded PDF was used by the government to fund PPP project preparation activities that included pre-feasibility studies, full feasibility studies, and the engagement of transaction advisors who would structure deals to bring to the private sector for bidding.

• Structural funds and blended finance funds: Structural funds, as defined by the ITU, are financial tools set up to implement national and regional policies.⁸⁰ They often involve the blending of financing from different sources of capital so that a larger pool of capital can be mobilized to achieve a common goal. Such funds can provide support through a range of funding instruments, including grants, debt, guarantees, and risk-sharing mechanisms. The European Investment Fund provides an example of a co-investment fund that blends public and private capital sources to provide finance through a number of instruments via private fund managers and banks.

Case study: Blended venture capital fund⁸¹

The **Rwanda Innovation Fund** is a new government-backed venture capital fund initiated by the government of Rwanda and capitalized by leading international investors. It aims to mobilize US\$100 million in direct commitments from the Rwandan government and private investors, and also secured a US\$30 million loan from AfDB. The project is expected to support more than 150 companies at various stages and invest in about 20 early-growth-stage opportunities. It is managed by Angaza Capital, a private fund manager, and focuses on early-growth-stage companies within the health tech, agtech, smart city, and edtech sectors across the Middle East and Africa. It invests between \$250,000 and \$5 million in each company to help them scale their operations. The fund also works alongside a technical assistance facility that offers hands-on support.

79 (i) Interview with Don Lambert. Asian Development Bank, Head of Private Sector Development, Vietnam mission. December 6, 2021. (ii) "e-GP Assessment Report for the Public Procurement Agency of Vietnam: Technical Assistance Consultant's Report." Asian Development Bank. Dec 2016. https://www.adb.org/projects/documents/vn-47192-001-tacr-1

80 Universal Service Funds are defined as a type of ICT-specific structural fund. Source: Msimang, "Financing Universal Access to Digital Technologies and Services," ITU, 2021.

81 (i) Interview with Nicholas Williams, Head of ICT, African Development Bank (AfDB). November 2021 ; (ii) "Angaza Capital Launches the RIF." EIN News. Nov 1, 2021. https://www.einnews.com/pr_news/555242632/angaza-capital-launches-the-rwanda-innovation-fund-rif-to-support-smart-sustainable-growth-and-innovation-ecosystems; (iii) "Rwanda Innovation Fund Project to Receive US\$30-million Loan from AfDB." Info Plus Gabon. 20 Mar 2018. https://www.infosplusgabon.com/a-la-une/12165-rwanda-innovation-fund-project-to-receive-us-30-million-loan-from-afdb.

Community cooperatives: The public sector can also support nonprofit, consumer-owned, community cooperatives to organize and self-fund a model that has been deployed in developed and developing countries for underserved populations to access public infrastructure or services. In such models, cooperatives operate as nonprofit organizations, where profits are either reinvested for infrastructure or distributed to members in the form of dividends paid on a member's investment in the cooperative. Operating costs for a community are covered by member fees and usage revenue collected by the cooperative, sometimes subsidized with government support. Examples include rural electricity and telephone cooperatives in the United States that were set up when investor-owned utilities failed to reach outlying rural areas. Cooperatives either pool purchasing power for wholesale electricity from larger power plants or generate it themselves, with members required to buy all electricity exclusively from the co-op. Recently, many of these cooperatives have branched out into rural fiber optic infrastructure and internet connectivity.⁸²

Case study: Blended fund⁸³

The African Digital Financial Inclusion Facility (ADFI) is a fund that blends finance from multiple donors as well as investment capital from the African Development Bank with a goal of reaching the 332 million people (60% women) with mobile phones who aren't yet part of the formal financial sector. This fund deploys loans and grants to scale up digital financial services to various public and private entities, including banks, non-bank financial institutions, mobile network operators, remittance and payment service providers, fintech companies, government ministries and regulatory bodies, and regional economic organizations. The fund has a target envelope of US\$100 million in grant funding alongside \$300 million in debt financing from the AfDB. The fund launched in 2019 with seven grant-funded projects approved and currently in the initial design phase. This will be an important source of additional targeted finance for governments and other actors to fund their digital transformation agendas, as it seeks specifically to fill gaps in the market while also building an evidence base of best practices to be shared as public goods.

In terms of **funding incentives to attract private capital and filling remaining gaps**, there are several ways for governments to stimulate private-sector activity and capital flows in the digital economy. A general overview of each of these mechanisms is outlined in sections 4.1 and 4.2. Examples of using these mechanisms to stimulate private capital in particular include:

Demand aggregation and minimum volume guarantees: When the public sector helps aggregate demand and guarantee minimum volumes/revenues, this mitigates risk by reassuring investors that there will be users and revenue for their networks or users of their services and devices. This is achievable through availability payments, where providers are paid based on performance regardless of actual demand and utilization, offtake agreements, and other contractual mechanisms.⁸⁴ One form of demand/volume guarantee is when the government itself serves as an anchor tenant,⁸⁵ procuring and guaranteeing demand for services to a pool of underlying users such as public schools, e-government initiatives, and public Wi-Fi users. An example of this is South Korea's information infrastructure project. By committing to become an anchor tenant of a nationwide fiber optic network, the government ultimately leveraged its investment 19 times and created benefits estimated at \$4 billion.

84 Msimang, "Financing Universal Access to Digital Technologies and Services," ITU, 2021.

85 Nicholas Williams Interview, African Development Bank (AfDB). November 2021

^{82 (}i) "Utility Cooperatives." University of Wisconsin Center for Cooperatives. Accessed Jan 16, 2022. https://uwcc.wisc.edu/resources/ utilities/; (ii) "Cooperatives Build Community Networks." Institute for Local Self Reliance (ILSR). Accessed Jan 16, 2022. https://muninetworks.org/content/rural-cooperatives-page; Trostle, H, Katie Klenbaum, et al. "Cooperatives Fiberize Rural America: A Trusted Model for the Internet Era." Institute for Local Self Reliance (ILSR). https://ilsr.org/wp-content/uploads/2020/05/2020_05_19_ Rural-Co-op-Report.pdf.

^{83 (}i) Interview with Lou Simpson, Communications and Knowledge Management Consultant, ADFI. November 17, 2021; (ii) ADFI website. Accessed Dec 11, 2021. https://www.adfi.org/.

Case study: Government demand aggregation⁸⁶

In 1995, the **Korea Information Infrastructure (KII)** project was launched by the Ministry of Information and Communication (MIC) of South Korea, as part of a wider strategy for broadband adoption throughout the country. This initiative aimed at providing high-speed connectivity to the 144 call zones in the country, covering government entities, and nonprofit organizations. Between 1995 and 2000, the construction of the optical backbone network implied a total investment of US\$9.5 billion, out of which only US\$0.5 billion (5.3 percent) came from the government of Korea as a soft loan to operators that was later paid in the form of free service provision to public schools and other public entities for a limited period of time. The infrastructure that was deployed as part of this project set the path for the KII-P (private) program, which complemented the initial government-driven infrastructure to create the current national backbone, covering 99% of all households in the country. Basically, by committing to become an anchor tenant of a nationwide fiber optic network and providing soft loans to operators, the government leveraged its investment 19 times and created benefits estimated at \$4 billion.

- Grants and subsidies: These are government-issued incentives, usually in the form of cash, grants, or a targeted tax cut. They can be used at multiple stages in the investment process to either demonstrate a beneficiary's business case or reduce business model risk, such as through digital literacy programs or local content and platform development. They can also be used to facilitate access to populations that are otherwise underserved by the private sector,⁸⁷ such as access deficit charges where operators are allowed to receive compensation for every connection deemed "high cost," and end-user subsidies where low-income/rural households are given a subsidy that allows them to pay for services.⁸⁸ Importantly, modern subsidies can incentivize delivery in terms of how they are structured, in tranches, and how they are measured. In order for subsidies to be effective, they must be outcome based and linked to certain policy conditions.⁸⁹
- Tax incentives: Tax incentives and exemptions can be used to stimulate investment as well as increase access and affordability of private goods/services. As discussed earlier, the ICT sector in many countries is taxed on multiple fronts, including value-added tax, corporate tax, and customs and excise duties. Measures to lower costs and increase investment could include tax holidays or license-fee exemptions for spectrum licenses and airtime taxes, which directly increase consumer prices and reduce affordability, and import taxes and customs and duties on network equipment, hardware, and devices. Tax incentives directed at specific digital sectors such as software development services and call center services can stimulate the growth of those sectors, as demonstrated by tax policies implemented in Belize, Djibouti, India, and the Philippines.⁹⁰ Additionally, tax exemption regimes can be used to attract investment, including through special economic zones (SEZs) and science parks that provide tax incentives; other incentives such as access to land and high-quality infrastructure; and streamlined processes for new ICT businesses and real estate investment trusts (REITs) that incentivize investment in infrastructure, such as towers and data centers.⁹¹ Clearly, such incentives need to be well targeted and based on sound policy rather than political directives. There is often an incentive to prioritize the construction of physical and visible infrastructure (e.g., data centers) for short-term political purposes, even if there are lower-cost, higher-impact investments that should take priority.

