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Report No: PAD4031

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT
ON A

PROPOSED SCALE-UP WINDOW CREDIT

IN THE AMOUNT OF EUR 86.5 MILLION
(US$100 MILLION EQUIVALENT)

TO THE

REPUBLIC OF RWANDA

FOR THE

DIGITAL ACCELERATION PROJECT

November 5, 2021

Digital Development Global Practice
Eastern and Southern Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective September 30, 2021)

Currency Unit =	Euro
EUR 0.86=	US$ 1
US$ 1.16 =	EUR 1

FISCAL YEAR
January 1 - December 31

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ABBREVIATIONS AND ACRONYMS

3G	Third Generation (Mobile Communication System)
4G	Fourth Generation (Mobile Communication System)
AIIB	Asian Infrastructure Investment Bank
AfDB	African Development Bank
BRD	Development Bank of Rwanda
CapEx	Capital Expenses
CBA	Cost-Benefit Analysis
CDO	Chief Digital Officer
CEO	Chief Executive Officer
CERT	Computer Emergency Response Team
CNI	Critical National Infrastructure
CNII	Critical National Information Infrastructure
COVID-19	Corona Virus Disease 2019
CPF	Country Partnership Framework
CRVS	Civil Registration and Vital Statistics
CSIRT	Computer Security Incident Response Team
DA	Designated Account
DAP	Digital Ambassadors Program
DE4A	Digital Economy for Africa
DPO	Data Protection Office
E&S	Environmental and Social
EFC	Errors, Fraud and Corruption
EICV	Integrated Household Living Conditions
EMR	Electronic Medical Records
ERP	Economic Recovery Plan
ESF	Environmental and Social Framework
ESCP	Environmental and Social Commitment Plan
ESHG	Environment, Health and Safety Guidelines
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESOs	Ecosystem Support Organizations
ESS	Environmental and Social Standard
FDI	Foreign Direct Investment
FI	Financial Intermediary
FIF	Financial Intermediary Framework
FM	Financial Management
FRW	Rwandan Francs
G2B	Government-to-Business
G2C	Government-to-Citizen
G2G	Government-to-Government
GCCRS	Green Growth and Climate Resilience Strategy
GEA	Government Enterprise Architecture
GEF	Generation Equality Forum
GESB	Government Enterprise Service Bus
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GMO	Gender Monitoring Office
GoR	Government of Rwanda

GNI	Gross National Income
GovNet	Government Network
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
HIE	Health Information Exchange
JICA	Japan International Cooperation Agency
IA	Implementing Agency
IC	Investment Committee
ICT	Information and Communication Technology
ID	Identification
ID4D	Identification for Development
IDA	International Development Association
IEG	Independent Evaluation Group
IFR	Interim Financial Report
IFC	International Finance Corporation
IFMIS	Integrated Financial Management Information System
IRR	Internal Rate of Return
IPF	Investment Project Financing
IoT	Internet of Things
IRR	Internal Rate of Return
IRU	Indefeasible Right of Use
ISP	Internet Services Providers
IT	Information Technology
ITU	International Telecommunication Union
KIC	Kigali Innovation City
LMP	Labor Management Procedures
LODA	Local Administrative Entities Development Agency
M&E	Monitoring and Evaluation
MDAs	Ministries, Departments and Agencies
MFD	Mobilizing Finance for Development
MFIs	Microfinance Institutions
MTEF	Medium-Term Expenditure Framework
MINALOC	Ministry of Local Government
MINECOFIN	Ministry of Finance and Economic Planning
MINEDUC	Ministry of Education
MINICT	Ministry of Information, Communication, Technology and Innovation
MININFRA	Ministry of Infrastructure
MIFOTRA	Ministry of Public Service and Labour
MNOs	Mobile Network Operators
MOH	Ministry of Health
MoU	Memorandum of Understanding
MSME	Micro, Small and Medium Enterprises
NCS	Non-Consulting Services
NCSA	National Cyber Security Authority
NDC	Nationally Determined Contributions
NIDA	National ID Agency
NISR	National Institute of Statistics of Rwanda
NIST	National Institute of Standards and Technology
NOC	Network Operations Center
NPF	New Procurement Framework

NPR	National Population Register
NPV	Net Present Value
NST1	National Strategy of Transformation
OAG	Office of the Auditor General
OGN	One Government Network
OpEx	Operating Expenses
OPRC	Operational Procurement Review Committee
PDO	Project Development Objective
PDPP	Personal Data Protection and Privacy
PFM	Public Financial Management
PhD	Doctor of Philosophy
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PKI	Public Key Infrastructure
PP	Procurement Plan
PPSD	Project Procurement Strategy for Development
PSC	Project Steering Committee
QoS	Quality of Service
RAP	Resettlement Actions Plan
RCA	Rwanda Coding Academy
RCIP	Regional Communication Infrastructure Project
RDB	Rwanda Development Board
REF	Renewable Energy Fund
REOI	Request for Expressions of Interest
RFP	Request for Proposal
RHEP	Rwanda Housing Finance
RISA	Rwanda Information Society Authority
RPF	Resettlement Policy Framework
RURA	Rwanda Utilities Regulatory Authority
Rw-CSIRT	Rwanda Computer Security Incident Response Team
SACCOs	Savings and Credit Co-operatives
SDID	Single Digital ID system
SEP	Stakeholder Engagement Plan
SPIU	Single Project Implementation Unit
STEP	Systematic Tracking of Exchanges in Procurement
SUW	Scale Up Window
TA	Technical Assistance
TC	Technical Committee
TOR	Terms of Reference
TVET	Technical and Vocational Education and Training
VPN	Virtual Private Network
UNICEF	United Nations Children’s Emergency Fund
US$	United States Dollars
WB	World Bank
WBG	World Bank Group
WEF	World Economic Forum

TABLE OF CONTENTS

DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Rwanda	Digital Acceleration Project	
Project ID	**Financing Instrument**	**Environmental and Social Risk Classification**
P173373	Investment Project Financing	Moderate

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[✓] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	[ ] Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
30-Nov-2021	31-Dec-2026
Bank/IFC Collaboration	**Joint Level**
Yes	Complementary or Interdependent project requiring active coordination

Proposed Development Objective(s)

To increase access to broadband and selected digital public services, and strengthen the digital innovation ecosystem

Components

Component Name	Cost (US$, millions)

Digital Access and Inclusion	60.50
Digital Public Service Delivery	100.00
Digital Innovation and Entrepreneurship	29.50
Project Management	10.00

Organizations

Borrower:	Republic of Rwanda
Implementing Agency:	Rwanda Information Society Authority Development Bank of Rwanda

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	200.00
Total Financing	200.00
of which IBRD/IDA	100.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Development Association (IDA)	100.00
IDA Credit	100.00

Non-World Bank Group Financing

Other Sources	100.00
Asian Infrastructure Investment Bank	100.00

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
Rwanda	100.00	0.00	0.00	100.00
Scale-up Facility (SUF)	100.00	0.00	0.00	100.00

Total	**100.00**	**0.00**	**0.00**	**100.00**

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2022	2023	2024	2025	2026	2027
Annual	5.00	15.00	22.77	23.45	22.75	11.03
Cumulative	5.00	20.00	42.77	66.22	88.97	100.00

INSTITUTIONAL DATA

Practice Area (Lead)

Digital Development

Contributing Practice Areas

Education, Finance, Competitiveness and Innovation, Governance

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Low
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Moderate
7. Environment and Social	Moderate
8. Stakeholders	Moderate
9. Other	Moderate
10. Overall	Moderate

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
Cultural Heritage	Relevant
Financial Intermediaries	Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description

Section I.A.2.a of Schedule 2 of the financing agreement: The Recipient shall, no later than 30 days after Effective

Date, establish within the Ministry of ICT and Innovation (MINICT) and thereafter maintain, a Project Steering Committee (PSC) with terms of reference, composition and resources acceptable to the Association.

Sections and Description

Section I.A.2 of the Project agreement between IDA and RISA: The Project Implementing Entity shall, within one month of Effective Date, establish and maintain throughout Project implementation, a Single Project Implementing Unit (SPIU).

Conditions

Type	Financing source	Description
Effectiveness	IBRD/IDA	Article 5.01.a of the Financing Agreement: Each of the Subsidiary Agreements has been duly executed and delivered in accordance with Section I.C of Schedule 2 to the financing agreement; and is legally binding upon the Recipient and the Project Implementing Entity with which it has been entered into, in accordance with its terms.
Effectiveness	IBRD/IDA	Article 5.01.b of the Financing Agreement: The RISA Project Implementation Manual, has been prepared and adopted by the Recipient and RISA in accordance with Section I.B.1(b) of Schedule 2 of the financing agreement.
Effectiveness	IBRD/IDA	Article 5.01.c of the Financing Agreement: The Recipient has caused RISA to recruit a financial management specialist for the SPIU in accordance with the provisions of Section I.A3 of the Schedule to the RISA Project Agreement.
Disbursement	IBRD/IDA	Section III.B.1.b. under schedule 2 of the Financing Agreement: No withdrawal shall be made for payments under Category 2 unless and until BRD has (i) established a Project Implementing Unit with adequate resources and facilitation, and key staff holding such qualifications and under terms of reference acceptable to the Association; (ii) appointed or recruited (as appropriate) to the Project Implementing Unit (A) a coordinator, (B) a procurement specialist, (C) a financial management specialist, and (D) two environmental and social specialists, all with such qualifications and under terms of reference acceptable to the Association, and in accordance with the provisions of the Procurement Regulations; (iii) Prepared and adopted the BRD Project Implementation

		Manual, in accordance with the Financial Intermediary Framework assessment, and in a form and substance acceptable to the Association; and (iv) complied with its environmental and social commitment with respect to ESS 9 (Financial Intermediaries) referred to under paragraph 9.1 of the ESCP.
Type	Financing source	Description
Disbursement	IBRD/IDA	Section III.B.1.d. under schedule 2 of the Financing Agreement: No withdrawal shall be made for payments under Category 3, unless and until the Recipient has enacted and published in the official gazette a modification of its law governing registration of the population and issuance of national identity credentials, incorporating the Principles on Identification, and including data protection requirements not already provided in the Recipient's data protection and privacy law in a manner acceptable to the Association.

I. STRATEGIC CONTEXT

A. Country Context

1. **Rwanda is a low income, landlocked country located in East Africa, characterized by a predominantly rural population**. The country is densely populated, with approximately 13 million[1] people living in a total area of 26,338 km. Rwanda's population is young (60 percent are under the age of 25) and increasingly urban, though the vast majority of Rwandans (82 percent)[2] continue to reside in rural areas. Most people living in rural areas remain dependent on agriculture, which continues to employ approximately 61 percent of the population.[3] Based on the latest Integrated Household Living Conditions Survey 5 (EICV 5), 38 percent of Rwanda's population still lives below the national poverty line, and 16 percent in extreme poverty. [4]

2. **Before the Corona Virus Disease 2019 (COVID-19) pandemic hit, Rwanda was in the midst of an economic boom, backed by large-scale public investment, but momentum towards poverty reduction had slowed.** Gross Domestic Product (GDP) levels reached 9.5 percent in 2019, up from 8.6 percent in 2018, which was above Rwanda's average annual growth rate of 7.1 percent recorded over the past decade.[5] Since the early 2000s, Rwanda has sustained high economic growth figures by consistently increasing public investment spending.[6] While Rwanda has made considerable progress in terms of improving the local investment climate, and scores low on corruption[7], the private sector credit-to-GDP ratio is still low at 21 percent.[8] Total factor productivity is also low, when compared to Rwanda's income level.[9] While Rwanda's recent performance in reducing poverty shows steady progress, poverty reduction between 2010/11 and 2016/17 was slower than over the preceding period, 2005/06 and 2010/11, and the pace of poverty reduction has not been commensurate with the pace of GDP growth recorded over the last decade.[10] Boosting productivity, supporting private sector investment, economic diversification and wider off-farm job creation have thus emerged as key government priorities and fundamentals for ensuring sustainable growth, where digital adoption and innovation is expected to play a major role.[11]

3. **While early signs of economic recovery from the pandemic are encouraging, there is a strong impetus to 'build back better' to ensure continued growth that can propel further poverty reduction and shared prosperity in Rwanda.** Lockdown and other social distancing measures, critical to reducing infection rates, sharply curtailed economic activity, and increased government spending, exacerbating challenges related

[1] *https://www.statistics.gov.rw/statistical-publications/subject/population-size-and-population-characteristics*
[2] WB Indicators (2019), based on United Nations Population Division's World Urbanization Prospects: 2018 Revision
[3] International Labour Organization, ILOSTAT database. Data retrieved in June 21, 2020
[4] World Bank (2020). Bolstering Poverty Reduction in Rwanda: A Poverty Assessment. World Bank, Washington, DC. See: *https://openknowledge.worldbank.org/handle/10986/34753* Calculations based on the Integrated Household Living Conditions Survey 5 (EICV 5).
[5] World Bank (2021), Rwanda Economic Update, June 2021: The Role of the Private Sector in Closing the Infrastructure. See: *https://openknowledge.worldbank.org/handle/10986/35970*
[6] World Bank (2019). Rwanda Systematic Country Diagnostic. See: *https://openknowledge.worldbank.org/handle/10986/32113*
[7] Rwanda ranks 49/179 in the 2020 Corruption Perception index, published by Transparency International.
[8] Based on 2016 IMF figures. International Finance Corporation (IFC) (2019) Creating Markets in Rwanda: Transforming for the Jobs of Tomorrow. Country Private Sector Diagnostic. See: *https://openknowledge.worldbank.org/handle/10986/32400*
[9] Ibid.
[10] Rwanda's semi-elasticity of poverty with respect to growth declined to 0.24 in 2011-2017 from 0.36 in 2005-2010. World Bank (2020). Bolstering Poverty Reduction in Rwanda: A Poverty Assessment.
[11] GoR (2019), Rwanda ICT Hub Strategy 2024. See: *https://www.minict.gov.rw/fileadmin/user_upload/minict_user_upload/Documents/Policies/ICT_HUB_STRATEGY.pdf*

to Rwanda's debt sustainability.[12] In 2020, the pandemic drove Rwanda into recession for the first time since 1994, with growth contracting by 3.4 percent, affecting all major sectors and services-related sectors (including travel, hospitality, and education).[13] However, the information communication technology (ICT) sector emerged as the stark exception, as it continued to grow by 29.3 percent in 2020. While Rwanda recorded 3.5 percent GDP growth in the first quarter of 2021 and 20.6 percent in the second quarter,[14] outperforming expected forecasts, Rwanda's economy is expected to continue to recover gradually, while remaining vulnerable to shocks.[15] Wider technology adoption that offers a means for governments, individuals, and businesses to better cope with shocks, including social distancing, while ensuring business continuity, and preventing service interruptions is viewed as essential to building back better and supporting Rwanda's sustained recovery.[16]

4. **Supporting investments in climate-smart infrastructure as well as digitally-enabled efficiency gains and increased response capacity will also be critical, as Rwanda has been identified as being highly vulnerable to climate change.** Rwanda ranks 153 out of 177 in the Notre Dame Global Adaptation Index (13th on vulnerability and 95th on readiness), indicating high vulnerability yet low readiness to combat the effects of climate change.[17] Since the early 2000s, the frequency and severity of disasters, particularly caused by floods, landslides, and droughts, have significantly increased. High vulnerability to climate change, as highlighted by the World Bank's (WB) climate risk country profile[18], stems from rising temperature levels and variable rainfall patterns, inducing high risks of flooding and landslides due to Rwanda's hilly terrain, impacting energy security (as hydropower has emerged as a key energy source), increasing the risk of vector borne disease-transmission[19], and damaging physical infrastructure including digital. Factors contributing to low readiness include (i) limited use of energy-efficient and resilient infrastructure (including digital), (ii) limited integration of climate data and climate risks in sectoral policies and regulation (including digital) and infrastructure planning, (iii) low ability to manage and analyze climate data, including its cross-sectoral impacts on sectors such as health; and (iv) limited e-waste management etc.[20]The economic costs of climate change are therefore estimated at upwards of 1 percent of GDP each year by 2030.[21] (See Annex 5 for more details on climate change risks and drivers, and what the project is doing to address them).

5. **The country's vision to become a knowledge-based economy and upper middle-income country by 2035 is underpinned by its commitment to leveraging ICT to accelerate growth and poverty reduction**. The National Strategy of Transformation (NST1-2017-24) identifies ICT as a cross-cutting enabler for development. Use of digital platforms is, for example, viewed as helping to spawn growth in services (financial, hospitality etc.), commercial transactions and increased access to markets. Investment in ICT thus

[12] The widened fiscal deficit led to unprecedented increase in public debt, with the public debt reaching 71.3 percent of GDP in 2020, which is more than 13 percent higher than the 2019 level, or about 6 percent higher than the HIPC level. WB (2020), Rwanda State of the Economy & Outlook, April (World Bank Estimates based on NISR data)
[13] Ibid.
[14] NISR (2021) https://www.statistics.gov.rw/publication/gross-domestic-product
[15] World Bank (2021), Rwanda Economic Update, June 2021: The Role of the Private Sector in Closing the Infrastructure.
[16] WB (2020), REU-15
[17] Notre Dame Environmental Change Initiative (ND-GAIN) (2019) Country Index, Vulnerability and Readiness. https://gain.nd.edu/our-work/country-index/rankings/
[18] WB (2021), Climate Risk Profile: Rwanda *https://climateknowledgeportal.worldbank.org/sites/default/files/2021-09/15970-WB_Rwanda%20Country%20Profile-WEB.pdf*
[19] Ibid. Rwanda is susceptible to many diseases that are influenced by climatic factors such as malaria, meningitis, and cholera.
[20] Ibid
[21] Downing, T., Watkiss, P., Dyszynski, J.; et al (2009), Economics of Climate Change in Rwanda. https://www.sei.org/publications/economics-climate-change-rwanda/

emerges as a central tenet of this strategy, viewed as critical to bypassing more 'traditional' pathways to shared prosperity and growth.

B. Sectoral and Institutional Context

6. **The Government of Rwanda (GoR) has distinguished itself as one of the continent's most ardent champions of the digital agenda, with sizable public investments made in digital infrastructure and public e-service expansion.** Rwanda is subsequently a regional frontrunner in relation to mobile broadband network coverage and in the global United Nations 'e-government' rankings.[22] It is also heralded as a 'proof of concept' country for adopting cutting-edge technologies such as drones for last-mile medical care provision or robotics for COVID-19 screening. Beginning as early as 2002, Rwanda began charting an ambitious course for achieving rapid digitization through a series of five-year national ICT strategies, culminating in the 2020 SMART Rwanda Master Plan.[23] This agenda is spearheaded by the GoR's leadership at the highest level, namely the Ministry of Innovation and ICT (MINICT), and its implementing arm, the Rwanda Information Society Authority (RISA) and its new network of Chief Digital Officers (CDOs) that have been appointed to lead sectoral digital transformation efforts in close collaboration with other Ministries, Departments and Agencies (MDAs).

7. **A WB digital economy diagnostic, conducted in FY2019,[24] revealed that many citizens remain unable to take full advantage of the broadband and digital public services on offer.** Slow progress has been made towards expanding the country's digital skills base and supporting digital businesses at scale, including the development of locally-relevant content and commercial e-services. This has, inter alia, limited the ability of most Rwandans to employ digitally-enabled social distancing strategies, during the COVID-19 pandemic, placing a dampening impact on commercial activity but also interrupting GoR's ability to deliver public services digitally, without the need for physical presence. However, the pandemic also prompted growing demand for mobile money, e-commerce, and the use of new digital applications to support the response.[25] Building on investments made to date, the GoR is therefore eager to tackle the stark digital access and inclusion gaps that still exist by actively addressing key barriers, strengthening its capacity for offering more public services digitally, supporting digitally-enabled productivity gains, and crowding in private sector investment through support for digital innovation and entrepreneurship – with the goal of preparing the country for a data-driven and e-service based economy capable of supporting sustainable recovery in a post-COVID-19 context.

Need to improve digital access and inclusion, starting with wider adoption of broadband

8. **Rwanda's 3G and 4G mobile networks remain underutilized, representing a major demand-side challenge, which in turn limits further investments in infrastructure and e-services expansion and maintenance.** Roll-out of a 6,000km national fiber optic backbone, facilitated by public funding[26], has helped extend network

[22] United Nations (2020), E-Government Survey. Rwanda ranks 130th in E-government Development Index (EDGI), and in the least developed countries category. See: *https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2020-Survey/2020%20UN%20E-Government%20Survey%20(Full%20Report).pdf*

[23] MINICT (2019), Smart Rwanda Master Plan. See: https://www.minict.gov.rw/fileadmin/user_upload/minict_user_upload/Documents/Policies/SMART_RWANDA_MASTERPLAN.pdf

[24] WB (2020), REU-15.