- 87 Wen, Jean-Francois. "Special Series on COVID-19: Temporary Investment Incentives." International Monetary Fund Fiscal Affairs. May 11, 2020. https://www.imf.org/-/media/Files/Publications/covid19-special-notes/en-special-series-on-covid-19-temporary-investment-incentives.ashx.
- 88 Muente-Kunigami. "Options to Increase Access to Telecommunications Services in Rural and Low-income Areas." World Bank, 2010. 89 Msimang, "Financing Universal Access to Digital Technologies and Services," ITU, 2021.
- 90 Ibid.
- 91 ibid.

⁸⁶ Muente-Kunigami, A. & Juan Navas-Sabater. "Options to Increase Access to Telecommunications Services in Rural and Low-Income Areas." World Bank Working Paper, No. 178. 2010.

Case study: Incentives for foreign direct investment (FDI)⁹²

Xchanging is a global business processes outsourcing (BPO) company with a wide range of multinational customers in 42 countries, employs 8,000+ people worldwide, and is publicly traded on the London Stock Exchange. Xchanging partnered with local government and KEONICS, a state-owned enterprise targeting the growth of the electronics and IT industry in Karnataka, India, to develop a data center it created in a special economic zone (SEZ) created to attract foreign investment. Xchanging has also set up a vocational school to train graduates in BPO skills. This case study also represents a successful example of "impact sourcing", an emergent concept in the sourcing industry, based on the premise of creating long-term social impact by utilizing global sourcing of services and employment generation for poor and vulnerable people. Through various tax and SEZ incentives, the local government was able to attract Xchanging's investment a new low-carbon state-of-the-art 1,000-person processing center, with an option to scale to 2,000, in Shimoga, a small (tier 3) town northwest of Bangalore (rather than a core urban center.)

- **Risk-mitigation mechanisms:** The public sector, whether LLMIC governments or development finance agencies, can use financial products to mitigate a variety of risks for property/infrastructure, equipment, service delivery performance, and political and macroeconomic challenges. Risk-mitigation instruments include guarantees, insurance, risk-sharing facilities, and currency hedging instruments. These can be funded by the public sector to help protect private investors against these various types of risks, and facilitate access to commercial finance at a lower cost.
- Finally, governments are also unique in their ability to impose mandates, in which private actors are required by law to take a particular action without compensation. Mandates for digital transformation include taxes and universal services fund models, as well as the granting of spectrum licenses, concessions, or public assets like land to private operators so they can operate. License obligations may include mandatory areas for coverage as part of the licenses of new players. While these can be useful tools, governments need to strike the right balance. They should be careful not to implement mandates that are overly onerous and stifle private providers, as well as ensure mandates are updated and revisited frequently enough to avoid them becoming ineffective or irrelevant due to loopholes or changing circumstances in the market.

Case study: Licenses⁹³

The **Ethiopian government ran a competitive bidding process for a license** for private providers to build out the country's telecoms infrastructure. The bid was won by a consortium led by Safaricom with a bid of \$850 million. Safaricom owns a majority stake in the consortium, which includes British development finance agency CDC Group, US DFC, and Japan's Sumitomo Corporation. IFC is going to help broker the second license bid transaction for a second provider. As part of this effort, Ethiopia has also been taking bids for private ownership of its main state-owned telecoms enterprise, which it is privatizing as well.

^{92 (}i) "Xchainging Sets up Centre in Shimoga." The Hindu Businessline. July 11, 2012. https://www.thehindubusinessline.com/news/ national/xchanging-sets-up-centre-in-shimoga/article23086269.ece; (ii) "Incentives & Opportunities for Scaling the 'Impact Sourcing' Sector." Avasant and Rockefeller Foundation. Sept 2012. https://www.rockefellerfoundation.org/wp-content/uploads/Incentives-Opportunities-for-Scaling-the-Impact-Sourcing-Sector.pdf

^{93 (}i) Ngugi, Brian. "Safaricom Gets Formal Nod to Start Operations in Ethiopia." Business Daily Africa. July 15, 2021. https://www.businessdailyafrica.com/bd/corporate/companies/safaricom-gets-formal-start-operations-in-ethiopia-3474478;
(ii) Endeshaw, Dawit. "Ethiopia to Reopen Bidding for Second Telecoms Licence." Reuters. Aug 2, 2021. https://www.reuters.com/ business/media-telecom/exclusive-ethiopia-reopen-bidding-second-telecoms-licence-officials-say-2021-08-02/; (iii) Interview with Lou Simpson. African Digital Financial Inclusion (ADFI) facility, Nov 17, 2021.

A key role for the public sector is **creating an enabling environment** for private-sector funding. When done smartly, this often provides the best value for scarce public resources. For instance, one of the best value-for-money interventions in the ICT sector for Africa has been **funding for policy reforms around ICT sector liberalization**. Tens of millions of dollars of advocacy and policy advisory support has helped unleash more than \$100 billion of subsequent private investment.⁹⁴ Similarly, A4AI's 2019 Affordability Report finds that promoting competitive markets is one of the most important drivers of affordability of internet services and should be a top priority of governments.⁹⁵

However, the intangible and longer-term nature of the benefits of investments in digital projects has led international development finance institutions and LLMIC governments to undervalue these investments and instead focus on more tangible, immediate, and politically appealing infrastructure/ hardware spending. Creating an enabling environment entails governments reforming policies and regulations; streamlining processes, procedures, and approval processes for private-sector actors to enter and operate; promoting open access and infrastructure sharing at national and local levels, as well as across sectors; supporting consumer education and awareness campaigns to address the public's concerns to support adoption; supporting local R&D and the entrepreneurship environment; creating and providing access to information; and improving cross-sector collaboration and cooperation. Others, such as the ITU and World Bank, have addressed this topic and best practices in much greater depth than can be covered in this paper. According to ITU's analysis, the impact of selected policy actions on increasing private telecom investment demonstrates the importance of governments focusing on this lever as a key way to mobilize more funding for digital transformation, as outlined in Figure 12.



FIGURE 12: IMPACT OF OVERALL TELECOM INVESTMENT AFTER % CHANGE IN SELECTED POLICY VARIABLE⁹⁶

94 Nicholas Williams interview. African Development Bank, Head of ICT. November 29, 2021.

95 "2019 Affordability Report." Alliance for Affordable Internet (A4AI). 2019. https://a4ai.org/affordability-report/report/2019/.

96 The graph shows an estimate of the impact of the adoption of regulatory policy on market performance (in terms of increase in CAPEX for the overall telecommunications sector). This is a generic simulation based on econometric modeling and historic data for 145 countries over the period 2008-2019. Source: "Impact of Policy Variables on CAPEX." ICT Policy Impact Lab. Accessed 28 Jan 2022. https://app.gen5.digital/lab/telecom.

4.5 Income and cost savings

Another funding source for digital transformation initiatives could be the operating revenues, retained earnings, and/or attributed cost savings derived from the implementation of the digital transformation initiative itself or other state-owned income-generating assets. One example is **service or license fees**. ICT service providers that must receive network and services licenses from the government to operate pay an annual license fee to the state. Vodafone, for instance, generates billions in revenue for South Africa's national treasury each year through payment of these fees.

State-owned enterprises or public utilities operating in the digital sector can also capture operating income for the state over time. Some of these state-owned enterprises may also be allowed to borrow on their own balance sheets, as outlined in the case studies of South Africa's Broadband Infraco and the Malaysia Digital Economy Corporation below.

Case study: State-owned enterprises⁹⁷

To promote competition in the telecoms sector, the government of South Africa created Broadband InfraCo in 2007, a national infrastructure company to provide low-cost backbone broadband network capacity to service providers in South Africa. Broadband InfraCo is a state-owned but non-sovereign entity that can raise its own debt. However, in 2015, it had to turn to the government for rescue funding after persistent losses. At the end of 2020, South Africa merged Broadband InfraCo with satellite service provider Sentech to create a national broadband network managed by a single broadband provider as part of a rationalization plan to reduce state expenditure.

In 1996, the Malaysian government created the **Malaysian Digital Economy Corporation (MDEC)**, a dedicated corporation to drive national digital transformation. Overseen by the Ministry of Communications, the MDEC's mandate is to develop Malaysia's digital economy by driving investments, building local tech champions, catalyzing digital innovation ecosystems, and promoting digital inclusivity. It is permitted to generate its own income and was established as a corporation rather than a statutory body.