[25] Examples include use of online movement clearance. See: https://www.mc.gov.rw/

[26] In 2008, the government signed a deal with Korea Telecom to roll out a national fiber optic backbone at a cost of US$40 million, financed by the sale of the historical operator Rwandatel for US$100 million in October 2007.

coverage.[27] Current 3G and 4G network[28] coverage rates stand at 93 and 97 percent[29] respectively, compared with a regional average of just 76 percent. However, demand for broadband services has not kept pace with supply-side gains. Official figures put internet penetration at 63.1 percent, yet most existing internet users (43.8 percent) are still using low speed 2G services, yielding a modest 19.2 percent mobile broadband internet subscription rate (with 13.5 percent on 3G and 5.7 percent on 4G networks), which is lower than for regional peers.[30] Rwanda's fixed broadband market remains nascent with penetration at just 0.14 percent, based on unique subscriptions.[31] Existing broadband users are predominately urban, pointing to a stark urban-rural digital divide on the demand-side.[32]

9. **Low smart devices ownership and digital literacy[26] represent major barriers to digital access and inclusion.** While a majority (67 percent) of households own a mobile device, these are predominately basic feature phones and not broadband-compatible smart devices.[33] Affordability is identified as the main barrier to wider devices access, with close to 80 percent of the Rwandan adult population (6 million, aged 16-64) currently unable to purchase a US$30 smartphone based on current income and affordability benchmarks.[34] Meanwhile, high credit risk prevents a private sector-driven solution to the affordability challenge.[35] National digital literacy stands at only 20 percent[36], whereas reported computer literacy is only 9 percent. The GoR has sought to address this issue by piloting flagship digital literacy schemes such as the Digital Ambassadors Program (DAP)[37], and digital education initiatives such as smart classrooms in school.[38] However, gaps remain: these schemes lack national coverage and need to be adapted to segmented user-groups with distinct training needs, including for women, people with disability and rural communities. Gaps

[27] 47 percent of the population live within 25km from the fiber backbone.
[28] Supported through a public co-investment in Korea Telecom Rwanda Network, a joint venture between the GoR and Korea Telecom, and managed by Korea Telecom, based on an exclusive license. Access to 4G wholesale capacity is open to all operators at cost-based prices.
[29] RURA (2020), Statistics report for the telecom, media, and broadcasting sector as of fourth quarter of the year
[30] Unique mobile broadband subscriptions per 100 inhabitants was 35 percent for Kenya and 27.9 percent for Tanzania in second quarter of 2020, based on GSMA data.
[31] Ibid
[32] NISR (2019), EICV 5, 2016-17. 38 percent of urban households versus 12 percent of rural households have access to the internet.
[33] Ibid. Although the household survey did not collect information on types of devices, a survey by After Access found that 66 percent of users owned basic phones, 25 percent owned feature phones and only 9 percent owned smartphones. After Access (2018), A demand-side view of mobile Internet from 10 African countries. See: https://researchictafrica.net/2019_after-access_africa-comparative-report/
[34] Based on household income figures and global affordability targets, and low-cost smartphones typically retailing from US$50 and above. Affordability means ability to purchase a device, based on the cost of that device not exceeding 15 percent of the monthly income plus cost-of-service plan (assumed to be maximum 2 percent of monthly income). Monthly income based on NISR (2019), EICV 5, 2016-17. Global affordability targets set by UN Broadband Commission (see below).
[35] Facebook Connectivity Research (2020), based on EICV 5 data.
[36] NISR (2019), EICV 5, 2016-17. Digital literacy here includes use of smartphones, tablets, and computers.
[37] In 2017, the GoR launched a novel flagship initiative called the 'Digital Ambassadors Program' (DAP), in partnership with the World Economic Forum and the Digital Opportunity Trust, to deliver basic digital skills training to 5 million Rwandans aged 15 years and above to reach the Government's target of 60 percent digital literacy by 2024. The present scheme is based on dispatching centrally trained young 'digital ambassadors' to impart digital literacy training at community level. Thus far, the scheme has only been piloted in a few districts, but evaluations point to encouraging results in terms of readiness to use basic ICT tools, especially among women.
[38] See: https://www.smartclassroom.nl/wp-content/uploads/2017/08/Brochure-Smart-Classrooms-Rwanda.pdf

in relation to gender, disability[39], between urban and rural areas as well as based on income exist in relation to device ownership, affordability, and literacy barriers. [40]

10. **Usage remains low among key user groups that would greatly benefit from increased connectivity and could begin to stimulate reliable and growing demand for broadband.** Government schemes such as the One Government Network (OGN)[41] have sought to expand last-mile access to broadband on the public sector side, but large access gaps remain. Currently, 22 percent of all local government offices at the cell-level remain without access to broadband, and most of the 416 offices at the sector-level are not yet connected to fiber,[42] preventing decentralized use of digital government platforms and local access to digitally-enabled public services in critical sectors such as health, education and social protection. A recent mapping also concluded that 43 percent of all schools (1,796 in total) lack internet access[43], preventing the use of enabling digital tools in education and expanded digital skills training in basic and secondary education. Meanwhile, only 17 percent of households have internet access at home, with a pronounced gender gap (18.5 percent male-headed households compared to 3.2 percent female-headed households have access to the internet),[44] and very few of Rwanda's micro, small and medium sized (MSMEs) businesses are online, according to surveys conducted.[45] Public access points could therefore also help bridge the lingering last-mile connectivity access gap.

11. **There is room to enhance industry policy and regulation to enable wider access and sustainable infrastructure investment, through interventions that boost competition, service quality, inclusion, and environmental standards.** Network service quality and data affordability remain factors that constrain access and usage that need to be addressed by the Rwanda Utilities Regulatory Authority (RURA). The average monthly price of 1GB of data was US$2.13 in 2020,[46] which is 3.4 percent of Gross National Income (GNI) and exceeds global affordability targets[47], while average internet speeds are 3.3Mbps.[48] Rwanda's hilly terrain and dispersed rural communities, along with weak demand, make investment in high-quality access networks an unattractive commercial prospect in some part of the country, prompting the need for wider application of enabling policy and regulatory measures that could help reduce the service cost for operators

[39] Recent analysis of census and household data for the UN Flagship Report on Disability and Development shows households with persons with disabilities lag behind households without in relation to both mobile phone ownership and internet access.
[40] NISR (2019), EICV 5, 2016-17. Device ownership among rural households is 54 percent, compared with 82 percent for urban; ownership among female-headed households is at 46 percent compared to 71 for male-headed. The highest percentage of device ownership falls within the richest quintiles (86.5 percent), compared to 44 percent in the poorest. Digital literacy is 7 percent for women versus 11 percent for men; 26 percent among urban populations versus 4.6 percent for rural.
[41] OGN is a tripartite arrangement between KTRN, GoR and Broadband System Corporation, a public internet services provider (ISP) that has sought to connecting public institutions with 4G wireless technology. Roll-out so far has predominately connected MDAs in urban areas, some public schools, hospitals and SACCOs. Government is looking to explore innovative and least-cost models for expanding access for public institutions, while crowding in more private sector participation, as part of a revamped and more competitive OGN scheme that also expands access to fiber.
[42] MINICT, 2019
[43] GIGA (2021), Mapping of school connectivity. See: https://gigaconnect.org/rwanda/
[44] NISR (2019), EICV 5, 2016-17.
[45] WB (2020), REU-15. Just over half (55 percent) of formal sector enterprises reported having internet access in 2016.
[46] ITU (2020), ICT Price Trends. See: https://www.itu.int/en/ITU-D/Statistics/Documents/publications/prices2020/ITU_ICTPriceTrends_2020.pdf
[47] Alliance for Affordable Internet (A4AI) (2020), UN Broadband Commission Adopts A4AI '1 for 2' Affordability Target set at 2 percent of monthly median income. See: https://a4ai.org/extra/baskets/A4AI/2020/mobile_broadband_pricing_gni
[48] Atlas, Data Cable (2019). See: https://www.ispreview.co.uk/index.php/2019/07/uk-ranks-34th-out-of-207-countries-for-average-broadband-speed.html Average internet speed in Kenya is 7.6 mbps, Madagascar 22.5mbps, South Africa 8.4 mbps, Zimbabwe 2.739mbps.

and incentivize network investment. The 4G wholesale monopoly arrangement, limited smart device penetration, and weak contextualized digital content availability all contributed to sub-optimal development of the 4G market segment, with limited resale of related services by mobile network operators (MNOs), and subsequently weak reinvestment in 4G network upgrades and maintenance. Meanwhile, the COVID-19 pandemic and climate-change induced weather events have also helped illustrate the role that telecommunications and digital services play in emergencies, prompting the need to consider means of improving disaster planning, risk analysis and encourage investment in climate-smart and energy-efficient infrastructure. There is a need to update existing policy, legal and regulatory instruments in favor of continued broadband market development in Rwanda, sustainable infrastructure sharing models, and rigorous quality of service (QoS) monitoring to ensure that operators fulfill their licensing obligations and end-users are offered attractive services that can help bolster uptake.

Need to enhance Government's ability to introduce fully transactional digital public services

12. **The pandemic has also increased the impetus for expanding and improving the GoR's ability to deliver e-services to ensure uninterrupted provision of critical services without the need for face-to-face interaction.** Government's online one-stop-shop platform for e-services, *Irembo*, currently provides access to almost 100 citizen-facing e-services; however, most still require some form of in-person interaction and physical processing of paperwork. Only a handful of services have been digitized end-to-end. To achieve the GoR's objective of providing "24-hour, self-service, cashless and paperless" government by 2024[49], there is a need to invest further in shared digital solutions, infrastructure and process reengineering that would allow the GoR to scale fully transactional Government-to-Government (G2G), Government-to-Business (G2B), and Government-to-Person (G2P) e-services both at central government and sectoral levels.

13. **Increasing the number and quality of public digital services offered will require stronger government capacity for safely digitizing, storing, sharing, and analyzing data.** A recent inventory of public sector systems identified over 280 digital systems deployed by GoR at national and local levels.[50] Investment in a government data center has enabled the launch of a shared government cloud by multiple government institutions and a pilot Government Enterprise Service Bus is ongoing. However, considerable fragmentation remains in relation to data management, including how systems are integrated and data is shared, due to gaps in existing data formatting, standardization, and interoperability, in the absence of a holistic shared Government Enterprise Architecture (GEA) and data guidelines.[51] Many key registries remain paper-based and while some data is being consolidated centrally, for example, through the National Institute of Statistics of Rwanda (NISR), many valuable datasets are still stored across Government.[52] The 2017 Data Revolution Policy advocates for having a centralized data portal, capacity building in data management and the elimination of silo-based handling of government data. Pooled data and stronger GoR capacity to utilize big data analytical techniques for predictive policy insights would also be instrumental to improving public service delivery. Meanwhile, making more data-sets available to the public would help foster innovation, as data has become a key enabler of firm-level productivity and innovation.

[49] MINICT (2017), ICT Sector Strategic Plan, 2018-2024.
[50] Inventory conducted by MININCT, RISA, in collaboration with RGB and MIFOTRA in October 2020.
[51] WB (2020), REU-15
[52] The data sets are stored in various files and standalone databases, are not available in standardized, clean, and machine-readable formats through a shared government data hub or other interoperable mechanisms. Valuable datasets that could be harnessed, include meteorological data held by Rwanda Meteorology Agency, tax systems data managed by Rwanda Revenue Authority and Irembo portal data, to name a few.

14. **An inclusive and trusted digital ID system that enables identity verification for online and in-person transactions will also be a key building block for scaling effective delivery of e-services by both government and the private sector.** An estimated 98 percent of adults above the age of 16 currently hold an ID card, which is used for accessing most services in Rwanda that are provided in person**.** The National ID Agency (NIDA) is completing the modernization of a decentralized civil registration and vital statistics system that is linked to the national population register (NPR), which covers nationals and refugees, with new birth and death registration modules being rolled across the country.[53] However, despite these positive developments, the current national ID card system faces a number of constraints, which include (a) providing limited identity verification capabilities for online and in-person service access; (b) providing no coverage of children under the age of 16, preventing access to services in sectors such as health, education and social protection that are key to human capital development; and (c) challenges with reliably establishing and verifying unique identities for use in cases that require higher levels of identity assurance. In addition, many thousands of legacy civil registration records remain paper-based, presenting challenges for streamlined ID registration, and preventing the GoR from offering seamless, user-friendly e-services that require proof of vital events. Moreover, the new Personal Data Protection and Privacy (PDPP) law (2021), adopted by the Parliament in August and published in the official gazette in October 2021, will have implications on the collection, storage, and processing of personal data, including for ID registration and the handling of ID related personal data. A '*Single digital ID system*' feasibility study was carried out in 2020-2021, supported by the African Development Bank, that proposed major upgrades to the national ID card system. The GoR has subsequently decided to modernize the entire ID ecosystem, including updating related legal, institutional and governance frameworks, to align with the *Principles on Identification for Sustainable Development*[54] and international best practices.

15. **Rwanda will need to continue to build a secure online trust environment, supported by enhanced governance, operational and technical cybersecurity, and data protection capabilities to reduce related vulnerabilities and risks.** In 2018, cyber fraud in Rwanda led to economic losses amounting to approximately US$6.6 million, caused by 113 identified cases. Moreover, the Rwanda Investigation Bureau recorded a spike in cybercrime by 72 percent during the COVID-19 lockdown. Growing digital adoption and reliance on digital infrastructure and solutions will make the Rwandan economy increasingly vulnerable to cyber threats. Recognizing these challenges, Rwanda has introduced foundations for cybersecurity resilience,[55] including the establishment by law of the new National Cyber Security Authority (NCSA) in 2017 and its operationalization in 2020, which houses the national Cyber Security Incident Response Team (CSIRT). However, both would stand to benefit from significant capacity building. The GoR has also adopted foundational laws on electronic messages, signatures, and transactions (2010) and cybercrime (2018). The new PDPP law (2021) also introduced a new supervisory authority for data protection that will need to be operationalized and will require significant capacity building to support movement toward a more robust trust environment, capable of fostering a reinforcing cycle of digital adoption as digitization increases.

Need to strengthen the digital innovation and entrepreneurship ecosystem

[53] The development of the CRVS system is being supported through the Strengthening Social Protection Project (P162646).

[54] See: https://id4d.worldbank.org/principles

[55] Rwanda has a National Cyber Security Policy (2015), a National Cyber Security Strategic Plan (2015) and has passed a National Cyber Security Bill in 2017. An Internet Security Center monitors the status of Internet security, the National Public Key Infrastructure (PKI) provides confidentiality, integrity, authenticity and non-repudiation of e-transactions and the Rwanda Computer Security Incident Response Team (Rw-CSIRT), mandated with preventing and responding to cybersecurity incidents in the public and private cyberspace, has been active since 2014.

16. **Rwanda boasts one of the most favorable business environments[56] on the continent yet lacks growth of digital innovation and digital businesses at scale.** While a handful of successful digital startups have emerged, including success stories like Zipline, most startups have a high fail rate, limiting their potential for providing a meaningful contribution to productivity gains, e-services expansion and job creation.[57] The digital innovation and entrepreneurship ecosystem currently benefits from active support from the GoR, the donor community and philanthropic organizations, as demonstrated by the build-out of critical support infrastructure and programs for aspiring digital innovators, such as Kigali Innovation City (KIC) as well as existing ecosystem support organizations (ESOs) (e.g., kLAb-FabLab, Westerwelle StartupHaus) and new entrants (e.g., Norrsken and Mastercard Foundation). However, heavy reliance on public and donor funding raises concerns related to the long-term sustainability and performance of ESOs.

17. **While Kigali is home to a growing community of ESOs, there are opportunities to improve coordination across the digital innovation ecosystem, diversify the ESO service offering to include post-incubation support, increase international linkages, sector specialization, as well as expand access to early-stage financing.** Though Kigali has one of the highest ratios of ESOs per inhabitant in the region,[58] a burgeoning entrepreneurial ecosystem has still been slow to develop. Most ESOs are focused on supporting pre-seed startups and there is a need to focus on commercialization and scaling. As a result, only a few startups successfully reach scale. Young, digitally enabled companies tend to be more productive than incumbents, but less able to weather adverse demand shocks such as the COVID-19 pandemic. This implies disproportionate losses to aggregate productivity if the impact of related shock cannot be mitigated among startups.[59] Moreover, access to new credit has declined during COVID-19.[60] Rwanda therefore needs to grow many of the diverse funding channels available in more developed entrepreneurial markets, such as venture capital funding, angel investors, and seed-stage investment. New funding channels (e.g., a new angel network and the Rwanda Innovation Fund) have emerged but there is need to stimulate private investors and build local fund management capabilities through cost and risk sharing mechanisms to fill existing market gaps in early-stage risk financing. There is room to build on Rwanda's favorable reputation for being an easy, safe, and stable place to do business – encouraging more investment activity and elevating Rwanda's status as a regional hub in East Africa – given the inherently small size of the domestic market.

18. **However, Rwanda still has a low base of the requisite level of advanced and highly specialized digital skills needed to propel cross-sectoral digital transformation and fuel the digital innovation ecosystem.** A shortage of highly qualified developers forces local companies to look for talent overseas. Potential employers also point to a mismatch between skills supply and demand, stemming from weak industry-academia collaboration, as well as the inadequate quality and availability of local training. The GoR has sought to address this by, for example, partnering with for-profit training providers such as Andela to offer advanced coding bootcamps, encouraging world-renowned academic institutions such as Carnegie Mellon University to establish a local campus in Kigali, and launching the Rwanda Coding Academy (RCA) in 2019 to

[56] World Economic Forum (WEF) (2020), Global Competitiveness Index 2019. Rwanda ranks 58 in the global index.
[57] Insight2Impact (2018), African Digital Platforms database : *http://researchictafrica.net/wp/wp-content/uploads/2018/12/DInfo_V11.pdf* For instance, digital platforms employ only 24,000 people in Rwanda – compared to 2.9 million in Nigeria, 1.29 million in South Africa and 286,000 in Kenya.
[58] Credit Suisse (2020), Connecting the Kigali Entrepreneurial Ecosystem
[59] World Bank (2020), COVID-19-Outbreak-Support-to-Firms. *https://pubdocs.worldbank.org/en/879461586478617078/COVID-19-Outbreak-Support-to-Firms.pdf*
[60] Decreased by 8.2 percent in 2020, according to WB (2020), Rwanda State of the Economy & Outlook (April)

provide training at Technical and Vocational Education and Training (TVET) level. [61] While these efforts are a step in the right direction, there is a need for sustainably scaling quality digital skills training, while ensuring active private sector participation, and student access.

19. **Supporting wider digital inclusion and participation will also require interventions sensitive to existing digital gender gaps and barriers faced by people with disabilities.** Currently, only 26 percent of those employed in the ICT sector are women.[62] As noted above, barriers exist in relation to access and usage of the internet owing to, for example, weaker device ownership[63], lower digital literacy levels and awareness[64], which translate to weaker access to the digital dividends stemming from higher adoption and participating in the digital economy. While there is a dedicated Gender Monitoring Office (GMO) that recognizes the need for collecting gender disaggregated data, most key ICT metrics are not consistently gender-disaggregated. Moreover, while 4 percent of the population are persons with disabilities, with a greater share located in rural areas[65], access to assisted technologies is weak which also prevents full participation in the digital economy.

C. Relevance to Higher Level Objectives

20. **The project is aligned with the World Bank Rwanda Country Partnership Framework (CPF), discussed by the Board on July 9, 2020 (Report No. 148876-RW), which was developed and finalized jointly with the Government in the context of the COVID-19 pandemic.** Specifically, the proposed operation addresses the CPF Objective 3 to expand access to infrastructure and the digital economy**.** Also relevant is Objective 1, related to "Improving Human Capital" through interventions focused on advancing digital literacy as well as advanced and highly specialized digital skills.[66] The project also contributes to CPF Objective 2, pertaining to "Improving the Conditions for Private Sector Development", by helping to create (i) a larger market of digital savvy consumers; (ii) opportunities for private sector investment in digital infrastructure; (iii) opportunities for private sector innovation in public service delivery, enabled by new data-driven platforms; and (iv) a stronger local entrepreneurship ecosystem capable of supporting digitally enabled innovation.

21. **The project will support Green, Resilient and Inclusive Development.** As will be seen below, the project will support Rwanda's efforts to (i) enhance climate change adaptation and mitigation, (ii) improve the country's readiness and resilience to future pandemics and (iii) accelerate development by supporting greater adoption of next generation, climate-smart and energy-efficient digital technologies, while ensuring that (iv) no-one is left behind, placing an emphasis on digital inclusion that will allow low-income households, rural communities and women to equally participate in the digital economy.

[61] GoR and the Swiss Agency for Development and Cooperation (SDC) recently launched the RCA in partnership with the MINICT, Ministry of Education, and Rwanda Polytechnic. It is hybrid of both general education and TVET. It teaches software development, embedded systems programming, and cybersecurity. The RCA aim to address the "shortage of specialized and hands-on workforce" by producing a pool of top-end experts. RCA takes in students that have completed ordinary level (Lower Secondary) and offers three-year programs. See: http://www.rca.ac.rw/about-us.php

[62] NISR (2018), EICV5, Gender Thematic Report. See: *https://www.statistics.gov.rw/publication/eicv5thematic-reportgender*

[63] Ibid

[64] GSMA (2019), Digital Identity Opportunities for Women: Insights from Nigeria, Bangladesh, and Rwanda. See: https://www.gsma.com/mobilefordevelopment/resources/digital-identity-opportunities-for-women-insights-from-nigeria-bangladesh-and-rwanda/

[65] NISR (2019), ECIV5

[66] Based on the DigComp 2.1 proficiency levels grouped into four broad headings—Foundational, Intermediate, Advanced and Highly Specialized. See: https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework

22. **The project is aligned with the WB's Digital Economy for Africa (DE4A) initiative, which is supporting the implementation of the African Union's (AU) Digital Transformation Strategy for Africa, 2020-2030[67], and contributing to the WBG's twin goals of boosting shared prosperity and reducing poverty.** The AU's Strategy sets out a bold vision that calls for every African individual, business, and government to be digitally enabled by 2030, to drive the digital transformation of Africa and ensure its full participation in the global digital economy. A well-functioning digital economy can help accelerate achievement of the WBG's twin goals.

23. **The project is aligned with the strategy outlines in the WBG's COVID-19 Crisis Response Approach Paper[68] and the GoR's Economic Recovery Plan (ERP).** The Project follows WBG's COVID-19 response approach, specifically, Pillar 3 ("ensuring sustainable business growth and job creation") by supporting the commercialization of digitally enabled business models and solutions; but also Pillar 4 ("strengthening policies, institutions, and investments for rebuilding better") by expanding access to digital infrastructure and strengthening GoR's capacity for digital service delivery. It also supports Pillar 2 ("protecting the poor and vulnerable") through targeted support for poor households for purchasing digital devices, alongside digital literacy and broadband access schemes tailored to groups with higher access barriers, including women and poorer rural communities. In addition, the project aligns with Rwanda's ERP, which identifies ICT as a critical sector that could catalyze broader economic recovery by "building back better".

24. **The project also promotes Mobilizing Finance for Development (MFD).** Cognizant of how Rwanda's development has historically been heavily public sector investment driven, the project's activities will be geared towards encouraging greater private sector participation. The project seeks to crowd in commercial financing by creating markets, using public finance to de-risk investment in digital service and infrastructure expansion, by stimulating reliable demand for broadband and addressing market failures through policy and regulatory reform, and using financial instruments such as subsidies, guarantees and early-stage finance to catalyze access to devices and innovation. The WB will be collaborating closely with the International Finance Corporation (IFC) in areas such as broadband market reform. The IFC is currently providing support to the MINICT on a new Broadband Policy, as well as updated regulatory frameworks for infrastructure sharing and spectrum management that will create a platform for enhanced competition. Implementation of these frameworks will be supported by the project. Moreover, public investments proposed provide avenues for continued IFC support for greater private sector participation in a more competitive broadband market, where existing schemes are being restructured to allow for the participation of more private sector players.

25. **The project will directly support Rwanda's National Gender Policy vision for ICT, the Generation Equality Forum (GEF) targets[69] and strengthen the country's ambitions for greater economic participation of people with disabilities**. Access to internet and digital devices for vulnerable groups such as people with disabilities and women will be supported through provision of accessible tools and gender sensitive trainings. Disability and gender targets will be set for many of the schemes financed. The project will support the GMO's Strategic Plan (2017-2022), which calls for creating a 'gender databank' through the collection of gender disaggregated data. It will also support Rwanda to achieve its GEF targets for 'technology and

[67] See: https://au.int/en/documents/20200518/digital-transformation-strategy-africa-2020-2030
[68] World Bank Group (2020) Saving Lives, Scaling-up Impact and Getting Back on Track: COVID-19 Crisis Response Approach Paper, June 2020. See: https://documents1.worldbank.org/curated/en/136631594937150795/pdf/World-Bank-Group-COVID-19-Crisis-Response-Approach-Paper-Saving-Lives-Scaling-up-Impact-and-Getting-Back-on-Track.pdf
[69] Rwanda has committed to 'Technology and Innovation for Gender Equality' under the UN Generation Equality Forum, 2020.

innovation' such as narrowing the gender gap in mobile phone penetration and participation in innovation ecosystem. The project will contribute to the National Council of Persons with Disabilities' strategic goals of monitoring the inclusion of people with disabilities in national programs. A gender analysis completed during preparation of the project identified several gender gaps that have informed specific activities to be financed under the project. Related indicators have also been identified and included in the Results Framework. Annex 4 provides more details on the specific activities and indicators proposed under the project.

26. **The project will support Rwanda's Green Growth and Climate Resilience Strategy (GCCRS)[70], and Rwanda's 2020 Nationally Determined Contributions (NDC) commitments through activities that support climate change adaptation and mitigation.**[71] Activities supported are informed by the Climate and Disaster risk screening conducted for the project, at the concept stage, which confirmed risk to physical infrastructure elements of the project and the high potential of digital tools to support adaptation and mitigation. Activities supported under the project will also be informed by the forthcoming Country Climate and Development Report for Rwanda, and support IDA19 climate change commitments. For a complete description of related support see Annex 5 that details the following:

    (a) **Climate adaptation**, including Project support for (i) integrating climate data and risk analysis in respect to digital infrastructure planning and deployment, and using sustainable energy solutions (sub-component 1.3); (ii) providing technical assistance (TA) for developing industry climate standards for digital infrastructure via new policy and regulation (sub-component 1.4); (iii) supporting disaster recovery through digitalization of paper-based civil records, investments in digital identification (sub-component 2.1) and digitization of emergency cash transfers that help enhance response capacity to climate events (sub-component 2.3); (iv) leveraging climate data for predictive forecasting to better map climate impacts and support related decision-making[72] (sub-component 2.2); and (v) strengthening the health sector's ability to respond to a climate-induced increase in disease transmission, through better information management and exchange[73] (sub-component 2.3).

    (b) **Climate mitigation**, including Project support for (i) integrating energy-efficient standards in ICT procurements, and digital infrastructure investments (sub-component 1.3); (ii) investing in better data management and exchange platforms that can support energy-efficiency gains; (iii) increasing end-to-end digitalization of e-services that do not require physical presence, including enabling remote

[70] Rwanda has launched a National Adaptation Program of Action and adopted a GCCRS, which emphasizes the need for supporting energy-efficient technology and climate proof infrastructure and services.

[71] Though Rwanda is a low global green-house gas (GHG) emitter, based on capita emission, total emissions are forecast to more than double over the 2015-2030 period. Government has targeted a 38 percent reduction in total GHG emissions by 2030. See:https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Rwanda percent20First/Rwanda_Updated_NDC_May_2020.pdf

[72] Future Climate for Africa (2014), Rwanda Pilot. See: https://cdkn.org/wp-content/uploads/2014/05/Rwanda-FCFA-final-report-vs-2.pdf

[73] Swedish International Development Agency (2019), Rwanda Environment and Climate Change Analysis. See: https://sidaenvironmenthelpdesk.se/digitalAssets/1748/1748556_environment-and-climate-change-analysis-rwanda-2019-06-05.pdf

identification, reducing the need for transport and use of paper[74] (sub-component 2.1 and 2.3); and (iv) scaling e-waste collection to reduce emissions through better waste management (Component 4).

27. **The project is aligned with the IDA19 digital commitments.** Component 1 activities that focus on digital access and inclusion will help close the digital infrastructure gap, expand broadband penetration, and address digital access barriers for women and persons with disabilities. Component 2 activities that support digital public service delivery, including adoption of accessible GovTech solutions, whereas those advancing digital entrepreneurship and innovation under Component 3 will aid in digital skills development, enabling access to better opportunities and jobs, particularly for women. See Annex 6 for more details.

28. **The project is aligned with the IDA Scale-up Window (SUW) objectives.** SUW financing has been mobilized for the full amount (US$100million) to be financed by the WB, in view of the project's expected transformative impact, including support for facilitating accelerated GDP growth, technology-enabled innovation and job creation, long-term government cost-savings, as well as efficiency and productivity gains, fueled by greater digital adoption by citizens, business and government. This is reflected by the project's estimated positive internal rate of return (IRR). Further, in line with the objective of managing risks of debt distress, project activities focus on safeguarding fiscal sustainability by encouraging greater private sector participation, through MFD. The project also satisfied the SUW prioritization filters, given its alignment with WBG strategy (including COVID-19, CPF), support for IDA19 priorities (Gender and Climate Change) and national development priorities.

II. PROJECT DESCRIPTION

A. Project Development Objectives

PDO Statement

29. The objectives of the project are to increase access to broadband and selected digital public services, and strengthen the digital innovation ecosystem.

PDO Level Indicators

30. **The achievement of the PDO will be measured by the following results indicators:**

(a) **Increase access to broadband:** Broadband penetration rate (mobile + fixed) (Percentage) (of which, percentage female, mobile broadband penetration rate, fixed broadband penetration rate).
(b) **Increase access to selected digital public services:** Fully transactional G2P, G2B and G2G e-services that are introduced, upgraded, or enabled (Number);
(c) **Strengthen the digital innovation ecosystem:** Digital startups supported creating and/or leveraging a digital technology solution (Number) (of which, percentage female-owned).

B. Project Components

31. **The project aims to accelerate country-wide digital transformation, focusing on critical digital enablers that "future-proof" economic growth and build on existing digital foundations.** Based on the findings and

[74] WEF, 2019, Why digitization is key to exponential climate action. See: https://www.weforum.org/agenda/2019/01/why-digitalization-is-the-key-to-exponential-climate-action/ WEF highlights that digital services have the potential to reduce the use of energy and materials across the economy and directly enable a third of the emissions reductions needed by 2030.

recommendations of the FY19 Rwanda DE4A diagnostics[75], project activities seek to expand digital adoption, by spearheading a series of innovative digital access and inclusion initiatives. The project will also enhance Government's digital service capabilities, equipping the GoR with the ability to harness the power of big data and scale e-service based on shared digital standards, platforms, and infrastructure. Finally, the project will increase Rwanda's capacity to support digitally-enabled innovation, by strengthening the local entrepreneurship ecosystem, supporting tech firms to move from startups to growth and by developing Rwanda's digital talent base.

32. **The project is designed around four integrated and mutually reinforcing components**, based on the following breakdown in cost and financing, which includes support from the Asian Infrastructure Investment Bank (AIIB) that will co-finance the proposed investment project financing (IPF) (see Table 1).

Table 1: Project costs and financing sources (US$ million equivalent)

Components	Cost	Allocation and source of financing	
		IDA	AIIB
1. Digital Access and Inclusion *Focused on creating digitally enabled citizens.*	**60.50**	**30.25**	**30.25**
1.1: Access to affordable smart devices	15.00	7.50	7.50
1.2: Digital literacy for all	8.00	4.00	4.00
1.3: Last mile connectivity access	33.50	16.75	16.75
1.4: Legal, regulatory, and institutional capacity for broadband market development	4.00	2.00	2.00
2. Digital Public Service Delivery *Focused on creating a digitally enabled government, as well as creating entry points for private sector innovation.*	**100.00**	**50.00**	**50.00**
2.1: Digital identification and authentication	39.30	19.65	19.65
2.2: Government data management, sharing and analytics	10.70	5.35	5.35
2.3: E-services in key sectors	30.50	15.25	15.25
2.4: Cybersecurity resilience and data protection	19.50	9.75	9.75
3. Digital Innovation and Entrepreneurship *Focused on supporting digitally enabled businesses.*	**29.50**	**14.75**	**14.75**
3.1: Regional digital entrepreneurship hub	22.00	11.00	11.00
3.2: Next generation capabilities for the digital economy	7.50	3.75	3.75
4. Project Management *Project implementation support*	**10.00**	**5.00**	**5.00**
TOTAL	**200.00**	**100.00**	**100.00**

Component 1: Digital Access and Inclusion. (US$60.50 million equivalent: of which US$30.25 million from IDA, US$30.25 million from AIIB)

33. **This component will increase digital access and inclusion through investment in digital access enablers, focusing on under-served areas and groups.** A series of interventions that address identified demand-side barriers hampering access to high-speed internet service will be financed. This includes support for smart device affordability financing schemes, an umbrella digital literacy initiative, as well as a local connectivity

[75] WB (2020), REU-15

access scheme targeting unconnected government offices, schools, hospitals, and public spaces. Activities supported will help connect more users to broadband, and subsequently enable wider access to and demand for data-driven public and commercial e-services (financed under Components 2 and 3). Financing provided will support wider local readiness for COVID-19 response and recovery, as digital tools and systems have proved critical to an agile response, where digital access and inclusion is viewed as a basic pre-requisite. By providing catalytic funding to stimulate demand by key user-groups and in low-income market segments, the project hopes to crowd in more private sector investment on the supply-side. Upstream support for an enabling legal, regulatory and policy environment for competitive broadband market development will also be provided, with a view to stimulating wider access, quality, affordability and sustainability, resulting in a more vibrant broadband market that can support wider access and service expansion.

Sub-component 1.1: Access to affordable smart devices. (US$15million equivalent: of which US$7.5 million from IDA, US$7.5 million from AIIB)

34. **This sub-component will provide financing support to facilitate wider device access, featuring the establishment of a smart device access scheme and dedicated fund.** The scheme will target potential users currently facing barriers to smart device access and ownership, such as securing credit for device purchase. The scheme will be implemented jointly by RISA and the Development Bank of Rwanda (BRD). The project will finance an in-depth market assessment and feasibility study to refine key design elements of the scheme, based on local context and anticipated demand, including targeting, the selection of financing instruments to be deployed, and how to best sustain the fund beyond the life of the project. Key financing instruments considered include grant-based subsidies for Rwanda's lowest income-earning households, with targeting, eligibility and subsidy levels based on the stratified household income classification system, *Ubudehe,* existing device ownership, and other GoR social assistance schemes, including links to the digitization of safety nets payments and digital literacy programs (under sub-components 1.2 and 2.3, respectively). Targeting of different *Ubudehe* household categories will consider level of financial need, scope for productive use, and perceived value of the device, with the aim of maximizing the coverage, inclusion, and impact of the scheme. Other instruments that will be considered include credit guarantees, insurance, and lines of credit to manage the challenges associated with access to finance for smart devices and high credit risk. All financial instruments leveraged under the scheme will adhere to the WB's policies and guidelines for financial intermediaries (FIs). Key activities to be financed include:

(a) **Capacity building for RISA and the BRD**, as well as other key scheme players, to support the development and operationalization of the affordable device access scheme, and related fund. A detailed feasibility study and a scheme-specific project implementation manual (PIM) will be developed, detailing financial instruments implemented, beneficiary disbursement mechanisms, eligibility criteria and scheme administration requirements. TA for demand- and supply-side enablers will also be provided.

(b) **Capitalization of the device affordability fund,** and operationalization of related financing instruments, which will be implemented by the BRD in its capacity as an FI, and where the project will cover the costs of the financial instruments deployed, including relevant fees.

(c) **Independent verification,** whereby the project would finance a third-party verification agent to verify compliance of the financing schemes.

(d) **Communication and outreach** through campaigns, sharing success stories and lessons learned to publicize the device affordability scheme to key stakeholders and targeted beneficiaries.

Sub-component 1.2: Digital literacy for all. (US$8million equivalent: of which US$4 million from IDA, US$4 million from AIIB)

35. **This sub-component will help tackle Rwanda's lingering digital literacy gap through a national digital literacy scheme that will enable end-users to access and use digital devices and data-driven services safely and effectively.** This activity will help expand the national coverage of Rwanda's existing flagship DAP, with the aim of training more people in digital literacy across all 2,148 cells. A revamped iteration of the existing scheme (version 2.0) will be scaled, and run by the RISA, building in more sustainability, inclusion, and performance-based management, including tailored and task-based training approaches sensitive to gender and persons with disabilities (see annex 2 detailed description of components). The scheme will also be broadened to enable the participation of more non-profit and for-profit digital skills providers. The initiative will be anchored in an overarching digital skills assessment and new national digital skills framework, developed in close collaboration with the MINICT, Ministry of Education (MINEDUC) and digital skills providers. Key activities to be financed include:

(a) **Development of a new national digital skills architecture and monitoring and evaluation (M&E) framework,** aligned with global best practices and allowing for continued evaluation of the DAP, through targeted TA.

(b) **Development and operationalization of the new DAP 2.0. model,** covering incremental operating costs, training, equipment, support for content creation and setting up a shared digital skills training platform allowing partner agencies to contribute through training material, shared M&E tools, building in more sustainability.

Sub-component 1.3: Last mile connectivity access. (US$33.50 million equivalent: of which US$16.75 million from IDA, US$16.75 million from AIIB)

36. **This sub-component will expand access to high-speed broadband among select public institutions, as well as targeted public spaces to enable wider digital service provision**. Financing will connect selected public sector organizations at central-, district-, sector- and cell-level that currently lack broadband access, including local government offices, schools, hospitals and citizen service access points, and support movement toward a more resilient, secure, and centrally managed dedicated government network (GovNet). The GoR is also looking to connect key commercial centers with public Wi-Fi that can stimulate greater commercial digital service usage. Demand aggregation and pre-purchase of capacity will be leveraged to catalyze climate smart and energy efficient infrastructure investment and low-cost services provision. Upfront purchase of internet bandwidth from private sector operators, under indefeasible right of use (IRU) operating expenses (OpEx) contracts, spanning 5-15 years[76], will serve as the investment guarantee needed to incentivize private sector capital expenses (CapEx) investment in the roll-out of last-mile access networks that connect targeted locations, but also benefit the wider consumer base in the vicinity of connected locations, with GoR serving as the anchor tenant required for enhanced service provision. A market study will support a comprehensive needs assessment and refine the implementation approach. Key activities to be financed include:

    (a) **Support for network planning and deployment of enhanced network management solutions**, where RISA will receive targeted TA to enable capacity purchase, development of a closed virtual private network (VPN), and central Network Operations Center (NOC), and benefit from related climate risks assessments. Financing will cover related services and infrastructure for VPN and NOC establishment and roll-out, as well as related capacity building and training, and climate risk adaptation.

    (b) **Connectivity capacity purchase for select public institutions and priority locations,** awarded on a competitive basis, covering the provision of international and domestic internet bandwidth and various sectoral and geographic lots, featuring minimum capacity and technical requirements for targeted institutions and locations, embedding climate guidelines in related tenders.

    (c) **Enabling infrastructure and equipment for targeted institutions** to facilitate internet access and use in connected locations, where needed. Public schools prioritized for connectivity access that lack enabling digital infrastructure will be supported with sustainable energy solutions and basic IT equipment for teaching and learning.

Sub-component 1.4: Legal, regulatory, and institutional capacity for broadband market development. (US$4 million equivalent: of which US$2 million from IDA, US$2 million from AIIB)

37. **This sub-component will provide upstream enabling policy, legal, and regulatory support, as well as capacity building to stimulate broadband market development.** It will support the modernization of policy, legal, regulatory, and institutional frameworks governing the telecoms sector, with financing for related TA, training, systems, and equipment acquisition needed to support regulatory reform in selected areas (see detailed component description in Annex 2), with the aim of boosting competition, access, inclusion through service expansion, innovation and adoption of emerging and climate smart and energy-efficient digital technology. The industry regulator, RURA, and MINICT are expected to be the main beneficiaries of activities

[76] Although any lease of capacity would be expected to extend for a 5–15-year period, any operations and maintenance costs that go beyond the closing date of the Project, as well as additional bandwidth purchased after the closing date, would fall under the responsibility of the GoR.

financed under this sub-component. As noted above, upstream support provided joint by the IFC and WB, will be reinforced through activities financed under this sub-component, providing opportunities for downstream MFD impact.