In some cases, the implementation of digital transformation initiatives, particularly those involving e-government, can help governments directly generate value by **improving tax revenue collection or realizing cost savings**. For instance, Pakistan's Raast (see Annex 3) is a government-led instant digital payments system that facilitates private-sector payments and enables government-to-citizen payment transfers. This should improve the efficiency of government social payment transfers and help the government collect more taxes by using digital, recorded transactions rather than cash.

Another funding source for digital transformation initiatives could be the operating revenues, retained earnings, and/or attributed cost savings derived from the implementation of the digital transformation initiative itself or other state-owned income-generating assets.

97 (i) Interview with Rezah Atcha. South Africa Treasury. Director, Energy and Telcommunications Nov 22, 2021 ; (ii) "South Africa Telecoms Infrastructure, Operators, Regulations Statistics and Analyses Report 2019." Associated Press – Business Wire. Nov 29, 2019. https://apnews.com/press-release/business-wire/technology-business-africa-south-africa-mobile-networks-a4e9669e48dd46 88a8e6a60b6837b075; (iii) Burkitt-Gray, Alan. "South Africa Merges Broadband Infraco and Sets Internet Target." Capacity Media. 17 Dec 2020. https://www.capacitymedia.com/articles/3827270/south-africa-merges-broadband-infraco-and-sets-internet-target; (iv) "Broadband Infraco begs for R1 Billion Government Bailout." Business Tech. 22 Sept 20215. https://businesstech.co.za/news/ broadband/99076/broadband-infraco-asks-for-r1-billion-from-govt/; (v) "Malaysia Digital economy Corporation (MDEC)." Graduan. Accessed Dec 10, 2021. https://graduan.com/company/malaysia-digital-economy-corporation-mdec-sdn-bhd.

Another well-used public funding mechanism is **sovereign wealth funds**. These are state-owned investment funds that invest in real and financial assets locally and globally. Investment management entities such as official investment companies may be set up to manage them. Most such funds are funded by revenues from commodity exports or foreign-exchange reserves held by the central bank.⁹⁸ The corpus of the fund can continue to grow over time, and its investment activities, depending on fund performance, can generate a significant stream of investment income for the country. The investment strategy of sovereign wealth funds can also be crafted to serve specific national development and policy goals.

It is important to note that if the intention is to rely on certain income streams and cost savings to cover all or part of an initiative's funding, such cashflows may only be feasible over time, requiring upfront financing. Also, it will require sufficient government capacity to operate and/or oversee effectively, to ensure its full monetization potential. This has been a challenge in the past, with underperforming state-owned enterprises, public utilities, and other forms of government service delivery. In 2015, South Africa's state-owned fiber optic company, Broadband Infraco, turned to the government for rescue funding after persistent losses.⁹⁹

Case study: Sovereign wealth fund¹⁰⁰

Indonesia's government launched its new sovereign wealth fund known as the Investment Authority Indonesia (INA) in 2021. Unlike some traditional sovereign wealth funds that are endowed solely through the country's own domestic resources for the purpose of acquiring international assets, often through allocations to private fund managers, the Indonesian model is intended to attract international co-investors to invest domestically or regionally, acting as an active/direct investor in transactions. Jakarta pledged US\$5 billion to the fund, which it hopes will attract an additional \$15 billion from international sources. The UAE, Japan's Softbank, and the U.S. International Development Finance Corporation (DFC) have already been lined up to invest in the fund, according to Indonesian officials.

The INA will initially focus on infrastructure in the country—both physical and digital. INA intends to co-invest with the same terms as the other investors, which also marks a departure from state-controlled investment approaches, since the government will now indirectly allow the private sector to influence state functions to provide public services. On the other hand, INA's operation would make the state an actor in capital mobility that can also direct the funds to sectors that support national interests. INA's domestic focus is a key feature that makes possible such influence.

It is worth noting that the funds offered by INA would invest in projects that receive government supports, including special tax treatment, regulation, and permit issuance. Experts expect the fund's operations to generate further observation and interest on the dynamics of state-market relations in future years.

It is important to note that if the intention is to rely on certain income streams and cost savings to cover all or part of an initiative's funding, such cashflows may only be feasible over time, requiring upfront financing.

98 "Sovereign Wealth Fund." Wikipedia. Accessed 16 Dec 2021. https://en.wikipedia.org/wiki/Sovereign_wealth_fund.

99 Broadband Infraco begs for R1 Billion Government Bailout." Business Tech. 22 Sept 2021.

100 (i) Cahyafitri, Raras. "Indonesia's Sovereign Wealth Fund: A New Era of Incorporation into the Global Private Market." London School of Economics Blogs. July 26, 2021. https://blogs.lse.ac.uk/seac/2021/07/26/indonesias-sovereign-wealth-fund-a-new-era-of-incorporation-into-the-global-private-market/; (ii) Aditya, Arys and Fathiya Dahrul. "Indonesia Wealth Fund Boards Get \$5 Million as Funds Stay Idle." Bloomberg. 3 Dec 2021. https://www.bloomberg.com/news/articles/2021-12-03/indonesia-wealth-fund-boards-get-5-million-as-funds-stay-idle.

5. Assessing the Options

Given the diverse array of funding/financing sources and mechanisms, as well as the diverse uses of proceeds for digital transformation programming outlined in Chapter 4, there are clearly many factors that must go into assessing options for decision-making. This chapter outlines some additional frameworks and steps to support policymakers as they consider which sources of finance are most appropriate for specific use cases in their own digital transformation strategy.

As tempting as it may be, there is no good way to devise a single menu that matches specific sources and mechanisms to specific projects, since there are so many variables at play for each unique market context, national strategy, funder organization, and transaction. However, there are some broad assessment parameters for government decision-makers in developing their funding/financing strategies, including:

- 1. The **financial profile** of the digital transformation intervention in question and which funding/ financing sources/models are actually **fit for purpose**
- 2. The **tradeoffs** between different funding/financing sources along several **feasibility and preference parameters**

The following section outlines these assessment parameters, which are generally true whenever a government seeks to assess funding and financing options for particular interventions, regardless of sector, intervention focus, or government department. Because digital transformation cross-cuts such a broad array of public, private, and mixed goods across all sectors and government focus areas, these assessment parameters must be relatively broad for the purposes of this analysis. Throughout, we reference specific examples and cases outlined earlier in the report to make a more concrete link to digital transformation. In Annex 3, we use these frameworks to explore three more in-depth case studies to tie this all together.

5.1 Fit for purpose

It is critical that the funding and/or financing models are fit for purpose to the financial profile and needs of the digital transformation in question. This is based on a combination of determinants:

- Who benefits from the intervention
- Who owns/operates over time
- · What is the likely cashflow profile (inflows/outflows) over time

Who benefits from the intervention: This is one important determinant of feasible funding/financing options because it determines if and where any revenue streams might be available and how best to capture them.

If the main beneficiary will be individual households/customers consuming a largely private good or service, such as home or mobile broadband services, there should be some form of revenue to be captured from providing that good or service. If the intervention is targeting a demographic that still receives private benefits but lacks the ability to pay, such as those using broadband services in very rural and low-income communities, then that suggests other funding/financing measures for consideration. If the main beneficiary and user will be the government itself, such as an e-government project, government budget sources should be seen as a key funding source, although a broader array of options may be available for any upfront financing needed. Finally, if the benefits of an intervention only accrue over a diffuse period of time to a diffuse population, such an intervention may have public goods benefits that may also require public-sector funding/financing sources to support. Who owns/operates over time: In addition to identifying the beneficiaries of the intervention and their incentives, the selection of an appropriate funding/financing model also needs to be based on the ultimate ownership and operating model of an intervention, such as:

- 1. **Government ownership, government service delivery** (e.g., a public utility that owns infrastructure and enacts service delivery, such as Aadhar digital ID or Raast digital payment systems)
- 2. **Government ownership, private service delivery/support** (e.g., an interoperable digital payments platform that is built and/or run by a private contractor)
- 3. **Private ownership and service with government support** (e.g., a private internet service provider whose service costs to certain qualifying low-income users are subsidized by public funds, such as Universal Service Funds)
- 4. **Public/private joint ownership and/or joint delivery** (e.g., a digital payments platform jointly owned/operated by a central bank and private banks, such as NPCI/UPI (see the case study in Annex 3)
- 5. **Private ownership and private service delivery** (e.g., a private internet service provider financed by private investors and funded by revenue/profits from fee-paying customers)

This is not to say that whoever is the owner or the operator must necessarily be the sole source of funding/financing. But the ownership and operating model does impact feasibility and appetite from public or private, commercial or development finance sources.

Fit for purpose is determined by the likely cashflow profile of the given intervention over time. This refers to what cash outflows will be required in terms of costs to be covered upfront and over time, and what cash inflows are realistic in terms of available revenue/income streams to draw from over time.

Likely cashflow profiles (inflows/outflows) over time: Ultimately, fit for purpose is determined by the likely cashflow profile of the given intervention over time. This refers to what cash outflows will be required in terms of costs to be covered upfront and over time, and what cash inflows are realistic in terms of available revenue/income streams to draw from over time. This is illustrated in Figure 13 below. In an intervention such as regulation and policy development, there will likely be no attributable income stream to draw from and, therefore, no way to cover the costs of such interventions other than through donor grants or government budget support.¹⁰¹

In another intervention, such as development of a national interoperable digital payments system, it may be that the upfront capital costs needed will be high and require government or development financing. But over time, this payments system may be used by private operators that can charge transaction and user fees as an income stream to cover their operating costs and help repay the original capital investments in part or in full. This cashflow scenario opens up the possibility of tapping other financing sources, such as development banks, DFIs, and impact investors.

Finally, in situations where an intervention is expected to tap into market-based and sustainable revenue streams over time, sufficient to cover all capital and operating expenditures as well as generate a profit above cost coverage, that opens up yet more options for sources, including more commercial sources of capital.

¹⁰¹ Such interventions may have indirect income generation down the road from facilitating increased tax revenue or improved market efficiency, although this is difficult to attribute. Regulation or policy development may have some direct fee generation if they put in place a licensing program, for example, that generates administrative fees (see Ethiopia privatization case study), but these would not likely cover full costs.

FIGURE 13: CASHFLOW PROFILE AS A DETERMINANT OF APPROPRIATE FUNDING SOURCES¹⁰²

				•	
Cashflow potential	1) No cost recovery potential	 2) Opex recovery but not capex recovery yet 	 Opex + capex recovery but no surplus 	 Cost recovery with surplus 	
	Donors			Sovereign or	
Public owner.	National or local government	budget	4) Cost recovery with surplus Sovereign or muni bonds Commercial bank loans Sovereign or muni bonds Commercial bank loans		
public operator	0 0 0	National development banks/loan funds		Commercial	
	0 0 0	MDB sovereign loans		bank loans	
Public owner	Donors			0 0 0	
	National government budget			Sovereign or muni	
private	0 0 0	National development banks/loar	funds	Commercial bank	
operator	• · · · · · · · · · · · · · · · · · · ·	MDB sovereign loans		loans	
	• • •	- 6 6	DFIs, Impact investors	Commercial bank loans	
Private owner/ operator, public support	• · · · · · · · · · · · · · · · · · · ·	Donors		0 0 0	
	• · · · · · · · · · · · · · · · · · · ·	Government budget		6 6 6	
	6 6 6	National development banks/loar	ı funds	Bank loans, debt &	
		- 0 0 0	DFIs, Impact investors	equity investors	

It is important to note that **sources of funding may be blended simultaneously** to achieve financial/ impact goals that a single source cannot achieve alone, as well as **transitioned to different sources over time** as the intervention's cashflow profile changes. This is illustrated by Figure 14 below, which shows how a blended funding model might evolve over time for a hypothetical infrastructure project that has certain upfront financing requirements, and then various sources of repayment, cost coverage, and ongoing financing over time.



FIGURE 14: BLENDED FINANCE APPROACHES BASED ON CASHFLOW PROFILE¹⁰³

102 Note that in cases of joint public/private ownership and/or delivery, financing pathways will be a mix of the above archetypes. Source: Volta Capital analysis.

103 Adapted from: "Reform and Finance for the Urban Water Supply and Sanitation Sector." World Bank Open Knowledge Repository. 2019. https://openknowledge.worldbank.org/handle/10986/32244

In the initial design and launch phases of the project, upfront capital and operating expenditures to install capacity and initiate service delivery will need to be financed, and these financing costs must also be included in costing. Sources to cover these upfront costs include government budget, concessional funding such as a donor subsidy, and some operating income that can be generated during the early phases of operationalization. This would still leave a gap that requires another financing source to fill in, such as a loan from a development bank.

As service delivery ramps up and volumes and revenues increase, the fee income stream grows and more government budget may also be mobilized to cover costs, which would reduce the donor subsidy requirements as well as any remaining funding gaps/financing requirements. To make further progress towards sustainability, continued scaling should allow more economies of scale and cost efficiencies to be realized, which would reduce the cash outflows that cash inflows need to cover. This is the case for infrastructure projects, but might not be the case for other types of projects.

Finally, at mature stages, the project's cash outflow profile has been minimized, while the project's cash inflows can be covered by maximized fee income streams and some government budget support. Any remaining financing needs can be sourced from private for-profit capital providers.

5.2 Feasibility and preference parameters

In addition to considering fit for purpose, a government should consider the various tradeoffs different funding sources present when it comes to a core set of feasibility and preference parameters: relative magnitude, financing cost, flexibility/sovereignty preferences, complexity and requirements to secure, and time intensity to secure.

The relative ranking of each funding source along these key parameters is summarized in Table 2 below. Because the specifics of each funding organization and transaction can vary greatly, the following is a generalized discussion of the major funding source segments.

	Relative magnitude	Financing cost to government	Flexibility/ sovereignty	Complexity/ requirements	Time to secure
Grant-based/ aid	Low	None	Low	Medium-high	Medium
Taxes	Medium	None	High	Low-medium	Medium
MDB borrowing	Medium	Medium	Medium	Medium-high	Long
Commercial debt	Depends on credit rating	Depends on credit rating	High	Medium	Short
Private sector investment	High	None	Medium	Medium	Medium-long
Income & cost savings	Medium	Medium	High	Medium-high	Medium-long

TABLE 2: FEASIBILITY AND PREFERENCE PARAMETERS BY FUNDING SOURCE

Grant-based aid: This is low or no-cost capital for governments, but it is a relatively small pool of capital compared to other sources. In addition, it often must be used for specific purposes, with conditions attached and stringent reporting and oversight requirements by the donor. Therefore, it is preferred by countries with lower fiscal resources and less favorable credit ratings that may have constrained access to alternative funding sources.

The fragmented aid landscape is composed of many bilateral public agencies in high-income countries, increasingly influential new bilateral actors like China and India, and private philanthropic actors with specific digital transformation funding agendas. This requires governments to be able to effectively navigate the dynamics and organizations within the development aid market to successfully tap funding that is aligned with their national digital transformation priorities. Indeed, some countries have demonstrated greater savviness in navigating these markets than others.

Aid and philanthropy can be particularly catalytic for taking innovation and earlystage risk when it comes to digital public goods.

The benefits of understanding the complex aid landscape can be seen in the case studies of Pakistan's national digital payments system and the mobile payments provider M-Pesa¹⁰⁴ in Africa, both of which were originally developed with modest amounts of donor funding that eventually unlocked larger pools of domestic resources and private capital for scale. As these cases demonstrate, aid and philanthropy can be particularly catalytic for taking innovation and early-stage risk when it comes to digital public goods.

There are also geopolitical considerations to take into account. Increasingly, aid for digital and other kinds of infrastructure development projects in LLMICs can potentially come with conditions to use operators from the countries providing that funding, particularly in the case of newer bilateral donors like China, whose conditions and intentions may be less well known than those of more traditional donors.¹⁰⁵ This can raise questions for recipient countries about the implications of opening up their national communications infrastructure, ID systems, payments systems, cybersecurity, or data to the foreign providers and governments they are associated with.

The picture of how new development finance players are influencing LLMICs' digital transformation is more nuanced than what is suggested by the oft-heard and simplistic storyline of exchanging aid for natural resources. For instance, a recent analysis of Chinese aid showed that while ICT aid constituted a very small portion of the total Chinese aid to Africa, ICT aid was disbursed to many African countries (92% of the African population), which is unique compared to other sectors receiving Chinese aid that are not nearly so broadly disbursed. This suggests that China is strategically positioning itself to extend its corporate footprint for the future. At the same time, Chinese aid has flowed to countries with smaller populations and worse economic development indicators, suggesting alignment with traditional development impact motivations. All told, the patterns of Chinese ICT aid reflect a diverse project portfolio serving diverse goals, including cultivating diplomatic goodwill, promoting infrastructure development, bolstering market growth, cultivating natural resource partners, selling telecoms equipment, and locking in market power.¹⁰⁶

^{104 &}quot;How Vodafone Launched a New Venture that Now Creates \$534M USD/ Year in Revenues. Highline Beta. Accessed 18 Jan 2022. https://highlinebeta.com/insights/how-vodafone-launched-a-new-venture-that-now-creates-534-m-usd-year-in-revenues/.