Component 2: Digital public service delivery. (US$100million equivalent: of which US$50 million from IDA, US$50 million from AIIB)

38. **This component will strengthen the GoR's ability to securely deliver more digital services, allowing for increased resilience and adaptability to health, climate, and other shocks.** Activities financed aim to respond to the COVID-19 crisis by 'building back better' through investments that strengthen GoR's ability to deliver services that are secure, data-driven, paperless, and cashless, and that improve both the front-end user-experience of digital public services as well as back-end government efficiency, while reducing the climate footprint of service provision and access. This will be achieved by developing shared frameworks on issues such as interoperability, and by leveraging re-usable and shared digital infrastructure and platforms that (a) enable expansion of sectoral digitization and e-service initiatives; (b) allow the GoR to scale the provision of just-in-time critical G2G, G2B and G2P e-services; and (c) support the use of big data analytics that inform policy making, planning and e-service development. An enabling environment for securely scaling e-services will also be supported through investments that strengthen GoR's technical and operational capacity for managing risks related to cybersecurity and data protection.

Sub-component 2.1: Digital identification and authentication. (US$39.3million equivalent: of which US$19.65 million from IDA, US$19.65 million from AIIB)

39. **This sub-component will strengthen Rwanda's ID ecosystem in support of improved online and offline service delivery and access.** NIDA will be supported to upgrade the existing ID card system, by introducing a Single Digital ID (SDID) as an inclusive and trusted digital identification and authentication framework, featuring the development of a new data and digital authentication layer that leverages the existing National Population Register (NPR), civil registration and vital statistics (CRVS) and foreigner registration systems and other authoritative data sources. These upgrades are envisioned to bring Rwanda's ID ecosystem in alignment with the *Principles on Identification for Sustainable Development* and the new PDPP law (2021). Activities financed will include the introduction of new identity credentials, promote emerging approaches to digital identification such as decentralized identity and digital wallets, and support the adoption of new ways to verify identity in the context of in-person and fully remote service delivery in key sectors. By providing related ID-services as a shared platform and a public good, investments made will help to catalyze both public and private sector service innovation, enabling expansion of fully transactional e-services, including those that require higher levels of identity assurance. Digitalization of select civil records will facilitate SDID pre-registration and will improve GoR's ability to seamlessly offer e-services that require proof of vital events as well as protect civil records from adverse climate-induced weather events. Activities to be financed include:

(a) **Upstream stakeholder engagement and advisory services**, which will feature: (i) engagement with citizens, residents, relying parties and other key stakeholders and (ii) advisory services for the preparation of bidding documents and legal and regulatory support, as needed, to inform the implementation of SDID.

(b) **Digitization and indexing of civil registration records** that will involve converting paper-based birth and death certificates, and other civil registration documents into digital formats to facilitate pre-enrollment into SDID and e-services delivery. Financing will be provided for consultancy services,

hardware, and software.

(c) **Establishment of a new *Single Digital ID* system (SDID)** that will include the deployment of: (i) upgrades to public key infrastructure (PKI) and central back-end IT infrastructure, featuring network equipment and data storage; (ii) hardware and software development for the new SDID; (iii) new digital identity credentials; (iv) new identity verification mechanisms and support for the adoption of new ways to verify identities in priority sectors in the public and private sector; (v) registration operations, including pre-registration activities, and expansion of registration to include children under 16. Financing will be provided for related IT equipment, operational costs, and support services, as well as necessary process re-engineering and change management.

(d) **Strengthening the ID ecosystem**, which will feature support for: (i) deployment of an online complaints portal and call center to ensure effective channels for grievance redress and timely feedback to enable people who face ID-related challenges to seek timely recourse; and (ii) communications and community outreach to drive SDID adoption and effective usage.

Sub-component 2.2: Government data management, sharing and analytics. (US$10.7 million equivalent: of which US$5.35 million from IDA, US$5.35 million from AIIB)

40. **This sub-component will improve the GoR's ability to securely manage, share, analyze and harness data for improved service delivery, policy development and planning, on the back of shared data frameworks, platforms, infrastructure, and big data analytic capabilities**. Stronger capacity for managing, sharing, and analyzing government data will play an integral role in enhancing GoR's ability to expand and improve its e-service offering. Activities financed are designed to fully capture the opportunity presented by big data and lay the foundation for the introduction of more advanced use cases in big data analytics, including leveraging predictive capabilities to support forecasting. Support provided will primarily be anchored at RISA, and include the development of shared data governance frameworks, shared government data infrastructure, whole-of-government data interoperability structures, pooled data analytics capacity, featuring the creation of a central 'Government Data Hub' envisioned as a collaborative platform for better use of digital data by government. Key activities to be financed include:

(a) **Development of national and big data governance and management frameworks**, including TA to support the development of enabling legal, strategic and policy frameworks through feasibility studies, data sharing guidelines, templates, standards, and protocols as well as related training.

(b) **Operationalization of the Government Data Hub**, including financing related software, hardware, hosting, and TA for deploying and operationalizing the hub at RISA, in close collaboration with sectoral MDAs that produce large amounts of data.[77] Further, support for cataloguing and tagging, cleaning, and formatting government data for upload, and anonymizing data for release will also be provided. This will also allow government to make data sets public, and support engagement with data users.

(c) **Upgrading of the Government Enterprise Service Bus (GESB),** operated by RISA, to enable seamless back-end data exchange between various MDAs. Support will be provided for system upgrades, related hardware, hosting, training on the GESB's maintenance and operation, as well as any TA required to support systems integration that is expected to generate efficiency gains.

[77] MDAs that produce large amounts of data are typically Ministries of Agriculture, Education, Finance and Health, as well as meteorological, mapping and disaster preparedness agencies.

(d) **Implementation of strategically selected big data use cases** to demonstrate the value of big data analytics in priority sectors (e.g., Health, Education, Social Protection and Agriculture), including use-cases that directly support climate change adaptation and COVID-19 response leveraging related data.

Sub-component 2.3: E-services in key sectors. (US$30.50 million equivalent: of which US$15.25 million from IDA, US$15.25 million from AIIB)

41. **This sub-component will expand the availability of high-quality transactional e-services in key sectors.** Priority sectors identified include health, social protection, agriculture, local government, as well as trade and industry. Financing will cover both (a) just-in-time support for the roll-out of demand-driven G2G, G2B and G2P e-services, primed for full digitization, which leverage and demonstrate the value of re-using shared digital infrastructure and solutions financed by the project; and (b) a comprehensive and in-depth flagship sectoral digitization initiative in the health sector, selected based on its high-level contribution to COVID-19 response and recovery. Funding for category (a) e-services will be allocated on an annual basis, following a structured prioritization exercise with sectoral MDAs, including due consideration to both readiness and expected impact. Meanwhile, the flagship digitization initiative in the health sector, will support the development of sector-specific back-end systems, which build on shared frameworks and infrastructure, as well as feature sector-wide business process re-engineering, which showcases how sector-wide digitization can facilitate cross-cutting transformation of service delivery. RISA will be spearheading the roll-out of all e-services financed, working closely with respective MDAs, through its sectoral Chief Digital Officers and dedicated technical committees established. Cybersecurity, data privacy, and secure data-sharing principles, informed consent and user-centric design will be mainstreamed for all e-services financed under this sub-component, with special attention given to ensuring access by vulnerable groups. To ensure adequate technical capacity at RISA, the MINICT and within sectoral MDAs to launch, maintain and upgrade respective e-services and back-end systems financed, this sub-component will also cover an extensive digital skills training program for civil service staff. Key activities to be financed include:

(a) **Support for strategic planning and design of e-services**. TA will be provided to refine prioritization criterion, as well as support detailed planning and refine technical design of priority e-services selected for financing. This will also cover support for end-user consultations, including dedicated focus groups with vulnerable user-groups to both inform design and to ensure higher uptake.

(b) **Development of select e-services in key sectors**. Financing provided will cover aspects such as software development, systems integration, IT equipment, data hosting requirements, technical and end-user training, as needed. Some priority e-services have already been identified for implementation starting in year 1, based on a recent e-service inventory exercise carried out by RISA, including support for a new e-Parliament system, a Unified Business Registry System, a Building Permit Management Information System and the digitalization of Savings and Credit Co-operatives (SACCOs) that are critical to the digitization of social safety nets payments. Rigorous prioritization criterion will inform selection of remaining e-services to be financed in years 2 to 5.

(c) **Flagship sectoral digitization initiative: Health.** Financing provided will transform service delivery in the health sector by (i) enabling the full digitization and integration of existing health systems, such as the Health Information Exchange (HIE) platform and Electronic Medical Records (EMR) system, across multiple points of care, as well as by (ii) supporting systems set-up and use across additional health posts. Support will also be provided for secure health data handling, and for IT infrastructure at health facilities. Related investments will be closely coordinated with the Ministry of Health (MOH).

(d) **Comprehensive capacity building and change management,** featuring skills assessments and training, will be supported, aimed at creating a cadre of digitally savvy government leaders and IT professionals and facilitating successful development, deployment, usage, and maintenance of e-services. Training and communications, targeting end user beneficiaries will also be financed.

Sub-component 2.4: Cybersecurity resilience and data protection. (US$19.50 million equivalent: of which US$9.75 million from IDA, US$9.75 million from AIIB)

42. **This sub-component will strengthen the GoR's capacity to mitigate risks associated with the expansion of digital public services by enhancing its capabilities to detect, prevent, respond, mitigate, and recover from cybersecurity attacks as well as manage data protection.** It will support the development of a robust enabling environment through strengthened cybersecurity institutional and policy frameworks, technical and operational capabilities, as well as cyber skills development for a trusted online transactions environment and the security and resilience of digital infrastructure and systems. It will also lay the foundations for safeguarding data protection in compliance with forthcoming legislation passed by Parliament, by supporting the establishment and operationalization of a Data Protection Office (DPO). Key activities to be financed include:

(a) **Strengthened cybersecurity operational capacity**, which will feature support for the newly established NCSA and existing Rwanda Computer Security Incident Response Team (CSIRT). Financing will include TA for developing strategies and operational procedures, investments in hardware, software and technical upgrades, and cover support for cybersecurity trainings and awareness campaigns.

(b) **Foundations for data protection operationalization** that will finance (i) the development of institutional and policy frameworks, (ii) the DPO's technical and operational capacity and (iii) capacity building and awareness raising programs.

Component 3: Digital Innovation and Entrepreneurship. (US$29.5 million equivalent: of which US$14.75 million from IDA, US$14.75 million from AIIB)

43. **This component will strengthen the local digital entrepreneurship ecosystem and talent base.** Activities financed will support better innovation ecosystem coordination, better service provision by ESOs, expand access to early-stage financing, and promote advanced digital innovation capabilities. By strengthening the local entrepreneurial and innovation ecosystem, this component will contribute to the COVID-19 pandemic response and related recovery by supporting startups that can aid the development of data-driven, digital products and services relevant to the response. Activities financed will leverage and complement the interventions proposed under Component 2 by also encouraging the use of new public dataset made available and public goods introduced. A stronger local entrepreneurship ecosystem will also aide in developing locally relevant content and services that can help stimulate digital adoption and uptake of digital services, auxiliary to interventions under Component 1.

Sub-component 3.1: Regional digital entrepreneurship hub (US$22 million equivalent: of which US$11 million from IDA, US$11 million from AIIB)

44. **This sub-component aims to improve the survival and growth rates of technology-enabled startups in Rwanda and strengthen Rwanda's position as a regional 'test bed' for innovation**. Support will be provided to create an enabling strategic, policy, regulatory and institutional environment that is conducive to

stimulating growth of digital innovation, businesses and startups, positioning Rwanda as a regional digital entrepreneurship hub. Mechanisms to strengthen the quality, sustainability, and range of ESOs and related services available will be financed, including support for acceleration services that can strengthen international market linkages. All support provided will consider the challenges that startups and young firms have been facing due to the COVID-19 pandemic. Interventions made will help create a more robust and attractive pipeline of viable startups poised for scale-up and strengthen Rwanda's innovation capacity, contributing to wider job creation and productivity gains critical to COVID-19 recovery. Key activities to be financed include:

(a) **Support for enabling strategies, policies, and institutions for digital innovation.** Support will be provided to key institutions that support the innovation agenda, such as the MINICT, RISA, the Rwanda Development Board (RDB) and Kigali Innovation City (KIC), and include financing for targeted trainings, capacity building and TA, IT equipment, as well as operating costs associated with industry consultation.

(b) **Performance-based grants[78] for ESOs that serve digital startups,** which aim to encourage quality-based and self-sustaining ESO models that offer better services, and entrepreneurship support programs.

(c) **Launch of an international accelerator program that serves digital startups**, with financing support provided to attract a high-quality international player to the local market.

(d) **Early-stage finance mobilization for digital innovation,** including support for investment events, training programs and establishment of early-stage financing mechanisms. Early-stage financing instruments selected would be managed by the BRD, whereas other elements would be managed by RISA. Instruments selected could potentially serve as a fund-of-funds to catalyze private sector investment, whereby the project would contribute financing to capitalize the fund as well as overhead fees. The project will finance a feasibility study to determine the design of the early-stage financing mechanism, identify capacity gaps for implementation as well as advise on relevant capacity building for the BRD.[79]

Sub-component 3.2: Next generation capabilities for the digital economy. (US$7.50 million equivalent: of which US$3.75 million from IDA, US$3.75 million from AIIB)

45. **This sub-component will equip young Rwandans with advanced 21st-century digital skills, boosting local capacity to contribute to digital entrepreneurship and innovation.** A two-pronged approach will be adopted; on the one hand supporting wider access to digital skills within traditional TVET and tertiary education and supporting business-models for advanced digital skills provision on the other. By building the local digital talent pipeline and equipping Rwandans with advanced digital skills for jobs of the future, this sub-component will actively help stem the rise in unemployment expected on account of COVID-19. Key activities to be financed include:

(a) **Further development of the Rwanda Coding Academy (RCA)**, managed by the MINICT, allowing the RCA to scale and develop a more effective operating and training model.

(b) **Performance-based grants[80] for technology bootcamps** and other innovative digital technology skills training models that support their expansion and operations.

[78] Grant disbursement mechanism will be detailed in the RISA PIM.
[79] Disbursement mechanism will be detailed in the BRD PIM.
[80] Grant disbursement mechanism will be detailed in the RISA PIM.

(c) **PhD scholarships[81] for highly specialized digital training**, such as AI, robotics, blockchain, awarded on a competitive basis. Supported scholars will be required to support digital government initiatives.

Component 4: Project Management. (US$10 million equivalent: of which US$5 million from IDA, US$5 million from AIIB)

46. **This component will finance project management costs associated with administering the project, including core project management functions related to financial management (FM), procurement, M&E, Environmental and Social Framework (ESF) compliance, as well as project communications and coordination.** It will finance the (a) operational expenses and staffing costs of the Single Project Implementation Unit (SPIU) at RISA, and the satellite PIU at BRD, including costs of site visits, ICT services, advertising etc.; (b) IT equipment and software for implementation units linked to project management; (c) hiring of consultants in key areas such as project management, as well as M&E, communication, and auditing service, as needed; (d) capacity building and training for implementation units, as needed; (e) costs related to Environmental and Social Framework (ESF) compliance for the project, including preparation of related audits and plans, stakeholder consultation, resettlement costs and establishment of a functioning grievance management system. Support for the rollout of e-waste management will also be provided to mitigate adverse climate impact.

C. Project Beneficiaries

47. **The project will benefit individuals, businesses, and government:**

(a) **Individuals** across Rwanda, particularly women and rural communities, will benefit from wider opportunities to participate in the digital economy through activities that promote digital access and inclusion. For example, at least 3 million people will receive training in basic digital literacy at cell-level (with targets for women), at least 250,000 beneficiaries will receive support for smart device financing (with targets for women and rural areas), and local communities will benefit from new connectivity access points, particularly in rural areas. At least 2,000 young Rwandans will receive training in advanced and highly specialized digital skills through new digital training schemes, inter alia established at district level, and hundreds of civil servants will also receive targeted training. Individuals will also benefit from increased access to new and improved G2P e-services, including ID services and digital payments. For example, the project will aim to enroll and issue new ID credentials to 75 percent of the population.

(b) **Businesses** will benefit from (a) a growing digital-savvy and connected consumer base, (b) provision of new public infrastructure (e.g., new ID verification and authentication services), select new and improved G2B services and access to public data, (c) improved legal, regulatory and institutional frameworks, (d) strengthened digital talent, (e) increased access to early-stage finance and to networks of investors and startup mentors, (f) enhanced entrepreneurial and innovation support services, and (g) a secure environment for online operations. Direct beneficiaries will include Internet Service Providers (ISPs) and operators contracted for bandwidth capacity purchase, as well as local IT equipment and service providers, ESOs receiving grants, startups, and private digital skills providers located across the country. At least 300 digital start-ups will be directly supported by the project, with a focus on those that are female-owned.

(c) **Government** will enjoy cost savings stemming from digitization and automation of core administrative functions and improved service delivery. Unconnected Government offices, hospitals, health posts and

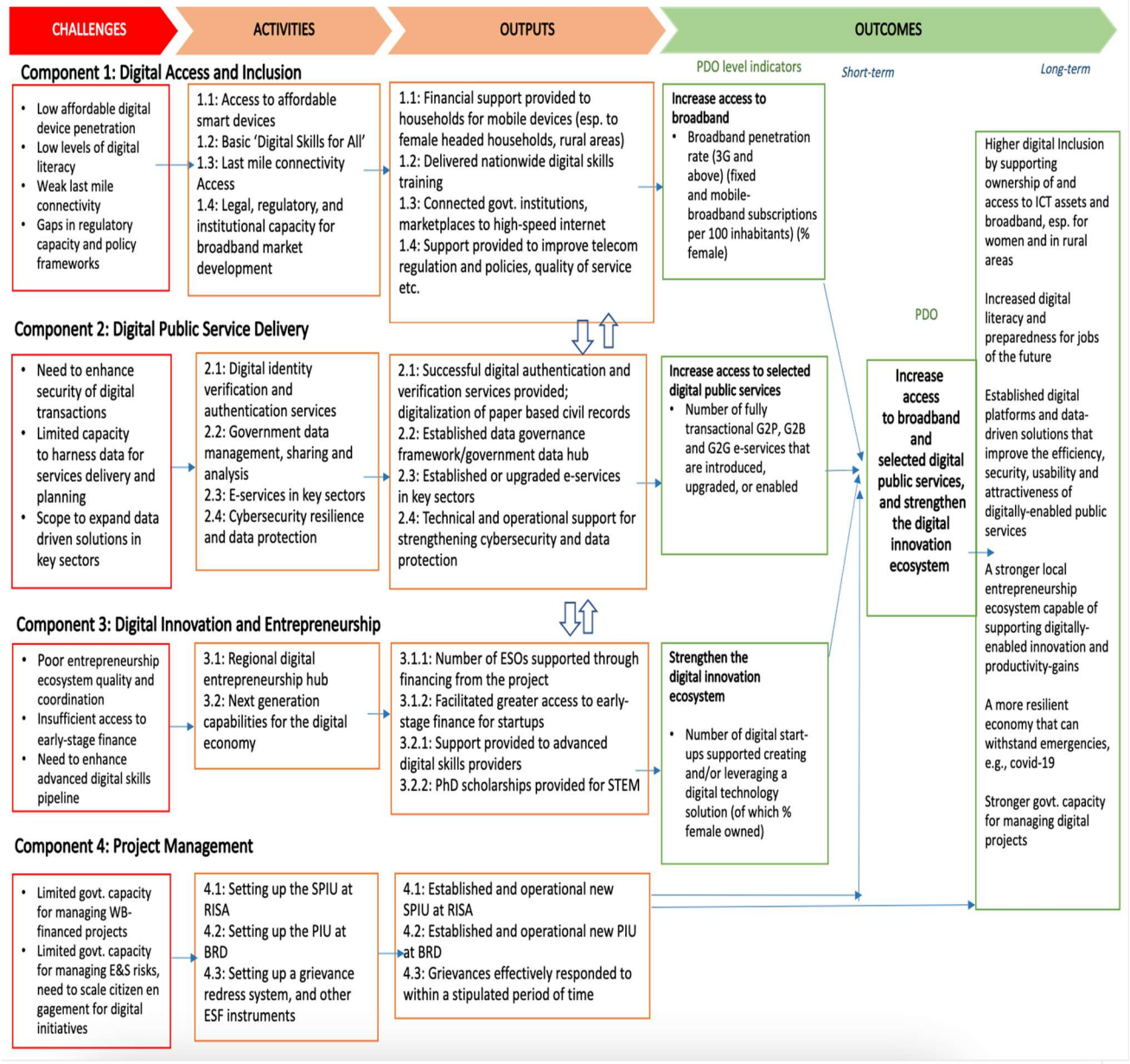
[81] Ibid.

public schools at cell and sector level, particularly those located in rural areas, will directly benefit through last-mile connectivity initiatives financed, with 2,500 new locations targeted and linked to a revamped government network and supplied with broadband. Several MDAs will benefit from capacity building, with at least 600 public sector officials trained, and through financed for e-services, with a particular focus on the health sector.