¹⁰⁵ Note that this can be the case whether the funding is grant based or a loan; as such, these considerations cross-cut both the aid and borrowing categories in this case.

¹⁰⁶ Wang, Rong, Francois Bar, Yu Hong. "ICT Aid Flows From China to African Countries: A Communication Network Perspective." International Journal of Communication, USC. Vol. 14. 2020.

Taxes: These are a government's own sovereign resource and allow the greatest autonomy when it comes to control over uses of proceeds. While instituting appropriate tax policies and implementing effective tax collection operations do impose a cost for governments, there are no financing costs associated with taxation. Still, tax revenues are a constrained resource that serve many other competing national development priorities, particularly for LLMICs. The COVID-19 pandemic is a good example of a fiscal shock that forced governments to rethink their use of tax dollars.

In addition, tax policy complexities and intragovernmental budgetary processes may present challenges for interagency coordination and mobilizing the kind of flexible funding that is well-suited to drive digital transformation agendas. Even if there is abundant government budget and political will for digital transformation, it does not mean government resources should be the default funding source. There may be many types of digital investments that are appropriately funded by other sources rather than relying exclusively on government resources.

Even if there is abundant government budget and political will for digital transformation, it does not mean government resources should be the default funding source.

Development bank lending: This is seen as an attractive and well-tapped source of external development finance for many countries because there is more financing available from development banks than aid, development banks are experienced with and focused on serving sovereign (and some non-sovereign) borrowers, and this type of lending is more accessible/affordable to LLMICs than private commercial debt sources.

Multilateral development banks are financially guaranteed by their member country governments, allowing them to borrow money in global capital markets at the lowest available market rates, akin to that of developed country governments borrowing inside their own borders. This allows them to onlend this money to their borrowers at much lower interest rates than the borrowers would generally have to pay for commercial loans, that is, if such loans were available to them at all.¹⁰⁷ Loan packages often come with supportive technical assistance led by teams that have deep expertise in the sectors and geographies they serve and carefully co-designed with the government to align to its sovereign priorities as well as lender governance requirements. Multilateral development bank loan envelopes available to countries can be significant, and countries can have a great deal of agency in determining the uses of proceeds for the loans.

However, the flip side is that this pool of funding becomes subject to the same challenges as other centralized pools of government funding, in that digital transformation competes among many national priorities for allocation. If digital transformation initiatives championed by one segment of government do not make it to the top of the political priority list, MDB funding will not be allocated for it. Digital transformation has thus far taken up a much smaller share of MDB lending compared to other core sectors like transport, energy, and industry. For digital transformation lending to increase, not only must there be government demand, which is on the rise, but supply-side institutional disincentives against digital projects must be overcome, such as their smaller ticket sizes or more complex and novel designs than large infrastructure lending requires.

^{107 &}quot;Multilateral Development Banks: Overview and Issues for Congress." Congressional Research Service. Feb 11, 2020. https://sgp. fas.org/crs/row/R41170.pdf

^{108 &}quot;Flawed Conditions: The Impact of the World Bank's Conditionality on Developing Countries." European Network on Debt and Development. April 9, 2019. https://www.eurodad.org/flawed-conditions.

In addition, development banks are large public institutions with a great deal of requirements for securing funding. Loan packages can take years to negotiate, secure, and disburse. They come with conditions on how the funds can be spent, oversight and governance requirements, prescriptions around economic policies, regulation, and fiscal management. Critics have long pointed to development bank conditionality as staid and bureaucratic at best, and at worst undermining national sovereignty, democracy, and the exact development outcomes they were meant to serve.¹⁰⁸

Given these dynamics, countries have different preferences for how and the extent to which they engage with development banks. Some have strong partnerships with the dominant multilateral and regional institutions and see them as an important funding source; some, such as many African countries, broaden their engagement to new development finance sources; some use development bank lending tactically to serve specific national interests, like Vietnam, which is directing MDB lending to non-sovereign borrowers specifically; and some are gravitating towards alternative financing sources, such as Indonesia with its relatively stronger credit rating and sophisticated private capital mobilization capabilities.

Indeed, **commercial debt** capital markets, as an alternative to development bank borrowing, affords greater autonomy and flexibility for government borrowers, since they rarely come with such a high level of conditionality or take as long to secure. However, access and affordability depend on each country's creditworthiness and credit rating. As mentioned earlier, even for those LLMICs whose economic fundamentals are sound, the government may be the only or the primary entity that is able to issue any bonds. Lack of investor demand and deep, liquid debt capital markets mean that the cost of issuing such debt for the government will be relatively high, compared to what it would be with development banks.

Commercial debt capital markets, as an alternative to development bank borrowing, affords greater autonomy and flexibility for government borrowers, since they rarely come with such a high level of conditionality or take as long to secure. However, access and affordability depend on each country's creditworthiness and credit rating.

Private-sector investment is the largest capital source and a means to drive sustainable marketbased solutions that relieve the burden on public-sector resources. However, as mentioned above, if private capital is solely relied on to achieve economic development goals, the system may be prone to market failures, like lack of access for underserved populations or monopoly power. The issues of how governments can best engage the private sector to help tap this vast source of financing to support their digital transformation agenda, as well as the key tradeoffs and considerations to keep in mind, are outlined in depth in section 4.4 above. The in-depth case studies in Annex 3 provide additional examples of some of these tradeoffs in context.

It is critical for governments to create robust enabling environments for private-sector capital to fund key parts of their digital transformation ecosystem where it is best suited, such as infrastructure, digital financial services, and investment in digital businesses, as outlined in Figure 11. However, public sources of funding and financing outlined in sections 4.1 and 4.2 are particularly important to ensure equitable reach of digital infrastructure and services provided by the private sector, such as through universal service funds and other types of incentives and structures outlined in section 4.4.

Finally, **income and cost savings** funding sources may be available, depending on the nature of the project and its cashflow profile, as outlined in more depth in section 4.5. However, these sources do require sufficient government capacity to operate or oversee them effectively, in order to generate

sufficient income streams/cost savings. Additionally, such cashflows may only be feasible over time, requiring some source of upfront/ongoing financing, such as the pathway illustrated in Figure 14 above.

For some countries, it may be feasible and preferable to self-fund or turn to commercial capital markets in order to preserve their autonomy and increase their flexibility and speed, even if it entails higher financing costs.

In considering all these factors together, governments can better determine what is feasible for their particular intervention and situation. If the intervention has no or limited ability to generate any future revenue streams to cover costs, that limits the array of funding/financing options to development finance and public-sector sources. Similarly, if a government has limited domestic resources, a weak credit rating, or little access to capital markets, its options are more limited to development finance aid/ investment sources. But those governments may also have developed strong relationships and the know-how to tap those sources to best serve their national interests.

For some countries, it may be feasible and preferable to self-fund or turn to commercial capital markets in order to preserve their autonomy and increase their flexibility and speed, even if it entails higher financing costs. There are also geopolitical considerations. LLMICs that are more politically aligned with high-income donor countries are more likely to have deeper relationships and more success working with the traditional development finance architecture, even if their economic fundamentals are weak. But countries whose political leadership has a more fraught relationship with these traditional donors may find it more feasible and more appealing to work with emerging powers and their funding sources.

6. Preparing to Mobilize Capital

Having laid out the various options for funding/financing national digital transformation strategies and key tools and frameworks for assessing when each may be most appropriate, this chapter serves to offer some final insights and takeaways governments can use to prepare for mobilizing capital during the strategy development and planning phase. While it is not possible to provide detailed action plans applicable to each context, several broad measures may be considered that can help governments better identify appropriate funding sources, craft the right ask for each, and ultimately be more successful in securing funding.

6.1 Conducting robust analysis

One common recommendation echoed by all funding sources consulted for this research—regardless of whether they are public or private, domestic or international—is to **undertake robust analysis and strategy development for the national digital transformation agenda before initiating any funding requests**. Ideally, this and all further steps would be done with a whole-of-government approach. This can be challenging for governments because digital transformation strategy development often has elements of multisector and interagency coordination, planning, novelty, and technical complexity. Nevertheless, sound analysis and strategy serve multiple purposes: 1) identifying and articulating a holistic and sustainable vision for national digital transformation, 2) identifying the appropriate sources of funding for the intended uses of proceeds, and 3) articulating a credible ask that gives the funder sufficient confidence to commit funding.

For public-sector and development finance sources of funding, a common concern and roadblock is lack of sufficiently robust analysis and credible strategy for national digital transformation, which makes it hard for them to commit funding because of a lack of confidence that it will be used effectively to achieve meaningful digital transformation outcomes. Meanwhile, when funding is not forthcoming from private-sector funding sources, it is because the government counterpart has not sufficiently understood or defined the appropriate market roles of the public versus private sectors in the digital economy, the limits of private capital risk/return appetites, or what a feasible financial proposition may be for a for-profit private-sector actor.

Thinking strategically about allocating public money is a critical component of the 'country-driven' planning process for its sustainable development objectives.

6.2 Determining fit for purpose

Part of the process of developing a sound funding strategy is an **examination of how fit for purpose it is to the intended uses of proceeds and the various practical tradeoff considerations**, which were identified in Chapter 5. Funding sources and instruments should be identified based on whether they are fit for the uses of proceeds, the intervention's intended beneficiaries/owners/operators, and the cashflow profile. There will also be feasibility and preference parameters that will clarify best options.

With a clear vision for long-term digital transformation and sustainable scaling/financing pathways to get there, countries will be much better positioned to present a compelling and credible investment case to secure funding, whether from a donor, lender, private-sector actor, or ministry of finance/treasury.

The World Economic Forum has provided more specific guidance for country planning on financing SDG goals, as illustrated in Figure 15 below. It emphasizes that: "Thinking strategically about allocating public money is a critical component of the 'country-driven' planning process for its

sustainable development objectives. From a country's perspective, this will likely form part of the upstream planning activities of the 'project life cycle,' which includes the identification of a pipeline of projects that supports a country's sustainable development objectives, an approach to allocating both domestic public and international public sources of capital, and a financing strategy to encourage private investment (both international and domestic), including the judicious use of concessional sources to crowd in private finance.^{"109}



FIGURE 15: ILLUSTRATIVE COUNTRY PLANNING APPROACH¹¹⁰

6.3 Utilizing a whole-of-government approach

As highlighted throughout this report and further affirmed in several of the case studies, utilizing a whole-of-government approach from the start helps facilitate the successful strategy and planning described above, and by extension sets up all downstream stages for greater success, including the critical stage of mobilizing capital. Not doing so risks fragmentation and duplication of efforts and limits a government's ability to raise sufficient financing and funding for its digital transformation agenda.

In this vein, presenting a credible ask also comes with getting one's house in order, in terms of **demonstrating sufficient execution capacity and governance**. Referring to some of the challenges that governments face in digital transformation more broadly, funders that perceive a lack of sufficient scale or authority by the recipient to drive transformational impact will be hesitant to commit. This may call for a more fundamental rethinking of government organizational structures and agile teams, budgeting and procurement processes, and interagency coordination, as well as associated governance structures, accountability mechanisms, and incentives to drive performance.

109 "From Funding to Financing: Transforming SDG Finance For Country Success." World Economic Forum. April 2019. https://www3. weforum.org/docs/WEF_From_Funding_to_Financing.pdf.

110 Ibid.

How to go about some of this redesign is a far deeper topic than can be addressed within the scope of this research, but experts such as Public Digital, Boston Consulting Group, and Harvard Kennedy School have delved more deeply into this question. In addition, DIAL and ITU's SDG Digital Investment Framework provides an in-depth set of frameworks, tools, and steps for governments to take in order to conduct successful planning and strategy development using a WGA. This includes defining cross-sector development goals and determining a set of ICT building blocks that could be shared across agencies and sectors that then feeds into long-term strategy development and creates a roadmap that a government can use to increase efficiency and deliver a higher return on digital investments.¹¹¹ For some examples of how whole-of-government approaches work in practice, see the case studies on Aadhar, Morocco Digital Development Agency, and Pakistan's Raast, among others.

Another key consideration within this approach is the **enabling environment for funding/financing flows**, an arena that government has unique agency in shaping. The requirements for developing or enhancing the enabling environment include regulatory, legal, and policy reforms; building capacity across public-sector and local private-sector stakeholders; and support for establishing or deepening local financial markets and institutions. Each of these can contribute to reducing the real and perceived risks to public and private finance and can increase the viability of initiatives that attract those sources of capital. Section 4.4 of this report highlights multiple case studies and key points to illustrate the positive impact of a well-functioning enabling environment. While the details of how governments go about building this enabling environment are beyond the scope of this report, ITU's recent report on financing universal digital access delves into these issues in more depth. As ITU aptly captured in that report, "funding follows good policy."¹¹² A healthy policy and regulatory framework is paramount to achieving digital transformation and all other SDG financing goals for every country.

Conclusion

Digital transformation approaches continue to evolve rapidly, with more and more focus on the benefits of integrated, whole-of-government approaches. In parallel, funding/financing options to enable national digital transformation agendas must adapt in order to ensure LLMIC governments are able to raise funds at a sufficient scale and in a sustainable way.

Fulfilling this need calls for the relatively complex work of mobilizing and blending funding from multiple sources: public donor/investment agencies, private donors, domestic resource mobilization, and private commercial capital. To achieve this, governments need to navigate these very different sources and successfully identify which sources to tap for which component of their strategy, craft the appropriate ask for each source, successfully secure funding, and then effectively allocate and deploy funding to achieve targeted outcomes.

Recognizing the knowledge and evidence gaps in this area, this report has offered a comparative analysis of applicable funding/financing approaches for national digital transformation agendas. Through this analysis, this report provides governments, particularly LLMIC ones, a set of tools and frameworks to identify appropriate sources of funds and key considerations to take into account when assessing the full menu of options.

In order to achieve equitable economic recovery from the COVID-19 pandemic, countries must be able to appropriately fund/finance digital transformation to avoid widening the global digital divide. We hope that this report serves as a useful tool for LLMIC governments; funders in the digital transformation arena; and practitioners seeking to foster effective, sustainable digital transformation. It is our intention that this report serves as the starting point for more in-depth conversations and plans to deepen this work going forward, adding to the menu of best practices for financing/funding national digital transformation as the sector continues to evolve.

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List of Acronyms

A4AI	Alliance for Affordable Internet
ADB	Asian Development Bank
ADD	Morocco Digital Development Agency
ADFI	African Digital Financial Inclusion Facility
AfDB	African Development Bank
BMGF	Bill & Melinda Gates Foundation
BPO	Business processes outsourcing
CIB	Career impact bonds
COVAX	COVID-19 Vaccines Global Access
DFI	Development finance institution
DIAL	Digital Impact Alliance
DT	Digital transformation
FCDO	United Kingdom's Foreign, Commonwealth & Development Office
FDI	Foreign direct investment
GBI	Global Broadband and Innovations Alliance
GDP	Gross domestic product
IBA	Indian Banks' Association
ICT	Information communication technology
IFC	International Finance Corporation
IMF	International Monetary Fund
INA	Investment Authority Indonesia
ISA	Income share agreement
ITU	International Telecommunication Union
KII	Korea Information Infrastructure
LDC	Least developed country
LLMICs	Low- and lower-middle-income countries

MDB	Multilateral development bank
MDEC	Malaysian Digital Economy Corporation
MGT	Modernizing Government Technology Act
MInT	Ministry of Innovation and Technology
NGO	Nongovernmental organization
NPCI	National Payments Corporation of India
ODA	Official development assistance
OECD	Organisation for Economic Co- operation and Development
PDF	Project development facility
PPP	Public-private partnership
R&D	Research and development
RBI	Reserve Bank of India
REIT	Real estate investment trust
SDGs	Sustainable Development Goals
SEZ	Special economic zone
SIDA	Swedish International Development Cooperation Agency
TMF	Technology Modernization Fund
UNDP	United Nations Development Programme
UPI	Unified payments interface
USAID	United States Agency for International Development
US DFC	U.S. International Development Finance Corporation
USF	Universal service fund
VAT	Value-added tax
WGA	Whole-of-government approach

Annex 1 - Overview of Digital Transformation Frameworks

Overview of key diagnostic tools used by large organizations and the common focus areas across them.