48. **The project places a strong emphasis on 'digital inclusion' and bridging the digital divide, by empowering women and girls, persons with disabilities, and vulnerable communities in rural and underserved areas.** Rwanda's lowest income-earning households will benefit from affordable device and connectivity access initiatives. IT equipment and software applications financed will include in-built accessibility features for persons with disabilities, where appropriate. Wi-Fi-hotspots will be designed to ensure access for women and persons with disabilities (e.g., through ramps to public offices connected, gender-appropriate locations, provision of required assistive tools such as screen readers, magnifiers where needed). Gender- and disability-sensitive approaches to digital skills programs will also be adopted (e.g. leveraging female-trainers and access-enabled devices). Schemes for startups will purposely support women-led businesses. Gender- and location-disaggregated data on connectivity will be recorded to track progress on key parameters of digital inclusion.

D. Results Chain

Figure 1: Theory of Change: Rwanda Digital Acceleration Project



Critical assumptions include: (a) The private sector is willing and able to expand provision of digital devices (b) Government readiness and commitment to enact legal and regulatory changes in the broadband market, regarding quality of service, spectrum management and others (b) Provision of public goods e.g. digital platforms and tools such as digital authentication and verification services can incentivise private sector players to invest in expanding digital services (c) The private sector has increasing capacity to absorb local specialised digital talent (d) The private sector is willing and able to provide funding for early stage financing for start-ups (e) The government is able to gather sufficient technical expertise to implement the various proposed activities.

E. Rationale for Bank Involvement and Role of Partners

49. **Public sector financing is appropriate as it will be used to (i) address market failures; (ii) support digital public goods and (iii) stimulate and/or crowd in the private sector in line with MFD principles**. Public financing will only be employed to the extent necessary to reach areas where private sector investment incentives are not adequate to provide connectivity without additional incentives, in line with MFD principles. The project will finance areas where market failures prevent private sector solutions or investment, in the absence of public sector funding or de-risking. This includes areas such as last-mile connectivity access, where the private sector investment incentive is insufficient to prompt further infrastructure expansion or provide connectivity at affordable prices, in the absence of greater demand.[82] This principle equally applies to the issue of mobile device access, where low purchasing power, high interest rates and high default credit risks prevent a purely private sector solution to the issue.[83] The project will also focus on reusable digital public goods, unsuitable for private financing such as digital ID and other trust services. Finally, the project will actively be stimulating private sector development through TA for upstream broadband and regulatory reform, as well as support for digital innovation and startups, and will closely coordinate with the IFC to ensure complementarities and opportunities to maximize MFD.

50. **The WB is well-positioned to support the digital sector, given its technical knowledge as well as prior track-record of advising the Client and investing in the main areas covered by the project.** For example, the WBG is home to a dedicated Global Solutions Group on "Broadband for All" and Identification for Development (ID4D) teams able to draw on experts and cutting-edge research. The recent DE4A diagnostic has informed project design. Moreover, the WB has a track-record of supporting digital development in Rwanda, including prior investments such as the eRwanda project (P098926) and the Regional Communication Infrastructure Project, Phase 2 (RCIP-2) – Rwanda project (P106369),[84] and similar operations regionally.

51. **The project identifies, leverages, and complements work done by other partners that continue to support digital development in Rwanda, thereby capitalizing on synergies and lessons learnt**. The WB has taken a leading role[85] in supporting donor and partner coordination. For example, it has worked closely with the United Nations Children's Emergency Fund (UNICEF) and International Telecommunication Union (ITU) on school connectivity, under the GIGA[86] initiative. Support for innovation and entrepreneurship complements existing interventions by Japan International Cooperation Agency, German Development Agency, French Development Agency and others, who are active in this space, as well as early-stage financing schemes supported by the African Development Bank (AfDB) that has also informed work on ID.

[82] As communities are both more geographically dispersed and have lower purchasing power. In this setting, public sector agencies can act as an anchor tenant, creating needed investment incentive.
[83] Private sector consultations confirmed that this would be the best way for Government to intervene, in addition to creating a more enabling regulatory environment that allows for greater infrastructure sharing that can help drive down prices of services offered.
[84] The eRwanda project closed in 2010 (US$10 million), whereas the RCIP-2 Project closed in 2015 (US$24 million).
[85] Through hosting joint sector meetings, discussions with key players and liaising with the government on creating a donor and partner mapping exercise.
[86] GIGA Initiative. See: https://www.unicef.org/innovation/giga

Project cost and financing

52. **The project will be co-financed by the AIIB with an additional US$100 million.**[87] Rwanda became a non-regional member of the AIIB in April 2020 and therefore eligible for AIIB financing.[88] The project is aligned with the AIIB's recently adopted Digital Strategy and existing Digital Infrastructure Strategy.[89] Moreover, this project would be the AIIB's first digital operation financed on the African continent, and thus represents a significant milestone for the AIIB, Rwanda and for the WBG's collaboration with the AIIIB. A detailed breakdown of project costs and financing covered by the AIIB and WB, respectively, is available in Table 1.

53. **A project preparation advance (PPA) agreement, in the amount of US$4.1 million, was signed on January 27, 2020 and became effective on March 8 that same year.** This PPA was WB-financed and has been leveraged to support the set-up of the SPIU at RISA (more on this in Section III), allowing RISA to hire the core SPIU team, including key technical experts, and prepare drafts of the main ESF instruments required for Board approval. It has also been leveraged to support a series of preparatory studies, including preparation of detailed activity plans and bidding documents, that will ensure higher implementation readiness.

54. **The project is expected to leverage private investment,** with the GoR acting as an anchor tenant in guaranteeing an income for investors that commit funds to building out their network in urban and rural areas to connect targeted locations and public institutions. The incremental additional investment to which the project will contribute is difficult to estimate upfront, as it will be determined by competitive bidding during implementation, but it is likely to be substantial given US$33.5 million of IDA financing committed to sub-components such as 1.3. Support for digital start-ups and innovators, including ESOs and early stage-financing, under sub-component 3.2, is also designed to stimulate private investment.

F. Lessons Learned and Reflected in the Project Design

55. **The project takes a comprehensive approach to stimulating digital adoption.** Global lessons point to the need for layered interventions that tackle all key access barriers related to affordability, readiness and relevance – including accessible broadband services access points, affordable data packages and mobile devices, digital literacy, attractive services - which inform project design. More novel areas such as device affordability will draw on research conducted with partners such as GSMA, Facebook Connectivity, and from experience of smartphone subsidy schemes[90], including related interventions in social protection projects, as well as asset-backed guarantees schemes for smartphones[91]. Related research shows that access to devices is becoming a major barrier to access, even where network exists.[92] Connectivity elements of the

[87] See: https://www.aiib.org/en/projects/details/2021/proposed/Rwanda-Digital-Acceleration-Project-Digital-Investment-for-Recovery-Resilience-and-Connectivity.html
[88] See: https://www.aiib.org/en/about-aiib/governance/members-of-bank/index.html
[89] See: https://www.aiib.org/en/policies-strategies/operational-policies/digital-infrastructure-strategy/index.html
[90] Example include: Full price of a device called Ascend Y21 was reverse subsidized by MTN Ghana, in the form of voice and data services over a 12-month period; Columbia allocated US$90 million for data and smartphones subsidies for low-income households; Malaysia launched a national program to encourage youth to purchase 3G-enabled smartphones with a rebate on certain phones reducing the cost by 40 percent.
[91] Examples include: "Plan Mobile Internet Access," offering a 12-month instalment plan to incentivize 8 million citizens to switch from 2G feature phones to 4G smartphones in Pakistan - a partnership between Tameer Bank, Telenor, and the Government of Punjab; Microfinance institutions in India offering 9-12-month loans at 18-22 percent interest to low-income women micro entrepreneurs to purchase smartphones.
[92] GSMA (2017), Accelerating affordable smartphone ownership in emerging markets. See:

proposed project leverage lessons learnt from a comparative analysis study of 70+ last-mile connectivity deployments[93], and the implementation of the Regional Communications Infrastructure Program (RCIP) series, including the RCIP-2 Rwanda project that closed in FY15, that has successfully leveraged similar models for pre-purchasing capacity based on IRUs. Moreover, the WBG has wide-ranging experience of working with countries to reform their telecom sectors, and developing regulatory capacity in emerging markets, featuring more recent projects in countries such as Colombia, Ghana, Malaysia, Pakistan, and India.

56. **The project pairs interventions that support a whole-of-government approach to government digitization with investment that mitigate growing risks associated with increasing digital adoption**. Investments that upgrade ID services are based on early lessons learnt from neighboring Uganda, which is also on track to introduce a digital authentication layer.[94] The operationalization of the NCSA is modelled after the Israeli National Cyber Directorate, drawing on prior bilateral knowledge exchanges, and its early cybersecurity activities are shaped by assessment, strategies and capacity building offered by the United Kingdom's Foreign and Commonwealth Development Office and the ITU.

57. **The project adopts a multi-pronged approach to strengthening the entrepreneurial ecosystem that provides a nudge to support market-based approaches.** The early-stage financing approach draws on successful models spearheaded in Tunisia (Startup Tunisia, Anava Fund), Israel (Yozma Fund) and Accreditation@SG, and aims to catalyze financing for innovative startups, incorporating key principles to avoid any market distortions. The design of the incubator and accelerator support activity is informed by prior assessments of various technology startup ecosystems, including a recent in-country assessment[95], and introduces performance-based funding, drawing on piloting developed for the preparation of the Kenya Industry and Entrepreneurship Project (P161317), as well as regional acceleration initiatives funded by the InfoDev Trust Fund. Support for demand-driven technology training providers, such as coding bootcamps, aims to catalyze this nascent market, based on learnings from the now-closed FY17 Technology Rapid Skills Training for Youth Employment initiative (P156294).

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

58. **RISA will serve as the main implementing agency (IA) of the project**: A SPIU has been set up within RISA[96] with PPA funding. The proposed SPIU structure is aligned with guidelines provided by the Ministry of Public Service and Labour (MIFOTRA), and WB requirements and capacity assessments. The SPIU will lead implementation of most of the project's sub-components, barring some activities within sub-components 1.1 and 3.1, whose implementations will be led by the BRD (see below). The SPIU will oversee core project-related fiduciary functions, including financial management (FM), procurement, as well as project-related M&E, and environmental and social (E&S) commitment management in respect to the sub-components being implemented by RISA, and will also consolidate overarching project reporting, working in close collaboration with the BRD. Related arrangement will be defined by an inter-agency memorandum of understanding (MoU), between RISA and the BRD. See Figure 2. The SPIU will be staffed with requisite

https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/07/accelerating-affordable-smartphone-ownership-emerging-markets-2017.pdf

[93] World Bank (2020), Innovative Business Models for Expanding Fiber-Optic Networks and Closing the Access Gaps study

[94] Uganda is developing a "buy-it-as-a-service" e-signature capability, financed through the World Bank.

[95] WB (2020), REU-15

[96] See: www.risa.rw/home

experts, including a dedicated Project Coordinator, FM, Procurement, Environmental, Social, and M&E specialists, as well as technical specialists in the various areas covered by the project that will act as liaisons with core technical partners on a day-to-day basis (see next paragraph). A majority of envisioned SPIU staff have already been hired, while recruitment of an FM specialist (which will be required for project effectiveness), an M&E specialist, an additional E&S specialist, additional procurement support staff, and some technical experts is on-going. The project will ensure that technical experts hired transfer and provide hands-on training to RISA staff to ensure sustainability after project closure.

59. **RISA will work closely with a handful of core partner MDAs.** RISA will work closely with six key MDA-partners that are envisioned as the main beneficiaries and technical partners for planned investments, which have been actively engaged in shaping project design. These include (i) RURA (for sub-component 1.4 – regulatory support), (ii) NIDA (for sub-component 2.1 – ID services), (iii) MINEDUC (for select activities under sub-components 1.2 – digital skills framework, 1.3 – school connectivity, and 3.2 – quality assurance of advanced digital skills training), (iv) MOH (for select activities under sub-components 1.3 – connecting hospitals, 2.2 – selected big data use-cases in health and 2.3 – flagship e-health initiative), (v) NCSA (for sub-component 2.4 – cybersecurity), and (vi) RDB (for sub-component 3.1 – digital entrepreneurship). These MDAs are expected to contribute technical inputs on a day-to-day basis, working closely with the technical specialists embedded in the SPIU, including supporting RISA on technical aspects of procurement-related processes, aid in quality assurance and validation of key deliverables, and provide input needed to support effective M&E framework management and reporting. Detailed roles and responsibilities, and terms of engagement will be captured in the project implementation manual (PIM) being drafted that will be finalized ahead of and be due by project effectiveness, on the basis of which MoUs will be established between the SPIU and partner MDAs, at the start of the project implementation, as needed.

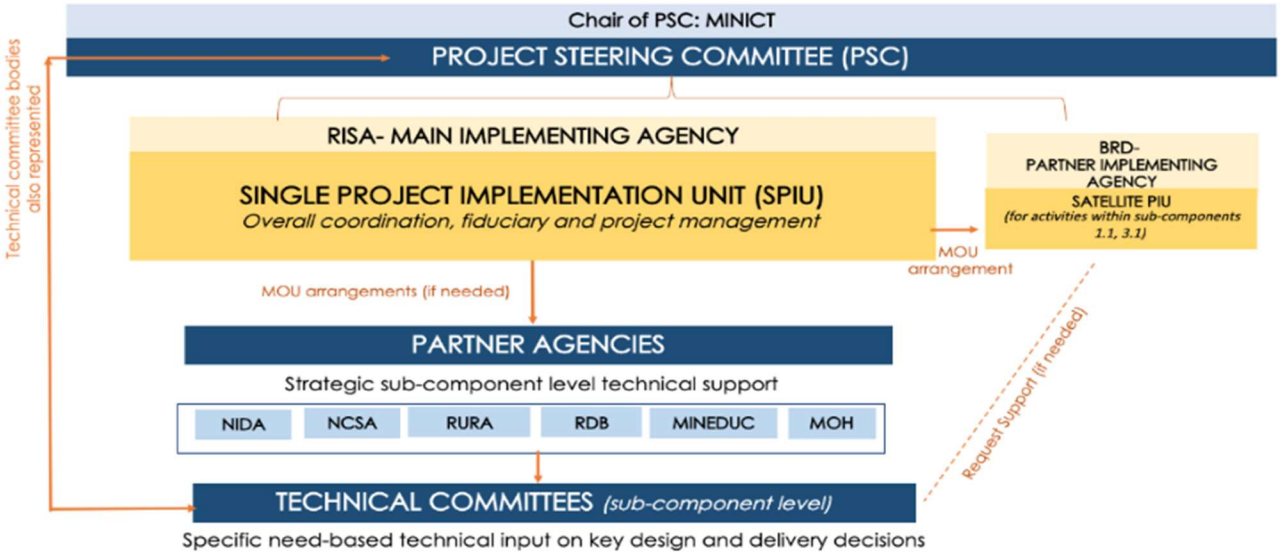
60. **The BRD will serve as an IA for a sub-set of project activities.** Specific activities under sub-components 1.1 (device financing) and 3.1 (early-stage and innovation financing) will be implemented by the BRD, given the nature of the activities in question, BRD's mandate and track record of managing similar funds, allowing the project to leverage the BRD as a financial intermediary (FI) to support related fund administration. A subsidiary legal agreement between Ministry of Finance and Economic Planning (MINECOFIN) and BRD will be signed. However, release of project funds to the BRD will be conditioned to the successful completion of a detailed Financial Intermediary Framework (FIF) assessment to ensure alignment with the WB FIF policy and drafting of an activity-specific PIM for the BRD. A satellite PIU will be set-up at the BRD, at a minimum comprising of a Coordinator, Procurement, FM, and two E&S specialists, with additional staff likely to include one or more investment officers, a legal counsel, and an administration and liaison officer. Based on capacity assessments conducted, a Coordinator would need to be appointed but Procurement, FM and E&S staff can be shared with existing WB-projects at the BRD, whereas the need for other staff will be determined by on-going feasibility studies. This should be documented in the PIM. The BRD is a suitable partner, as it is currently supporting several WB-financed projects, and familiar with WB guidelines and processes. Specifically, the BRD has experience of analyzing risk and managing loan guarantee programs and has the mandate to establish additional specialist FIs. There is, however, a need to strengthen the BRD's capabilities on the risk capital side. Capacity building to strengthen this function will be provided through the project (see Annex 9 for more details).

61. **A dedicated Project Steering Committee (PSC) will provide strategic oversight of the project, chaired by the MINICT.** The mandate of the PSC will include (i) approval of annual budgets and work plans; (ii) quarterly review of project progress; and (ii) provision of strategic guidance and recommendations related to project

implementation and/or any restructuring needed. The PSC will be chaired by the MINICT[97] and the Chief Executive Officer (CEO) of RISA will serve as its Secretary. Its members will include NIDA, RURA, NCSA, BRD, and RDB (required for quorum), and the MOH, MINEDUC, Ministry of Local Government (MINALOC), attending on an as needed basis. Other MDAs may also be invited to observe on the PSC to increase project buy-in and participation. In addition, the PSC will include representatives from the private sector through the Private Sector Federation-ICT Chamber to facilitate continuous dialogue with the private sector. In the event of disagreements at PSC-level, arbitrage will be provided by the MINICT. The Terms of Reference (ToR) for the PSC will be detailed further in the PIM.

62. **The RISA SPIU and BRD will be supported by a series of technical committees (TCs), as needed, to address any key ad hoc technical issues that emerge.** These dedicated sub-component specific TCs will convene relevant government MDAs deemed key to supporting successful implementation and stakeholder management and to support key technical-level decisions that require broader agreement. TCs can escalate issues, as needed, to the PSC if they require strategic discussion. TC meetings will be chaired and called by relevant RISA SPIU technical specialists. A member of the BRD PIU will call and chair any TC meetings related to device financing. The ToRs for TCs, including expected membership, will be detailed further in the PIM. A select number of expected TC members will also be represented on the PSC, as they play a consistent role across the project's sub-components and activities.

Figure 2: Project implementation arrangements



B. Results Monitoring and Evaluation Arrangements

63. **The RISA SPIU will be responsible for monitoring achievement towards the PDO and intermediate indicators, based on the Results Framework detailed in section VII.** It will do so by ensuring that the SPIU is staffed with an M&E expert, tasked with coordinating M&E centrally (for all project activities across components, including those managed by the BRD), and by ensuring that an adequate M&E system is established based on the M&E plan detailed in section VI. The status of project implementation will be documented in progress reports prepared on a semi-annual basis and submitted to the WB for review by

[97] Represented either by the Minister or delegated to the Permanent Secretary.

RISA and BRD, where reporting will be centralized to the degree possible by RISA. These will include updates on results, disbursements, FM, M&E, procurement, and E&S compliance.

64. **In-built systems for tracking results and satisfaction surveys will be leveraged to support citizen engagement and solicit beneficiary feedback.** Related tools will be embedded directly into project delivery to ensure feedback in real time, using digital tools and systems to register beneficiaries and report their feedback (e.g., using tablet-based or rapid mobile/short message service survey tools). Beneficiary focus groups will also be leveraged to inform design and track progress over time.

C. Sustainability

65. **The project's sustainability will be ensured by using private sector-led and market-based mechanisms for resource allocation to digital connectivity and digital entrepreneurship, and by supporting capital investments in shared public infrastructure/platforms that can reduce the long-run costs of public services delivery.** Project sub-component targeting digital connectivity and access will (i) address market failures, and (ii) stimulate demand that can mobilize greater private sector financing, create new markets in underserved and low-income market segments where none currently exist. Legal, regulatory, and institutional support will be focused on creating an enabling environment that will outlive the project's lifecycle. Project-funded capital investments in new digital public infrastructure and systems are designed to factor in the need for long-run maintenance. For instance, the proposed "whole-of-government" approach allows for more sustainable investment than maintaining several individual siloed information systems. Finally, investing in human capital through skill development programs and knowledge transfers with government staff will help build capabilities that will also outlive the project's lifecycle. Continuous efforts are already underway to liaise with external partners and donors that could further support continuation of project activities (maintenance, operational expenses etc.) post-completion.