UNDP Digital Assessment Framework	UNCDF Digital Economy Scorecard	Smart Africa Digital Economy Blueprint	World Bank Digital Economy Diagnostic	Pathways Digital Economy Kit	Dial Digital Impact Alliance DIAL Focus Area
Infrastructure	Infrastructure	Infrastructure	Digital Infrastructure	Infrastructure	Infrastructure
Regulations	Policy and Regulation			Policy and Regulation	Regulation
People	Skills	Digital Skills	Digital Skills	People	People and Skills
Business	Innovation	-Business -Innovation	Digital Business		Business and Innovation
Government		Digital Government	Digital Public Platforms		Digital Government

Annex 2 - Summary of sources of funding, applicability, and uses

Sources of funding	Applicability	Use of proceeds
Grant-based aid	 There are features of public goods¹¹³ and/or utilities¹¹⁴ To reach underserved populations that market actors are not currently incentivized to reach To support near-term development impact when the local government lacks near-term fiscal capacity To support capacity-building and improve absorptive capacity for other funding sources To support R&D, innovation, and early-stage risk 	 Government and institutional capacity building (e.g., TA programs) Regulation and policy development R&D for new technology Infrastructure/service expansion to marginalized population areas Building user demand and digital literacy for marginalized populations, user fee subsidies Incentives and risk mitigation to attract private capital flows
Taxes	 There are features of public goods and/or utilities To reach underserved populations that market actors are not currently incentivized to reach The government is the user or direct provider of the good/service There are limited monetization avenues/ revenue streams For an intervention that cuts across multiple economic sectors, since private firms and other market actors typically operate within single sectors 	 Strategy, planning, cross-sectoral coordination Regulation and policy development Building foundational enabling digital infrastructure that facilitates downstream private-sector activity Infrastructure/service expansion to marginalized populations (e.g., rural and unserved) E-government infrastructure and services Building user demand and digital literacy for marginalized populations, user fee subsidies Incentives and risk mitigation to attract private capital flows
Government borrowing	 There are features of public goods and/or utilities with high upfront costs and benefits that accrue over time, such as infrastructure Loans are available at concessionary/ affordable levels that can be comfortably paid back once revenues are generated later 	 Building foundational enabling digital infrastructure that facilitates downstream private-sector activity E-government infrastructure and services Infrastructure/service expansion to marginalized populations
Private capital	 Monetization avenues/revenue streams are available within a near- or medium-term time horizon The intervention takes place within single economic sectors or industries 	 R&D and innovation Operating expenditures for service delivery and adoption scaling Digital skilling and employment Building downstream digital infrastructure and distribution channels Spurring competition, creating more consumer options, optimizing consumer service
Income streams and attributable cost savings	 Tapping such funding sources requires sufficient government capacity to operate/ oversee effectively in order to generate sufficient income streams/cost savings Such cashflows may only be feasible over time, requiring upfront financing 	 Service fees such as digital payments and mobile banking service fees Improving government tax revenue collection capabilities Attributed cost savings (e.g., from streamlining government service delivery) Endowment investment return income (e.g., sovereign wealth funds)

113 A commodity or service that is both non-excludable and non-rivalrous, i.e., users cannot be barred from accessing or using it for failing to pay for it. Also, use by one person neither prevents access of other people nor does it reduce availability to others.

114 Utilities have features that make them amenable to provision by one or a few large providers because of high entry barriers/upfront costs, duplication inefficiencies, and positive externalities.

Annex 3 - Comparative Case Studies

Here we outline a more in-depth set of case studies to make the analysis more concrete as policymakers seek to incorporate this paper's findings. While the below case studies cannot address all facets of the comparative analysis laid out in this paper, they do provide illustrative examples of some of the key points and frameworks.

This section explores three different examples of countries building digital payments systems, a critical piece for national digital transformation. A full, in-depth history and analysis of each case is beyond the scope of this paper, but we do provide links to additional resources that have explored each of these cases in great depth. Note also that these cases are not meant to be directly comparable, as they all accomplish slightly different goals in very different contexts. Instead, they provide a way to examine how the goal of facilitating digital transformation through digital payments systems was accomplished in quite different ways.

Owner/operator	Private ownership and delivery (with public regulation and support)
Beneficiary/user	Individual consumers and businesses
Financing/ funding sources and pathway	Grant-based aid and private-sector capital \rightarrow purely private sector owned and operated, with government regulation and support
Cashflow profile, feasibility, and preference parameters	 The government of Kenya had very low costs to get M-Pesa financed, with all upfront design funding coming from grant-based aid and the private sector. Kenya had the right set of regulatory and socioeconomic conditions at the time to make this business model work to reach most unbanked Kenyans. Increased revenue from private-sector taxes and associated economic growth helped bring further revenue to the government of Kenya over time. However, this allows for less direct government control over the overall system, and ongoing potential for equity concerns and market failures due to M-Pesa's dominant position in the market.
Country planning approach	The government participated in the design, launch, leads regulation, and enabling environment. All major design and ongoing management planning was done by the private sector, with support from donors and the government.

M-PESA

M-Pesa, one of the most studied and well-known digital innovations, is an SMS-based mobile money system that enables users to deposit, send, and withdraw funds using their mobile phones. Within five years of its launch, M-Pesa had reached nearly 20 million users in Kenya, some 83% of the adult population, who transferred the equivalent of 24% of Kenyan GDP annually.¹¹⁵ By 2020, M-Pesa expanded into seven countries and had 42 million active customers.¹¹⁶ M-Pesa represented a major innovation in financial inclusion, as customers do not need to have a bank account and can transact at any of the country's 40,000 agent outlets. Registration and deposits are free, and pricing for most other transactions is based on a tiered structure to allow even the lowest-income users to use the system.

^{115 &}quot;M-Pesa: A Mobile Money Success Story from Kenya." Harvard Business School. Dec 9, 2015. https://digital.hbs.edu/platform-rctom/submission/m-pesa-a-mobile-money-success-story-from-kenya.

¹¹⁶ Piper, Kelsey. "What Kenya Can Teach its Neighbors – and the US – About Improving the Lives of the Unbanked." Vox. Sep 11, 2020. https://www.vox.com/future-perfect/21420357/kenya-mobile-banking-unbanked-cellphone-money.

Prior to its launch, there was no well-established, trusted, and robust network for carrying out financial transactions, although 83% of the population over age 15 had access to mobile phone technology. The innovative idea of creating a mobile currency was originally developed by researchers at the United Kingdom's development agency, the Foreign, Commonwealth, and Development Office (FCDO; formerly DFID), which noticed that Kenyans were transferring mobile airtime as a proxy for money. The UK government provided £1 million in grant funding to Vodafone (the local provider Safaricom, the largest mobile provider in Kenya, is part of the Vodafone Group) through its Financial Deepening Challenge Fund, which was established to finance PPP projects that would improve access to financial services. As a condition of this grant funding, Vodafone provided matched funding for a six-month pilot period. In 2007, Safaricom launched M-Pesa.¹¹⁷

M-Pesa's success was enabled by Safaricom's strategic partnerships with organizations such as the Central Bank of Kenya, the Commercial Bank of Africa, and the ATM provider Pesapoint. Critically, the **government of Kenya**, which has a 35% stake in Safaricom, was a strong supporter from the design phase onwards, playing a crucial role in getting regulatory approval and facilitating the Kenya Central Bank's decision to insure M-Pesa deposits.¹¹⁸ In this way, the government of Kenya was able to use its position as regulator and convener to help get M-Pesa off the ground in support of its digital transformation and financial inclusion goals without providing its own direct financing.

While purely private delivery of services can often come with tradeoffs around reaching the most vulnerable, M-Pesa's ability to get to scale very quickly allowed it to reach Kenyans even from the lowest socioeconomic backgrounds. Only four years after launch, 72% of those living on under \$1.25 per day used M-Pesa.¹¹⁹ In addition, a 2016 study found that M-Pesa increased per capita consumption levels and lifted 2% of Kenyan households out of poverty.¹²⁰ However, its effect on reaching the poorest of the poor and its impact on lifting people out of poverty continue to be actively debated. There is also ongoing concern that M-Pesa continues to hold near-monopoly power in the market, possibly undermining some of these gains over time.¹²¹

M-Pesa worked well in the Kenyan context, but very few similar initiatives have been able to replicate this success. When looking to replicate a predominantly private model like M-Pesa, the enabling environment and local context are critical to consider, and different models will be more appropriate in different contexts, as explored in the case studies below. Indeed, M-Pesa's success was the product of multiple factors in its enabling environment, including strong support from the Kenyan government without onerous regulations or government fees, high mobile phone coverage, a simple-to-use technology, entering the market at the right time, and a strong coalition of partners to assist with rollout and scale-up.¹²²

117 "Mobile Currency in Kenya: the M-Pesa." Centre for Public Impact. Mar 21, 2016. https://www.centreforpublicimpact.org/case-study/m-currency-in-kenya

118 Ibid.

119 McKay, Claudia & Rafe Mazer. "10 Myths About M-Pesa: 2014 Update." CGAP. Oct 1, 2014. https://www.cgap.org/blog/10-myths-about-m-pesa-2014-update.

120 Suri, T and W. Jack."The Long-Run Poverty and Gender Impacts of Mobile Money." FinDev Gateway – CGAP. Dec 2016. https://www.findevgateway.org/paper/2016/12/long-run-poverty-and-gender-impacts-mobile-money.

121 Mutai, Edwin. "MPs Snub Bill Seeking M-Pesa, Safaricom Split." Business Daily Africa. Aug 19, 2021. https://www.businessdailyafrica.com/bd/economy/mps-snub-bill-seeking-m-pesa-safaricom-split-3516334.

122 Piper, "What Kenya Can Teach its Neighbors - and the US - About Improving the Lives of the Unbanked."

NATIONAL PAYMENTS CORPORATION OF INDIA (NPCI) – UNIFIED PAYMENTS INTERFACE (UPI)

Owner/operator	Public-private ownership model (majority owned by public banks)
Beneficiary/user	Citizens, government, private financial institutions and companies
Financing/ funding sources and pathway	Design co-funded by public-private partnership (PPP) \rightarrow PPP nonprofit operational model with sustainable revenue streams (government regulation and co-managed with IBA)
Cashflow profile, feasibility, and preference parameters	 India has a robust financial sector to tap for financing. The WGA approach and digital ID pioneered by Aadhar provided critical enabling factors for NPCI and UPI. Government is a primary user of this technology for benefit transfer and tax collection, and the technology also provides significant value to private financial institutions and companies. Upfront investment from government and the private sector recouped over time in the form of increased revenue generation and cost savings. Nonprofit status helps maintain equity focus and public utility nature.
Country planning approach	Whole-of-government approach with direct collaboration with private-sector banks and stakeholders

India's Unified Payments Interface (UPI), developed by the National Payments Corporation of India (NCPI), provides an example of how the government can facilitate private-sector financing for its digital transformation while still taking a more active role than in the case of M-Pesa. The Reserve Bank of India (RBI) and the Indian Banks' Association (IBA) created NPCI in 2009 with the intention of providing infrastructure to the entire banking system in India for physical as well as electronic payment and settlement systems.¹²³ The NPCI has rolled out new products at a rate of more than one a year, with its most widely known and used being the **unified payments interface**. Launched in 2016, UPI allows for interoperability between any bank or financial service provider and, therefore, real-time mobile payments for individuals, government transfers, and any other financial transactions within and between the public and private sectors.¹²⁴ In 2018, more than 3 billion transactions took place on UPI platforms, with dramatic increases in usage particularly since the start of the pandemic in March 2020, currently reaching nearly 200 million active users.¹²⁵

Importantly, NPCI built off the success of Aadhar, India's biometric national ID system, which is a successful example of a whole-of-government approach to digital transformation. The technology behind Aadhar meant that setting up and managing UPI and other NPCI products was much more feasible, given they had the unique digital ID technology to build off of and connect to in order to make this work securely and efficiently across public and private institutions.

The RBI set up the governance of NPCI as a public-private ownership structure, with 10 of India's leading banks making up the initial members, including six of India's largest public-sector banks, two private domestic banks, and two foreign banks. Each of the 10 initial participants invested approximately US\$14 million and took a 10% share in NPCI, thus giving industry a direct stake, with

^{123 &}quot;An Introduction to NPCI and Its Various Products." NPCI. Accessed Jan 2022. https://www.npci.org.in/who-we-are/about-us.

¹²⁴ Cook, William and Anand Raman. "National Payments Corporation of India and the Remaking of Payments in India." CGAP. May 2019. https://www.cgap.org/sites/default/files/publications/2019_05_07_NPCI_Working_Paper_0.pdf.

¹²⁵ Joseph, Anto. "How UPI is Making India's Digital Economy Boom." Fortune India. Apr 24, 2021. https://www.fortuneindia.com/ enterprise/how-upi-is-making-indias-digital-economy-boom/105433.
majority control by public-sector entities. Despite the private-sector participation, NPCI was formed as a nonprofit organization, allowing it to assume features of a public utility and promote equitable access. As such, the NPCI received indirect financing support from the Indian government via public-sector banks, while also facilitating upfront financing from private domestic and international banks as well.¹²⁶

The variety of digital infrastructure built as a result of Aadhar, including UPI and many other NPCI products, has led to significant cost savings for the government, preventing leakage in the large-scale cash transfer and subsidy payments the government makes to citizens, while also helping increase efficiency of tax collection. In addition, many of NPCI's products are revenue generating, creating sustainable financing streams for UPI and NPCI's other digital financial products.

RAAST – PAKISTAN

Owner/operator	Government owned and operated
Beneficiary/user	All citizens, government, financial institutions, and private companies
Financing/ funding sources and pathway	 Donor funding → government financing (including income generation and cost savings) Required multiyear upfront financing from donors via the government for creation and development Able to generate revenue and cost savings over time Intended as a way to facilitate e-government across multiple departments, services, and sectors, and provided as a public good
Cashflow profile, feasibility, and preference parameters	 Purely private-sector solutions to digital payments infrastructure had low uptake and no reach to the poorest, necessitating government creation of a system to serve as a public good. Pakistan has a very limited tax base to fund such an initiative but has strong and ongoing relationships with several key donors.
Country planning approach	Whole-of-government approach in partnership with public and private donors

Pakistan recently launched its first instant payment system that will enable end-to-end digital payments among individuals, businesses, and government entities instantaneously. Raast (or direct way) was launched in early 2022 as a free platform to promote digital banking over traditional over-the-counter banking or cash. It is meant to serve as the digital "rails" that will enable banks, fintech players, e-commerce platforms and utility companies to operate for-profit business models. Pakistan already has several private-sector digital cash transfer systems that do not require a bank account, but they have struggled to gain traction, with digital payments accounting for less than 1% of all transactions. Raast is uniquely positioned in its ability to link the state to financial institutions and citizens on its platform, creating a secure and instant transaction platform. The vision is that social funding and aid programs will also be run through Raast, along with public-sector salaries and pensions and payments for national social safety net programs.¹²⁹

126 Cook, "National Payments Corporation of India and the Remaking of Payments in India." 2019.

127 "Aadhar-enabled DBT Savings Estimated Over Rs 90,000 Crore." Economic Times. Last updated: Jul 11, 2018. https://economictimes.indiatimes.com/news/economy/finance/aadhaar-enabled-dbt-savings-estimated-over-rs-90000-crore/ articleshow/64949101.cms

128 Kazmi, Mobasher. "Raast Set to Revolutionise Digital Payments in Pakistan." The Asian Banker. March 2, 2021. https://www.theasianbanker.com/updates-and-articles/raast-set-to-revolutionise-digital-payments-in-pakistan.

129 Farooq, Umar. "Pakistan Government Announces New Instant Digital Payment System." Reuters. Jan 11, 2021. https://www. reuters.com/article/us-pakistan-economy/pakistan-government-announces-new-instant-digital-payment-system-idUSKBN29G28C

Similar to the M-Pesa and UPI cases above, a major motivation for Raast is to move the country from a cash-based economy to a digital economy and provide key infrastructure to connect unbanked citizens to financial services. Like India's digital infrastructure, Raast is intended to support government tax revenue collection as it enables more formal transaction channels to be utilized. In 2019, the World Bank reported that Pakistan's government collected half of what it should have been able to take in via taxes based on its economy, making this issue of critical importance from a government revenue perspective.¹³⁰ Unlike M-Pesa's pure market approach, Raast has a public good and equity lens, with a clear focus on financial inclusion for women and providing its platform free of charge for all citizens.¹³¹

Like M-Pesa, Raast was developed with donor support—from the Netherlands, the Bill & Melinda Gates Foundation (BMGF), the British High Commission, and the World Bank. Unlike M-Pesa, however, donor funding was part of a multiyear collaboration with BMGF and the Pakistani government rather than a seed grant to develop and launch a pilot that would be fully run by the private sector, as was the case for M-Pesa. Raast is implemented by the State Bank of Pakistan, making it entirely government run and managed unlike the private-sector solution of M-Pesa or public-private model of UPI. Unlike the other two cases, there is no substantial financial commitment from the private sector to date.

Similar to both other examples, Raast will serve as a critical enabling factor to allow for increased efficiency and growth throughout the economy, as it will serve as a base infrastructure for innumerable other services and interactions cross-cutting the public and private sectors. As such, government revenue sources are expected, like in the UPI example, including expected increases in tax collection capability, as well as government cost savings through a more efficient system for many government services and transfers.

Much like other innovations such as M-Pesa that received grant-based aid at the design phase, donor funding can be catalytic in the strategy development and planning stage to get an idea off the ground, particularly when leveraging outside knowledge that may be well suited for new ways of working, such as a whole-of-government approach. Importantly, Raast is still in the midst of its rollout at the time this report was written, and as such Raast's effectiveness at achieving its objectives is yet to be seen.

130 "Pakistan Raises Revenue (PRR) Fact Sheet" The World Bank. Nov 18, 2019. https://www.worldbank.org/en/news/ factsheet/2019/11/18/pakistan-raises-revenue-prr.

131 Farooq, Umar. "Pakistan Government Announces New Instant Digital Payment System." Reuters. Jan 11, 2021.