Table 2: Sustainability mechanisms by component

Component	Sustainability Mechanisms
Component 1: Digital Access and Inclusion	• Digital access initiatives, including schemes for affordable smart devices, public connectivity access points and digital skills programs will create a wider digital consumer base, boosting demand, incentivizing expanded and continued digital services provision by the private sector. • Digital literacy scheme launched will be redesigned as an umbrella initiative, aimed at also crowding in additional partners (including private and non-profit providers, donors). • Access to broadband for targeted public institutions and locations will be facilitated through a competitive bidding process that awards long-term supply contracts for internet capacity to winning bidders. Cost-recovery, featuring progressive hand-over of OpEx to MDAs at sectoral level, will also be leveraged. • Trained staff within the industry regulator, MINICT and RISA will be retained after project closing.
Component 2: Digital Public Service Delivery	• The shared infrastructure, platforms, and services approach will allow for significant savings compared with each MDAs maintaining independent IT infrastructure, platforms, and applications, though continious funding will be needed for operations, maintenance, and upgrading. • Phased transfers of OpEx costs emanating from World Bank-supported activities. • Capacity built in training of government officials within MDAs will be retained after project closing.
Component 3: Digital Innovation	• Performance-based grants designed to prompt more sustainable ESO models.

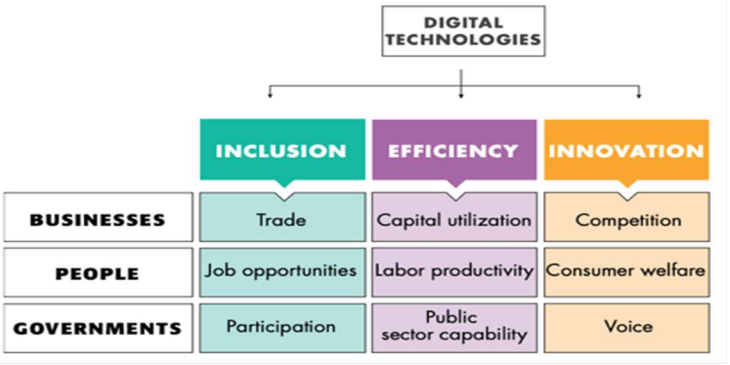
Component	Sustainability Mechanisms
and Entrepreneurship	• International accelerator to collaborate with local partners to allow for knowledge transfer and local ownership and demonstrate self-sustainability by year 5 of the project. • Interventions to catalyze market-based approaches to boost early-stage finance.
Component 4: Project Management	• Implementation will leverage existing structures/teams/processes wherever possible to avoid creating an additional burden on the government. • Capacity building within the government through training would allow for sustainable continuation of the activities beyond the project lifecycle.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

66. **The project is expected to contribute to sustainable economic growth, through long-term cost-savings, efficiency, and productivity gains, fueled by greater digital adoption by citizens, businesses, and government.**[98] Greater adoption of digital technologies can enable *inclusion*, as people gain access to new and improved services that were previously out of reach, enabling wider participation in an increasingly digitized economy. It can also help *efficiency,* by reducing the transaction and operational costs associated with both delivering and accessing public and commercial services. Digital *innovation* and adoption of technology among businesses can support new business models that increase competition, productivity, and yield, with increasing returns to scale. (Figure 3)

Figure 3: Benefits of digital technologies through increased inclusion, efficiency, and innovation[99]



67. **Increased broadband adoption, supported under component 1, is estimated to stimulate GDP and job growth.**[100] Research suggests that a 10 percent increase in broadband penetration in developing countries is associated with a 1.4 percent increase in GDP. Likewise, the ITU[101]estimates that the number of jobs can be expected to increase by between 0.2 and 0.4 percent for every 1 percent increase in broadband penetration.

68. **Greater government digitization and investment in public goods, supported under Component 2, is expected to yield cost savings and efficiency gains.** Use of digital technologies are expected to reduce

[98] WB (2016), World Development Report, Digital Dividends
[99] Ibid
[100]Kim, Y., Kelly, T., & Raja, S. (2010), Building broadband: Strategies and policies for the developing world. Washington DC: World Bank.
[101] International Telecommunication Union (ITU) (2019), Economic Contribution of Broadband, Digitization, and ICT Regulation: Econometric Modelling for Africa

transaction costs by lowering the time spent on manual processing, allowing public sector staff to focus on higher value tasks. Numerous examples of savings from a reduction in errors, fraud and corruption (EFC)[102] are also expected to apply. A 'build once re-use always' approach will reduce the incremental costs of offering each new service, through capital investments in shared public infrastructure, platforms, and services. Investments in trust services and stronger cybersecurity prevention are also expected to stem related economic losses, which were as high as US$6.6 million in 2018. Each dollar invested in cybersecurity is expected to yield an economic return of approximately 9.1 percent.[103]

69. **Strengthening the entrepreneurship ecosystem, supported under Component 3, is expected to increase digital startups' performance, and generate employment opportunities.** All top ten countries in the Global Innovation Index also exhibit high GDP growth rates.[104] Activities geared towards strengthening innovation ecosystem support services are therefore expected to translate into increased outputs (goods, services). For example, a 2017 InfoDev assessment found that startups supported by ESOs (Africa's mLab) have achieved much higher survival rates (84 percent) and created a substantial number of jobs. Studies confirm that early-stage capital positively affects (a) the number of startups, (b) employment, and (c) aggregate income.

70. **The project-level economic and financial analysis undertaken follows a standard Cost-Benefit Analysis (CBA) approach and reveals a positive Net Present Value (NPV).** The model relies on available secondary data and reasonable assumptions, based on prior experience, but also additional evidence sourced from consultations and interviews conducted. The model was used to run a cash flow and financial analysis that features three different scenarios: Optimistic, Pessimistic and Neutral. Where possible, the model also ran sensitivity assessments to quantify the benefits and costs attributable to the project against current baseline indicators. Based on this CBA, the overall NPV for the project in the neutral scenario is estimated at US$92 million at a discount rate of 16.5 percent[105] and is expected to demonstrate an IRR of 37 percent over a ten-year period. In optimistic and pessimistic scenarios, the NPV is expected to be US$194 million and US$15 million, respectively, whereas the IRR is expected to be 53 percent and 20 percent, respectively. See Annex 3 for a more detailed economic analysis.

B. Fiduciary

(a) Financial Management

71. **The FM risk is 'moderate'.** An assessment of the FM arrangements at RISA and the BRD was carried out and confirmed during project appraisal, in compliance with WB policy and directives on investment project financing (IPF). The aim of the assessment undertaken was to determine whether the implementing entities have acceptable FM arrangements to ensure that (a) funds will be used for their intended purposes in an effective, efficient, and economical way; (b) financial reports will be prepared in a reliable, accurate and timely manner; and (c) project assets will be appropriately safeguarded. Key risks identified, based on the assessment of RISA, include (a) lingering staffing gaps in FM and internal audit, including a dedicated FM specialist for the RISA SPIU (for which recruitment is still in progress), which will be needed to absorb the additional workload generated by the project; and (b) inadequate and delayed implementation of external and internal audit recommendations. Risk mitigation measures proposed include: (i) recruitment of one

[102] ID4D (2018), Public Sector Savings and Revenue from Identification Systems: Opportunities and Constraints. Report. Washington, DC: World Bank Group
[103] Integrating cost–benefit analysis into the National Institute of Standards and Technology (NIST) Cybersecurity Framework via the Gordon–Loeb Model.
[104] Global Innovation Index (2019)
[105] World Bank Data, Lending interest rate for Rwanda.

additional FM specialist by RISA ahead of project effectiveness; (ii) development of detailed FM guidelines for the project, as part of the PIM; and (iii) continuous customized (in person and virtual) training and support to FM and internal audit staff at RISA, as needed, both prior to effectiveness and during project implementation. Meanwhile, the existing FM arrangements of the BRD provide reasonable assurance that the financing proceeds will be used for their intended purpose in a transparent, effective, and efficient manner. The BRD is experienced in the implementation of WB-financed projects (including the Renewable Energy Fund (REF), Rwanda Housing Finance Project, and Social-Economic Inclusion of Refugees and Host Communities in Rwanda Project). Responsibility for FM must be assigned to a specialist at the BRD, but this could be a shared resource, as current FM capacity is deemed sufficient to manage activities envisioned. Potential need for additional FM staff will be revisited during implementation.

72. **The arrangements for project oversight and accountability are acceptable.** These arrangements comprise of (a) management oversight at RISA and BRD; (b) internal oversight bodies in the form of internal audit functions and audit committees at both RISA and BRD; and (c) external oversight bodies (in the form of Private Audit Firms, recognized by the Institute of Public Certified Accountants of Rwanda, that will audit project activities carried out by the BRD and that will provide separate audit opinions for these activities; while the project activities undertaken by RISA shall be audited by the Office of the Auditor General (OAG), where Parliament also reviews the OAG's audit reports and approves the Government's budget, including for the project). Monthly financial reports are prepared by RISA and submitted to the MINECOFIN for internal monitoring.

73. **Funds flow arrangements.** Proceeds of the financing will flow from the WB directly to RISA and BRD. RISA shall open a Designated Account (DA) in US dollars at the National Bank of Rwanda (BNR). BRD shall open a DA in US dollars at the BNR, or a commercial bank approved by the WB, and shall also open a project account in Rwandan Francs (FRW) at a commercial bank approved by the WB. Disbursements will follow the Interim Financial Report (IFR)-based method. However, the project may also use direct payments, the transaction-based Statement of Expenditure method, reimbursement, and special commitments on a case-by-case basis, as required. Upon effectiveness, each of the project's IAs will submit a request for withdrawal of funds to the WB, accompanied by a six-month cash forecast. More information can be found in Annex 1.

(b) Procurement

74. **The Procurement risk is 'moderate'**, based on early implementation of many recommended mitigation measures. RISA is expected to undertake most project-related procurement, whereas procurement activities undertaken by the BRD will be limited in scope and feature lower-value contracts. A procurement assessment of both RISA and the BRD has been carried out by the WB. The key risks identified in relation to RISA's procurement capacity include (a) slow staffing of the SPIU (while a dedicated Procurement Specialist has been hired, more support staff may be needed to ensure timely procurement processing and contract management); (b) weak familiarity with World Bank procurement regulation and weak experience of implementing World Bank-financed projects; (c) potential for high staff turnover due to lower salary scales and short contract duration; and (d) weak competition for project-related contracts, inter alia due to the highly technical nature of items being procured under the project. Risk mitigation measures instituted include: (i) recruitment of further SPIU procurement staff, prior to project effectiveness (on-going); (ii) capacity building and trainings for the SPIU at RISA (on-going); (iii) negotiation with MINECOFIN and MIFOTRA to offer competitive salary scales (on-going) and longer contract lengths; and (iv) sensitization

workshops for potential bidders and wider publication of invitation for bids / requests (planned). As noted above, the BRD is more familiar with managing WB financed projects. However, an additional procurement specialist will need to be hired by the BRD to accommodate activities proposed.

75. **Procurement for the proposed project will be carried out in accordance with the 'WB Procurement Regulations for Borrowers under Investment Project Financing', dated November 2020 using STEP.** The project will be subject to the WB's Anticorruption Guidelines, dated July 1, 2016, and beneficiary disclosure requirements. The project will use the Systematic Tracking of Exchanges in Procurement (STEP), a planning and tracking system that will provide data on procurement activities, establish benchmarks, monitor delays, and measure project procurement performance.

76. **A Project Procurement Strategy for Development (PPSD) has been developed** to understand the implementation context market, and identify associated risks to achieving value for money and project development objectives. The PPSD sets out the selection methods to be followed in the procurement of Goods, Works, and Non-Consulting and Consulting Services financed under the project. The underlying Procurement Plan will be updated at least annually, or as required, to reflect project implementation needs and institutional capacity, which will also be informed by market-sounding that may be conducted as needed during project implementation. More information can be found in Annex 1.

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

D. Environmental and Social

77. **The environmental and social risks are both rated as 'moderate'.** Direct environmental risks identified are predictable, reversible, and site-specific – with a low probability of serious adverse effects on human health and the environment. Most activities financed involve installation of "soft" digital infrastructure, as opposed to "hard". While last-mile connectivity initiatives are likely to result in the physical deployment of connectivity infrastructure, these are not expected to result in large-scale civil works and/or permanent disruptions with adverse environmental impact. Key risks identified include e-waste generation and increased energy consumption, which will be mitigated through e-waste provisions financed, and application of energy-efficiency requirements in procurement undertaken. The project will facilitate the installation of 30 new decentralized e-waste collection facilities across the Country (one per district) and cover their maintenance cost for the first 12 months. Overall, the expected social impact stemming from the project is expected to be positive. The project is consciously addressing the issue of social inclusion, through its focus on rural and underserved areas, targeting of low-income households, as well as access requirements for women and persons with disabilities. In this vein, the project will also ensure that the needs and voices of vulnerable people are heard through inclusive participation and access to services financed.[106] The project is likely to involve minimal land acquisition and impact on community property. For more detail, see the Appraisal Environmental and Social Risk Summary disclosed.

[106] The SPIU will also be liaising with key lead MDAs in respect to related needs. See Annex 1.

78. **Several ESF instruments have been prepared.** A Stakeholder Engagement Plan (SEP) and Environmental and Social Commitment Plan (ESCP) were prepared and disclosed by RISA on September 3, 2021. The SEP and ESCP were disclosed by the WB on July 13 and October 26, 2021 respectively. Stakeholder consultations were conducted in the capital city Kigali as well as all the 30 districts of Rwanda between October and December 2020, and January and May 2021. An Environmental and Social Management Framework (ESMF), a Resettlement Policy Framework (RPF), and Labour Management Procedures (LMPs) have been developed by RISA, which have been cleared and disclosed by the WB on November 4, 2021 and disclosed by RISA on November 5, 2021.[107] The ESMF prepared will guide the screening and preparation of site-specific Environmental and Social Assessments and Environmental and Social Management Plans, whereas the RPF will guide the preparation of Resettlement Actions Plans (RAPs), prepared by RISA, and submitted to the WB for review and clearance, where required. The project-affected persons shall be fairly compensated before the start of any civil works, where required, as per cleared RAPs. The need for site-specific instruments will be reviewed as part of ongoing project supervision during implementation. In addition, the task team will ensure that RISA (and the BRD) are both familiar with the WB's incident reporting and management framework, should related incidents occur. The project will utilize the WBG's Environment, Health and Safety Guidelines (EHSGs) for telecommunication and general EHSGs.

79. **ESS 9 applies to this operation as the BRD will serve as an IA and FI.** The BRD has an existing Environmental and Social Management System (ESMS) in place, which was recently updated (September 2021) to cover all active and pipeline WB-funded operations. A final draft has been submitted to the WB and is on track to be cleared by project approval. Key gaps identified and bridged as part of this exercise included provisions for the screening of FI sub-projects, monitoring and reporting, and staffing. Two senior E&S Risk Management specialists have also been recruited by the BRD to strengthen its internal safeguard's capacity, which can be leveraged for this project but need to be formally assigned to do so. At appraisal, no additional FIs were identified. These will be determined by preparatory studies conducted under the PPA, which will inform an FIF assessment and activity-specific PIM for the BRD. No funds will be disbursed to the BRD until these and the ESMS are completed and have been cleared by the WB.

80. **Citizen engagement.** The design and delivery of project activities (specifically components 2 and 3) will be based on feedback collected from end-users or beneficiaries, annually. Several citizen engagement indicators will be tracked: (i) "Percentage of people accessing new e-services supported through the project and reporting satisfaction (of which percentage female)" will ensure that feedback actively shapes e-services financed, (ii) "percentage of project beneficiaries (startups) reporting satisfaction with incubation and acceleration services received" will measure the quality of project interventions and impact related contracting; and (iii) "percentage of grievances registered that receive an adequate response within 30 days" will ensure timely resolution of grievances.

81. **The project will set up a dedicated Grievance Redress Mechanism (GRM) for people to report their concerns or complaints before project activities commence.** The project will ensure that the GRM is equipped to register and respond to complaints related to project activities, including resettlement (if any), and suited to addressing more sensitive grievances, including those related to gender-based violence and sexual exploitation and abuse. A grievance committee will address complaints, which will be logged,

[107] For ESF instruments disclosed by RISA see : https://www.risa.rw/home/#publications; and by the WB see: https://projects.worldbank.org/en/projects-operations/document-detail/P173373?type=projects

tracked, and promptly resolved during and after project implementation. A social survey also will be leveraged to ensure that the GRM is accessible to all.

V. GRIEVANCE REDRESS SERVICES

82. **Communities and individuals who believe that they are adversely affected by a WB supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS).** The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the WB's attention, and WB Management has been given an opportunity to respond. For information on how to submit complaints to the WBG's corporate GRS, please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service. For information on how to submit complaints to the WB Inspection Panel, please visit www.inspectionpanel.org.

VI. KEY RISKS

83. **The overall project risk is rated as 'moderate', driven by moderate risks across the majority of categories**.

84. **Institutional capacity for implementation risk is rated as 'substantial'.** While the GoR does have prior experience with implementing WB-financed projects in this sector, the project size is now considerably larger and being implemented under a new institutional set-up, with more MDAs involved. While RISA, the main IA, does have a successful track record of implementing donor-funded, complex digital projects, the agency has no prior familiarity with WB financing and/or procedures. Ongoing set-up of the SPIU at RISA and recruitment of high-caliber SPIU staff[108], leveraging the approved PPA, is seen as critical to active risk mitigation. However, the project is also expected to rely on several other MDAs, at central and local level, to ensure successful delivery, where capacity gaps may be larger. Related risks will be mitigated through training, change management and capacity building for core partner agencies. However, the number of MDAs involved does still infuse higher risk related to implementation capacity, leaving residual risks as substantial.

85. **'Other' risks associated with COVID-19 are rated as 'Moderate'**. The national vaccination campaign is gaining momentum: As of September 2021, Rwanda has fully vaccinated 13 percent of its population (60 percent in Kigali) against COVID-19[109], and is on track to achieve the country's target to vaccinate 30 percent of Rwandans by the end of 2021 and 60 percent by 2022. Locally, restrictions are therefore beginning to ease, and are thus not expected to adversely impact project activities such as in-person digital skills training delivery in the short-term. However, delays in vaccine availability could continue to necessitate social distancing policies and perpetuate the risk of a new wave of cases, prompted by the possible spread of more transmissible variants. Moreover, the pandemic's effect on global supply chains, and lingering restrictions on international travel could also adversely impact the project. Given the highly technical nature of many project activities, it is expected to rely heavily on external experts, consulting firms in many areas as well as

[108] Discussions are ongoing with MINECOFIN and MIFOTRA to ensure that competitive salaries can be offered to attract and retain to staff the SPIU, which will help support knowledge transfer and should also help mitigate this risk.
[109] Rwanda Biomedical Center (RBC), Daily COVID-19 updates. See: www.rbc.gov.rw

international suppliers *inter alia* for IT equipment, where delays in delivery could be expected. Related risk mitigation measures have been embedded into both the PPSD and ESF instruments prepared. COVID-19 risk is to be regularly reassessed, as the context continues to evolve quickly.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework
COUNTRY: Rwanda
Digital Acceleration Project

Project Development Objectives(s)

To increase access to broadband and selected digital public services, and strengthen the digital innovation ecosystem

Project Development Objective Indicators

Indicator Name	PBC	Baseline	End Target
Increase Access to Broadband			
Broadband penetration rate (mobile + fixed) (Percentage)		19.34	31.00
Mobile broadband penetration rate (Percentage)		19.20	30.00
Fixed broadband penetration rate (Percentage)		0.14	1.00
Of which female (Percentage)		0.00	40.00
Increase Access to select Digital Public Services			
Fully transactional G2P, G2B and G2G e-services that are introduced, upgraded, or enabled (Number)		0.00	30.00
Strengthen the Digital Innovation Ecosystem			
Digital startups supported creating and/or leveraging a digital technology solution (Number)		0.00	140.00
Of which female-owned (Percentage)		0.00	30.00

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	End Target
Digital Access and Inclusion			
Beneficiaries that receive support under the smart device financing scheme (Number)		0.00	250,000.00
Of which female beneficiaries (Percentage)		0.00	50.00
Of which beneficiaries in rural areas (Percentage)		0.00	30.00
People trained in digital literacy (Number)		0.00	3,000,000.00
Of which female (Percentage)		0.00	40.00
Additional internet access points established (connected govt. offices, schools, hospital and marketplaces etc.) (Number)		0.00	2,500.00
Of which located in rural areas (Percentage)		0.00	75.00
Digital Public Service Delivery			
Population enrolled and issued a new digital ID credential (either a physical card or a virtual equivalent) (Percentage)		0.00	75.00
Of which female (Percentage)		0.00	40.00
Children enrolled (Percentage)		0.00	50.00
Cybersecurity standards, compliance and audit framework published (Yes/No)		No	Yes
Public sector officials trained in digital skills (Number)		0.00	600.00
Citizen engagement indicator: People accessing new e-services supported through the project and reporting satisfaction (Percentage)		0.00	75.00
Of which female (Percentage)		0.00	50.00
Data Controllers and Processors that are listed in the DPO		0.00	100.00

Indicator Name	PBC	Baseline	End Target
Register (Number)			
Datasets publicly available for download in the Government Data Hub (Number)		0.00	400.00
Percentage of successful identity verification and digital authentication services provided in the context of service delivery to population 5 years and above (Percentage)		0.00	75.00
Digital Innovation and Entrepreneurship			
Startups supported through the project (Number)		0.00	300.00
Graduates from specialized digital skills training employed or in education within 12 months after completion (Percentage)		0.00	75.00
Of which female (Percentage)		0.00	35.00
Citizen engagement indicator: Startups reporting satisfaction with incubation and acceleration services received (Percentage)		0.00	75.00
Project Management and Institutional Coordination			
Citizen engagement indicator:Grievances registered that receive an adequate response within 30 days (Percentage)		0.00	75.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Broadband penetration rate (mobile + fixed)	This indicator measures both fixed and mobile broadband internet subscriptions. The	Quarterly	Statistics report for the telecom, media and	Data collected from telecom operators through RURA	SPIU-RISA

	penetration rate is defined as subscriptions per 100 people (total number of subscriptions, divided by population), as per RURA's current definition. Fixed broadband subscriptions include those on digital subscriber lines (DSL), fiber-to-the home/building, satellite broadband, terrestrial fixed wireless broadband, and other fixed wired-broadband networks. Mobile broadband subscriptions include those on 3G, 4G, and above (if/when launched). EDGE and GPRS technologies are not included. To be counted, subscriptions need to be active e.g. SIM cards subscribed to broadband and that provided revenue to the operator within the last 90 days.		broadcasting sector, RURA		

Mobile broadband penetration rate	Supplemental indicator. Mobile broadband only includes 3G and 4G (EDGE and GPRS is not included)	Quarterly	Statistics report for the telecom, media and broadcasting sector, RURA	Data will be collected from telecom operators by RURA	SPIU-RISA
Fixed broadband penetration rate	Supplemental indicator. Fixed broadband subscriptions include those on digital subscriber lines (DSL), fiber-to-the home/building, satellite broadband, terrestrial fixed wireless broadband, and other fixed wired-broadband networks	Quarterly	Statistics report for the telecom, media and broadcasting sector, RURA	Data will be collected from telecom operators by RURA	SPIU-RISA
Of which female	Supplemental indicator.	Quarterly	Statistics report for the telecom, media and broadcasting sector, RURA	Data will be collected from telecom operators by RURA	SPIU-RISA
Fully transactional G2P, G2B and G2G e-services that are introduced, upgraded, or enabled	Fully transactional is defined as being supported through end-to-end digitization – i.e. that the process is paperless and cashless – and therefore does not require any physical presence to enable access or usage.	Bi-Annual	Surveys and project reports, including data published by IREMBO	Data will be collected through centralized reporting by RISA, leveraging RISA's network of decentralized Chief Information Officers at sectoral level, with	RISA SPIU

	This indicator measures three categories of e-services that can be directly attributed to the project: (a) New e-services that are introduced as a result of project financing. This, for example, includes paper-based services that are now digital; (b) Existing e-services that have been upgraded as a result of project financing. This includes e-services that previously where only partially digitized but have been upgraded through the project to achieve end-to-end digitization; and/or (c) E-services that where enabled by project financing because they make use of at least two or more shared solutions financed through the project. Examples of shared solutions to be financed by the project include digital identity verification and authentication mechanisms, interoperability through the			input from MDAs.	

	Enterprise Service Bus, use of datasets and/or analytics available through the Government Data Hub, and/or any data hosting financed etc.				
Digital startups supported creating and/or leveraging a digital technology solution	This indicator will count of number of startups that are directly or indirectly supported through the project e.g. through the ecosystem support services financed, and/or any of the startup financing initiatives supported under the project. A digital solutions refers to a digital good or service offered to customers (B2P, B2B or B2G), but also includes analogue goods or services that are enabled by a digital solution.	Bi-Annual	Surveys and project reporting	Data will be collected by RISA from ESOs and other entities contracted and/or supporting startups that receive project financing, with input from relevant MDAs such as RDB, BRD and KIC.	RISA-SPIU
Of which female-owned	Supplemental indicator. This indicator will apply the IFC's definition of women-owned enterprises, which	Bi-Annual	Surveys and project reporting	Data will be collected from ESOs and other entities contracted and/or supporting startups that receive	RISA-SPIU

	includes firms where (i) a woman/women has/have a 51 percent or more ownership stake, or greater than or equal to 20 percent; (ii) 1 or more woman/women is/are the CEO/COO (President/Vice President); or (iii) 30 percent or more of the board of directors are women.			project financing.	

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
Beneficiaries that receive support under the smart device financing scheme	Number of individual beneficiaries that receive financing support for smart devices under Component 1.1. This indicator will count the number of individuals with at least one smartphone that is broadband (3G and above) compatible, which was financed (either partly or fully) through the project or where purchase was facilitated through other	Bi-Annual	Surveys, third party verification and project reporting	Data will be collected by the verification agent contracted by RISA and will be cross-reference with data from the BRD and LODA.	RISA-SPIU and BRD-PIU

	financing mechanisms introduced by the project through the device fund established.				
Of which female beneficiaries	Supplemental indicator.	Bi-Annual	Surveys, third party verification and project reporting	Data will be collected by the verification agent contracted by RISA and will be cross-reference with data from the BRD and LODA.	RISA-SPIU and BRD PIU
Of which beneficiaries in rural areas	Supplemental indicator. This will be based on the definition applied by the Integrated household Living Conditions Survey-EICV in respect to rural households.	Bi-Annual	Surveys, third party verification and project reporting	Data will be collected by the verification agent contracted by RISA and will be cross-referenced with data from the BRD and LODA.	RISA SPIU and BRD PIU
People trained in digital literacy	This indicator captures the number of people, who have benefited from training under the revamped Digital Ambassador Program (DAP) and/or any other linked schemes financed by the project through virtual and in-person training. It will count people who have participated in at least one	Quarterly	Surveys, and project reporting (dig ital and analogue)	Data will be collected by RISA that now administers the DAP, where data will be sourced from local trainers/ training providers contracted and registered on the DAP online portal etc.	RISA SPIU

	training session. This indicator will also count those trained by third parties that were not directly financed by the project but where said training provider used training material or monitoring tools financed by the project as part of the umbrella DAP scheme.				
Of which female	Supplemental Indicator. Training participants who are female.	Quarterly	Surveys, and project reporting (digital and analogue)	Data will be collected by RISA that now administers the DAP, where data will be sourced from local trainers/ training providers contracted and registered on the DAP online portal etc.	RISA SPIU
Additional internet access points established (connected govt. offices, schools, hospital and marketplaces etc.)	Number of additional internet access points established (connected govt. offices, schools, hospital and marketplaces etc.) This indicator will count of number of ministries, departments and agencies (MDAs) and public access points connected to	Bi-Annual	Surveys, and project reporting (digital and analogue).	Data will be collected by RISA that centrally administers connectivity access schemes in question, where data will be sourced from service providers contacted under the project. Data will be cross-referenced	RISA SPIU

	broadband internet through project financing. The count measures locations (i.e., if the same ministry has more than one site, it is counted multiple times). Only public and government -aided schools connected will be counted. The number of marketplaces, taxi stands, and other designated public places equipped with wifi-hotspots will also be counted.			with data held by LODA, REB and MOH in respect to connected entities under their purview. Data will also be captured in existing and new digital maps financed.	
Of which located in rural areas	Supplemental indicator. This will be based on the definition applied by the Integrated household Living Conditions Survey-EICV in respect to rural versus urban areas.	Bi-Annual	Surveys, and project reporting (dig ital and analogue).	Data will be collected by RISA that centrally administers connectivity access schemes in question, where data will be sourced from service providers contacted under the project. Data will be cross-referenced with data held by LODA, REB and MOH in respect to connected entities under their purview. Data will also be captured in existing and new digital maps financed.	RISA SPIU

Population enrolled and issued a new digital ID credential (either a physical card or a virtual equivalent)	This indicator will measure the total share of the population, who are 5 years and above, who have been enrolled in new SDID and issued a new digital ID credential, which can be either a physical card or a virtual equivalent. This indicator covers both children (aged 5-16) and adults (aged 16 and above). Population refers to Rwandan citizens, refugees and foreign residents residing in Rwanda, not overseas.	Annual	Surveys and project reporting	Data will be collected and reported by NIDA	RISA SPIU
Of which female	Supplement indicator. This indicator refers to the share of the total number of new registrations recorded, including both adults and children.	Annual	Surveys and project reporting	Data will be collected by NIDA, and cross-referenced with the ID4D dataset published.	RISA SPIU
Children enrolled	Supplement indicator. This indicator refers to the share of the total number of all children, who are between 5-16 years of age, currently residing in Rwanda, who have been enrolled in the	Annual	Project reporting	Data will be collected and reported by NIDA	RISA SPIU

	new SDID.				
Cybersecurity standards, compliance and audit framework published	Related standards will need to have been published in a format that is readily available to the public and industry e.g. on the NCSA's website.	Annual	Project reporting and online verification.	Data will be collected by RISA from the NSCA.	RISA SPIU
Public sector officials trained in digital skills	This indicator will count of number of civil servants that have participated in at least one training (in person or virtually) financed by the project, covering the full spectrum of digital skills – basic through to highly-specialized digital skills – based on the DigiComp digital skills methodology. However, most of the training financed is expected to be at advanced level, including specialized digital trainings on cyber security, data protection, operation and maintenance of IT systems financed by the project etc	Bi-Annual	Surveys and project reporting	Data will be collected centrally by RISA, leveraging RISA's network of decentralized Chief Information Officers at sectoral level, with input from MDAs. Data on cyber security training will, for example, be provided by the NCSA.	RISA SPIU
Citizen engagement indicator: People accessing new e-services supported	This indicator will track the percentage of people	Bi-Annual	Surveys and project	Data will be collected through centralized	RISA SPIU

through the project and reporting satisfaction	accessing new e-services supported through the project and reporting satisfaction. Data collected will connected through the e-services.		reporting	reporting by RISA and decentralized sectoral Chief Information Officers, with input from MDAs. Data will also be submitted by any contractor leveraged to deliver or re-design e-services under the project. Whatever method leveraged to engage people it is expected to result in meaningful consultation in line with ESS10 and disclosed wherever possible, as part of documentation on stakeholder engagement.	
Of which female	Supplemental Indicator.	Annual	Surveys and project reporting	Data will be collected through centralized reporting by RISA and decentralized sectoral Chief Information Officers, with input from MDAs. Data will also be submitted by any contractor leveraged to deliver or re-design e-services	RISA SPIU

				under the project.	
Data Controllers and Processors that are listed in the DPO Register	This indicators will measure the total number data controllers and processors listed in the main register, once operational, at the Data Protection Office (DPO) due to be launched.	Annual	Project reporting, with data pulled from the registry in question	Data will be collected by RISA from the DPO, once established.	RISA SPIU
Datasets publicly available for download in the Government Data Hub	This indicators will measure the total number datasets that have been cataloged, tagged, cleaned, formatted and anonymized (where applicable) that have been made publicly available online and are thus readily downloadable and ready to be used by government, industry, CSOs etc.	Annual	Online verification	Data to be collected by RISA that will administer the Government Data Hub.	RISA SPIU
Percentage of successful identity verification and digital authentication services provided in the context of service delivery to population 5 years and above	This indicator will measure the improved capability of NIDA to perform successful identity verification (YES/NO answer versus error) and digital authentication resulting from modernization of the ID ecosystem.	Annual	Project reporting, complemented by surveys	Data generated by NIDA based on enhanced ID system reporting capability and aggregation of the reports by service providers using this service.	RISA SPIU, NIDA
Startups supported through the project	This indicator will count the number of startups that are directly or indirectly	Bi-Annual	Surveys and project reporting	Data will be collected by RISA from ESOs and other entities	RISA SPIU

	supported through the project e.g. through the ecosystem support services financed, and/or any of the startup financing initiatives supported under the project.			contracted and/or supporting startups that receive project financing, with input from relevant MDAs such as RDB, BRD and KIC.	
Graduates from specialized digital skills training employed or in education within 12 months after completion	This indicator will measure the percentage of graduates from specialized digital skills training (such as coding bootcamps, the Rwanda Coding Academy, training centers etc.) supported by the project, who are either employed or in education 12 months after graduation. Employment would include employment in the private sector/public sector or self-employment, and education would include graduates pursuing higher education (e.g. specialized master's and/or PhD programs)	Annual	Student tracer surveys and project reporting	Data will be collected by RISA, sourced from specialized digital skills providers supported and/or contracted under the project such as the RCA, bootcamps etc.	RISA SPIU
Of which female	Supplemental Indicator. Share of graduates that are female.	Annual	Student tracer surveys and project	Data will be collected by RISA, sourced from specialized digital skills providers supported	RISA SPIU

			reporting	and/or contracted under the project such as the RCA, bootcamps etc.	
Citizen engagement indicator: Startups reporting satisfaction with incubation and acceleration services received	This indicator will measure the satisfaction rate of firms participating in the programs run by the supported incubators and accelerators, which will indicate the quality of services provided.	Annual	Satisfaction surveys and project reporting	Data will be collected by RISA, sourced from ESOs supported. Surveys will be administered at the 12-month mark, which is the average expected length of the performance plans for ESOs envisaged	RISA SPIU
Citizen engagement indicator:Grievances registered that receive an adequate response within 30 days	Percentage of grievances or complaints, relating to the project, which are responded to within 30 days of receipt (annual average)	Annual	Surveys and project reporting	Based on RISA-SPIU's logging of complaints received and processes for responding to them.	RISA-SPIU

ANNEX 1: Implementation Arrangements and Support Plan

Financial Management

1. **FM conditions and covenants.** Based on the FM assessment undertaken, the following conditions and covenants are proposed: (a) the development of detailed FM guidelines for the project for RISA, focusing on activities implemented by RISA – a PIM for RISA will be required before project effectiveness; (b) the recruitment of a dedicated FM specialist for this project at RISA, prior to project effectiveness; (c) the development of detailed FM guidelines for activities implemented by the BRD, which confirms assigned FM specialist – a PIM for the BRD will be required to enable disbursement to the BRD.

2. **Use of Country System.** The project's FM arrangements will rely on the existing PFM system at central and decentralized level, and on the individual FM Systems in place at each of the IAs, with some amendments to accommodate the project's and the WB's FM requirements.

3. **Country system.** Rwanda's public financial management (PFM) system is anchored in the 2003 Rwanda Constitution, revised on December 24, 2015, Articles 162 to 166. The Organic Law N° 12/2013 of December 9, 2013 on State Finances and Property establishes principles and modalities for sound management of State finances and property. The organic law applies to all budget entities at the central and decentralized level and sets up fundamental PFM principles, including comprehensiveness, transparency, accountability, uniformity, consolidation, and gender balance in public State finance management. Other guiding documents include:

   (a) The Ministerial Order N°001/16/10/TC dated January 25, 2016 on financial regulations that regulates the structure and functioning of PFM; the preparation and implementation of the State budget; the accounting and reporting of all financial transactions; and financial controls. The Order applies to the PFM of all public entities, including of the Central Government, decentralized entities, public institutions, and subsidiary entities.

   (b) Government Accounting Policies Manual.

   (c) Articles 165-166 of the Rwanda revised Constitution and the Law N° 79/2013 of dated September 11, 2013 that determines the mission, organization and functioning of the OAG of State finances.

   Rwanda's PFM system had undergone a series of reforms since 2008, guided by the PFM sector strategic (SSP) plan 2008–2012, the PFM SSP 2013–2018 and the PFM SSP 2018–2023. At the national level, progress has been made in improving budget planning, expenditure efficiency, the internal audit function, external audit coverage, and level of financial reporting. The Public Expenditure and Financial Accountability assessment from 2016 confirmed these developments. Nevertheless, areas for improvement identified include weak consultation in respect to budget preparation, weak access to fiscal information, lack of qualified PFM staff and low alignment of between policies and budgets.

4. **The FM risk is 'moderate'.** An assessment of the FM arrangements at RISA and the BRD was carried out and confirmed during project appraisal, in compliance with WB policy and directives on investment project financing (IPF). A summary of FM risks and mitigation measures is presented in table 1.1.

Table 1.1. FM Risks and Mitigating Measures

Risk	Risk Mitigating Measures Incorporated into Project Design	Residual Risk Rating
Inherent risk		**Substantial**
Country level The country's political environment is deemed stable, with ongoing judicial and legislative reforms. Governance challenges including retention of adequate accounting and internal audit capacity across government, weak linkage between budgeted and actual performance. Likely macroeconomic challenges due to the impact of COVID-19.	Establishment of Medium-Term Expenditure Framework as a basis for government budgeting, adoption of International Public Sector Accounting Standards, implementation of Smart Integrated Financial Management Information System (IFMIS). Regular oversight through the OAG, which is deemed independent and effective. Ongoing World Bank support to PFM and accountability.	Moderate
Entity level RISA has no previous experience with implementing of WB projects. BRD has previous experience with implementing of WB projects.	World Bank to provide support and training on World Bank FM and disbursement procedures to staff at RISA before project effectiveness and, as needed, during project implementation. RISA to recruit an additional FM specialist.	Moderate
Project level There may be challenges in executing, monitoring, and coordinating various project activities.	A detailed PIM to be prepared that clarifies roles, responsibilities, and authority of all stakeholders in the project. Dedicated teams at RISA and BRD will be in charge of day-to-day coordination, while a high-level PSC shall provide overall leadership and oversight.	Moderate
Control Risk		**Moderate**
Budgeting Unreliable budget forecast	RISA to strictly follow national budget procedures and timeline, while BRD shall follow its approved internal budget procedures. Engage all project stakeholders early during planning and budgeting process (PSC, MINICT, RISA, BRD and World Bank). Ensure that annual work plans and budgets are in line with procurement plan to prevent any delays.	Substantial
Accounting Existing accounting capacity RISA may be overstretched due to additional project workload.	Recruit a dedicated FM specialist at RISA. Enroll the project in respective FM Systems of the implementing agencies.	Moderate

Risk	Risk Mitigating Measures Incorporated into Project Design	Residual Risk Rating
Internal Controls and Internal audit Lack of clear definition of responsibilities. Ineffective audit function due to inadequate coverage of project activities.	A detailed PIM to be prepared that clarifies roles, responsibilities, and authority of all stakeholders in the project. Internal audit of RISA and BRD to include project activities as part of annual approved audit plans. Present audit reports to project management annually.	Moderate
Funds Flow Potential funds flow delays may affect delivery of critical project activities.	Open a Designated Account (DA) in BNR for RISA. Open a DA for BRD in BNR or a Commercial Bank approved by the World Bank and a Project Account in local currency may be opened in a Commercial Bank approved by the World Bank for BRD to make payments in local currency including operational costs. Funds disbursed by the World Bank based on six-month cash flow need.	Moderate
Financial Reporting and Monitoring Unreliable interim financial report (IFRs) and delay in submitting the IFRs.	Enroll the project into IFMIS for RISA; and the FM System of BRD to ensure near real-time processing. Monthly management reviews of FM reports should mitigate unreliability of IFRs and submission delays as the same systems, processes and people should deliver.	Moderate
External Auditing Delay in submitting the audit report.	Private external auditors to be engaged by BRD on time to ensure the audit reviews start early so that reports are availed on time. RISA to engage the OAG on time to ensure there are no delays.	Low
Fraud & Corruption Risk of fraud and corruption.	Monitor the GRM. Few cases of fraud detected under programs financed by Government-owned funds and correctives measures have previously been taken.	Moderate
Overall Risk		Moderate

5. **Planning and budgeting.** RISA will follow the GoR's planning and budgeting procedures. The BRD will follow their own approved internal procedures, which shall be consistent with activity and procurement plans adopted in respect to project activities. Project budgets shall be presented for approval by their respective Board of Director's as part of the annual budget approval process. The first project budget approval may have a separate Board Approval as it might not coincide with the annual planned budget approval timelines. The approved budgets will be monitored on a monthly and quarterly basis through

the preparation and analysis of budget execution reports, including: (a) budgets for the period and for the year; (b) actual expenditure for the period and to date; (c) future expenditure commitments; and (d) balance of period budget remaining (actual expenditure and commitments together, compared to periodic budget). The annual workplan and budget for the project shall be submitted to the WB for no-objection.

6. **Internal control.** Each implementing agencies (RISA and BRD) shall develop a PIM that will reflect the FM arrangements under the Project. The PIMs will provide detailed internal control arrangements for the project, which describes how segregation of functions in payment processing and internal check mechanisms is ensured, as well as payment approval and authorization arrangements. To enhance internal control arrangements for the proposed project, the internal audit units in RISA and BRD will conduct at least annual reviews of project activities and submit reports to the project management team and to the WB during implementation support missions. A dedicated FM specialist for this project will be recruited or appointed in RISA to ensure effective FM oversight, including timely financial reporting. Within the BRD this role could be undertaken by a shared resource, but responsibility will need to be assigned.

7. **Accounting and financial reporting.** Project-related financial records at RISA shall be maintained using the government IFMIS, while the financial records at BRD shall be maintained using their FM system and shall be prepared in accordance with the International Financial Reporting Standards; these systems shall be modified to accommodate any special financial reporting requirements prescribed by the WB. The project implementing agencies (RISA and BRD) will each prepare and submit quarterly interim financial reports to the WB within 45 days after the end of the quarter. The interim financial reports will be used to monitor project financial progress, including the rate of budget execution and level of disbursements. In the same way, the respective agencies will prepare annual project financial statements, which will be submitted for external audit within three months after the financial year-end. Financial Reports submitted shall at a minimum include: (a) Consolidated Sources and Uses of Funds (revenues and expenditures statement); (b) Consolidated Financial Position statement; (c) Consolidated Cash flow statement; (d) Consolidated Budget execution report; € DA activity statement; (f) Notes on accounting policies; and (g) Appendices. A summary of financial reporting requirements can be found in table 1.2

Table 1.2. Financial Reporting

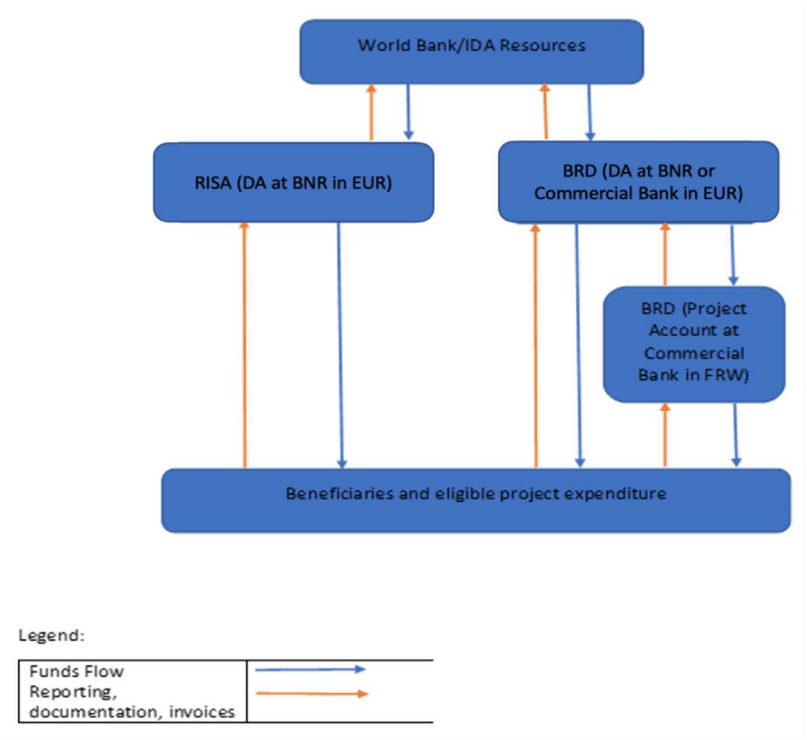
FM Activity	Frequency	Outputs
Desk reviews		
IFRs review	Quarterly	Interim Financial statements review report
Audit report review	Annually	Audit review report
Internal audit of project activities	Annually	Internal Audit review report
Review of other relevant information, such as internal control systems reports	Continuous, as they become available	FM review report
On-site visits		
Review of overall operation of the FM system, including internal controls	Twice per year (as part of Implementation Support Missions)	FM review report

FM Activity	Frequency	Outputs
Monitoring of actions taken on issues highlighted in audit reports, auditors' management letters, internal audit, and other reports	As needed	FM review report
Transaction reviews (if needed)	Annually, or as needed	FM review report
Capacity building support		
FM training sessions	Prior to effectiveness and thereafter, as needed	Training sessions held

8. **External audit.** The activities managed by RISA shall be subject to external audit by the OAG. The activities to be managed by BRD shall be subject to external audit by a Private Audit Firm that is regulated by the Institute of Certified Public Accountants of Rwanda. The ToR for the Private Auditors must be acceptable to the WB. The audit reports and management letters will be submitted to the WB within six months after the financial reporting year-end. The audit reports will be publicly disclosed in accordance with the WB's Access to Information Policy. Upon receipt of the audit reports, each of the implementing/reporting agencies will be expected to prepare an action plan to address audit findings. Follow up on the implementation of audit recommendations will be conducted as part of regular WB FM supervision missions and quarterly reviews of IFRs.

9. **Funds flow arrangements.** Proceeds of the financing are envisaged to flow from the WB directly to RISA and BRD. RISA shall open a DA in Euros at the BNR. BRD shall also open a DA in Euros at the BNR, and shall also open a project account in FRW at a commercial bank approved by the World Bank. Disbursements will follow the IFR-based method. However, the project may also use direct payments, the transaction-based Statement of Expenditure method, reimbursement, and special commitments, depending on the case. Contracts denominated in Foreign Currency will be settled from the DAs or via direct payment from the WB. Upon effectiveness, RISA will submit a request for withdrawal of funds accompanied by six months' cash forecast to the WB. The BRD will submit a request for withdrawal of funds, accompanied by six months' cash forecast to the WB, when it meets the disbursement condition stated in the Financing Agreement. Based on requests received, the WB will transfer the proceeds of the loan/grant to the various DAs. Subsequent replenishment of the DAs will be based on the submission of application for withdrawal accompanied by the IFR that will show the funds required as part of the DA reconciliations. See figure 1.1.

Figure 1.1: Funds flow arrangement



Procurement

10. **Project Procurement Strategy for Development (PPSD).** A PPSD document has been prepared by RISA and the BRD, in line with the WB's 'New Procurement Framework' (NPF) and Procurement Regulations for Projects financed by Investment Project Financing - November 2020'. The PPSD defines the Procurement Objectives, aligned with the PDO. Key procurement transactions envisaged have been identified. To procure and implement these key transactions, the PPSD considers (i) operational context, (ii) the Borrower's procurement capacity and (iii) market dynamics to identify potential procurement-related risks that are likely to impact the achievement of the PDO and proposes corresponding mitigation measures. For key procurement activities with high value and high risk, the PPSD discusses the merits/demerits of feasible selection methods/arrangements and market options (procurement approaches) available in the NPF. As a result, the PPSD recommends an optimum Fit-for-Purpose procurement approach to achieve Value for Money and the PDOs. The PPSD's analysis and recommendations made inform the initial Procurement Plan (PP) for the project. An initial PP has been prepared for the first 18 months and agreed upon with the WB. This PP will need to be published through World Bank's STEP portal. The PP will be updated every 12 months or earlier, as needed, subject to No Objection by the WB.

11. **Project procurement profile.** The project will procure a wide range of (a) goods, including ICT products; (b) non-consulting services (NCS), such broadband capacity contracts, network, and information systems (IS) or information technology (IT) systems; (c) consulting services (CS) (individuals and firms) that will support the design and roll-out of IT systems, provide TA in respect to policy formulation, regulatory and legal framework development, and strategic planning in technical areas such as telecommunication, digital skills development, digital identification, data management, e-services, cybersecurity, digital innovation, and entrepreneurship; as well as include (d) some smaller works contracts. The project is expected to procure for

a value of US$48,570,000 (24.3 percent of the total project envelope), within the first 18 months, based on an interim cost assessment.

12. **Market potential**. The project will provide multiple business opportunities for potential providers and contractors. Given the specialized and technical nature and value of project procurement packages envisioned, larger or technically specialized CS will follow the international market approach. CS firm selection will primarily leverage either the Quality-based Selection or the Quality and Cost-based Selection method, after shortlisting through Open Request for Expressions of Interest (REOI). However, other selection methods may be used, where/if considered necessary. Many goods and NCS tender will be subject to national competitive bidding processes and may hence use the Borrower's standard national procurement procedures, where deemed appropriate. For goods and NCS, open national and/or international Requests for Proposal (RFP) and Request for Bids (with/without pre-qualification) selections methods will be applied, with use of the former for high-value, complex, or high-risk activities procurement. In cases where multiple solutions and innovations are possible for goods and NCS, RFP will also be leveraged. Design, development, deployment, and support and maintenance will be carried out using Open International RFP, after an initial mandatory pre-qualification. Small value works may also be undertaken, based on the Requests for Quotation procedure. Finally, operating cost will be procured using the Borrower's procurement and administrative procedures, subject to review and approval by the WB.

13. **Use of direct contracting, negotiation, and beneficial ownership pilot.** Limited use of direct contracting is expected and will be informed by the PPSD to the benefit of the project, where applicable. Equally, limited use Best and Final Offer/negotiations is envisioned but could be used in cases where procurement activities need to be customised - e.g., where the Borrower has the conceptual design, but faces challenges in prescribing specifications, and defines precise requirements. The market may have multiple solutions and provides scope for innovation. No procurement activity currently envisaged under the project would be likely to fall within Operational Procurement Review Committee (OPRC) thresholds that requires application of a 'beneficial ownership pilot'. However, it will apply if contracts happen to fall outside the OPRC threshold.

14. **Market sounding.** More broadly, for procurement activities that are high-value, complex, or high-risk, a virtual market sounding will be required. Though there may be multiple providers for related activities, virtual market soundings may help to garner attention, as part of market engagement and also inform the procurement process. Potential providers may present alternative / innovative solutions. Feedback provided can thus benefit the project by helping to the IAs to refine procurement documentation.

15. **Supplier risk.** No supplier risk is perceived that would adversely impact participation and pricing but should be assessed before the publication of General Procurement Notices. Adequate participation by potential providers is anticipated, as goods/IT equipment can be imported and given the status of market development in the wider region and is thus likely to result in competitive prices.

16. **Use of national procurement standards.** Where national standards are used, the bid documents shall be subject to World Bank review and clearance to ensure that bid documents are (i) consistent with World Bank regulation, (ii) include provision for World Bank anti-corruption guideline and the WB's right to audit, (iii) consistent with the Rwanda public procurement law and (iv) the ESF instruments prepared for the project.

17. **Record keeping.** All records pertaining to the award of tenders, including bid notification, registers pertaining to sale and receipt of bids, bid opening minutes, bid evaluation reports, bid evaluations, communications sent to/with the WB in the process, bid securities, and/or to secure approval of invitation/evaluation of bids will be retained by respective IAs, in electronic or hard copy, and uploaded in STEP.

18. **Disclosure of procurement information.** The following documents shall be disclosed on the IAs' websites: (a) PP and related updates; (b) invitation for bids for goods and works for all contracts; (c) REOI for selection/hiring of CS; (d) contract awards of goods, works, and NCS and CS; (e) monthly financial and physical progress reports of all contracts; and (f) actions taken report on the complaints received, on a quarterly basis. The following details shall also be published on the United Nations Development Business (UNDB) and the WB external websites: (a) invitations for bids for procurement of goods and works, following open international market approaches, (b) REOI for selection of CS, following open international market approaches, and (c) contract award details of procurement of goods and works and selection of CS, using open international market approaches.

19. **Fiduciary oversight by the WB.** The WB shall conduct a prior review of contracts, based on the prior review thresholds established in the PPSD/PP. All contracts not covered under prior review by the WB shall be subject to post review, during implementation support missions (ISM), mid-term review mission, and/or special post review missions, including missions by consultants hired by the WB or third-party independent auditor delegated by the WB.

20. **Contract Management.** Currently, no high-risk and high-value procurements that require increased contract management support have been identified. However, if such contracts are identified in due course, during implementation, the IA in question will develop key performance indicators (KPIs) for such contracts and related KPIs will be monitored. The WB team will provide additional due diligence and independent review of the contract performance of such identified procurements. The RISA-SPIU and BRD PIU will be responsible for overall project/contract management for procurement activities that they with respectively manage. Notably, the RISA-SPIU plans to hire a dedicated staff member to provide additional support on contract management.

21. **Procurement capacity assessment.** A procurement capacity and risk assessment has been carried out by the WB for the IAs: (i) RISA and (ii) BRD. Key findings from the assessment undertaken include:

    (a) **Procurement experience.** (i) RISA is expected to administer most procurement under the project. RISA's lack of experience in applying Bank procurement regulation has thus been identified as a potential risk. However, RISA does have experience in centrally administering ICT-related procurements, at scale, for the GOR, using Government-funds to secure connectivity, IT equipment and IT systems for government MDAs, and therefore does has adequate experience in managing procurement in the digital sector. RISA has a track-record of adequate application of competitive procurement methods in relation to digital, where methods other than direct contracting (single sourcing) are used. However, some procurements conducted by RISA have leveraged less competitive procurement methods (direct selection). RISA does have in-house procurement capacity to procure off-the-shelf, standard software and ICT equipment. However, RISA only has moderate experience in administering larger procurement transactions of a similar value and complexity to those envisaged under the project (for example, high-value and complex procurement activities linked to customised design, development, deployment, and operationalization of specialised IS or IT systems); (ii) Meanwhile, the BRD is not expected to engage in extensive

procurement of large value contracts. It is expected to engage in limited procurement activities, as it will primarily be leveraged as an FI to support fund-administration. The BRD also does have prior experience in applying Bank procurement regulation, as it currently supports several WB-financed projects.

(b) **Staffing.** (i) The RISA Procurement Office is comprised of two procurement staff, one at Specialist-level and another at Officer-level. A qualified Procurement Specialist has also been competitively selected and appointed to the RISA-SPIU. Recruitment of a RISA-SPIU Procurement Officer to back-stop the Specialist is also due to be launched. Moreover, RISA is expected to hire a Contract Management Specialist to help supervision of high-value, high-risk and/or complex contracts, using Bank funds. During the implementation of the project, RISA will need to ensure minimal staff turnover to retain institutional memory and avoid disruption to procurement; (ii) The BRD Procurement Unit is comprised of a number of Procurement Officers, supervised by the Manager of Corporate Services, and headed by the Head of Human Capital and Corporate Services. Some of these Procurement Officers and the Manager Corporate Services are conversant with the BRD's procurement policy and procedures, and the WB NPF. Given the scale of procurement activities expected under the project, the current number of procurement officers at BRD is deemed to be adequate. Initially, the procurement specialist assigned to the project could therefore be a shared resource. However, depending on how the procurement planning evolved, the BRD may need to hire one additional Procurement Specialist dedicated to this project. This will be reviewed during project implementation.

22. **Procurement auditing in place.** RISA is audited by the Rwanda Public Procurement Authority (RPPA) and the OAG. This ensures compliance with fundamental principles governing public procurement, as per article 6 in law N°62/2018 dated September 25, 2018, governing public procurement. These audits are conducted yearly. BRD has an Internal Audit Unit, with three staff members, who report to the BRD Board of Directors. The Unit sources external auditors, who report to Board of Director and General Assembly.

23. **Use of Rwanda's e-procurement system**. An electronic government procurement system (e-GP) system assessment has been carried out that benchmarked Rwanda's system against the requirements of Multilateral Development Banks (MDSs). The system was found to be acceptable for use for procurement under Bank-funded projects. RISA already uses the e-GP system (Umucyo) and this system will be used for all "post" review procurements and may also be used for "prior" review procurement. The e-procurement system will not be used by the BRD.

24. **Procurement appeals and complaints procedure in place.** Rwanda's procurement law includes an established appeals and complaints handling mechanism. The e-GP is in use at RISA, allows for complaints to be registered and addressed electronically. Hence, all complaints and responses are available in the system for public disclosure. Auditing is carried out through the e-GP system. In cases where a complainant is not satisfied by explanations provided by the public entity, complainants can appeal to the Independent Review Panel (IRP) established under procurement law. The Panel receives and handles procurement complaints, as well as appeals to tenders launched by a public entity. Similarly, BRD procurement policy and operating procedures provide for adequate handling of procurement appeals and complaints.

25. **Coordination with other MDAs on procurement.** A multitude of MDAs will rely on RISA's ability to lead, closely coordination and monitoring relevant project procurement activities. RISA is expected to collate outputs from multiple consultancies to derive requirements and specifications. RISA will also need to ensure

ownership and sustainability of assets and/or services that are created and/or operationalized under the project. Roles and responsibilities in relation to procurement will be captured in the PIM. MoUs will be agreed upon between RISA and participating MDAs to complement the PIM, as needed, at the start of the project. BRD is expected to liaise with less MDAs in relation to the procurement activities that it is expected to manage – mainly RISA.

26. **Procurement committees.** Normally, there are formal public tender committees in charge of evaluating and awarding contracts at every procuring entity within the GoR. However, for the purpose of project procurement, RISA will maintain the role of a central coordinator and convener of all procurement committee meetings (for the procurement activities that it leads), with pre-assigned committee members based on the topic area, as per the Procurement Law. BRD will do the same, as per it's Procurement Policy. No one can represent a pre-assigned member of the evaluation committee. However, if additional expertise is needed, the committee(s) can solicit this from a third party, who cannot participate in later decision making in relation to the procurement activity in question.

27. **Need for training.** The concerned staff at RISA and BRD, dealing with procurement and contract management, may be provided with refresher/orientation training on NPF and STEP before the implementation of procurement activities and contract execution. The RISA-SPIU has already benefitted from an initial procurement training project during preparation. A focused and need-based refresher procurement training is recommended for the staff directly involved in procurement activities, including Tender Committees. These trainings should (i) cover utilization of appropriate tools for efficient procurement and contract management; (ii) focus on the need for closely monitoring; (iii) provide timely advice to management; (iv) cover the disclosure of procurement information, (v) review the PPSD prepared and (v) look at contract management plan strengthening.

28. **The procurement risk is 'moderate'.** The risk rating has been based on both the probability of occurrence of various events and their likely impact. As noted above, RISA does have moderate familiarity/proficiency in administering procurement and processing contracts of similar magnitude and scope. The BRD has adequate prior experience in implementing Bank-financed projects but may potentially need additional procurement staff to manage the additional workload. The involvement of a multitude of Partner Agencies (PAs), as collaborators, may present a challenge for coordination in respect to procurement. This will need to me managed carefully to avoid delays. These risks are related to capacity limitations and coordination. Proposed mitigation measures include the recruitment of a Procurement Officer and a Contract Management Specialist for the SPIU at RISA, in addition to the Procurement Specialist already in place, and additional training in targeted areas. Duly considering the procurement profile and contract management arrangements, based on the perceived risks and proposed mitigation measures, the project's overall residual procurement risk rating is determined to be 'moderate'. This rating also considered the prevailing COVID-19. situation, and related uncertainties. This risk rating will be reviewed and updated periodically by the WB during implementation.

Implementation Support plan

29. **The proposed strategy and approach for Implementation Support has been tailored to strengthen the capacity of RISA, BRD and other supporting MDAs.** There will be strong coordination between the WB and RISA and the BRD in relation to the day-to-day administrative management and implementation of the project. Formal implementation support missions (ISMs) and field visits will be carried out, jointly with the

Government, every three to six months. Initially, these missions will focus on strengthening project management and fiduciary capacity at RISA and BRD, development of operational guidelines and preparation of the first phase of activities planned. Later, missions will focus on reviewing implementation progress, achievement of results and sustainability. A mid-term review will be carried out 18 months after project effectiveness to take stock of progress and make any needed adjustments to project design. Targeted technical, FM and procurement-related review missions will be undertaken. Ongoing dialogue with the RISA, BRD and MINICT, including through VC conferences and e-mail, will ensure continuous support and monitoring. The implementation support plan will be reviewed on an annual basis to ensure that it is adequately aligned with support needs. The estimated level of annual support required by the WB team is identified in Table 1.3.

Table 1.3: Implementation support and skills required

Time	Focus	Skills Needed	Resource Estimate (US$)
First twelve months	1. Supporting speedy project approval by Parliaments/project effectiveness 2. Technical Assistance for Development of key legal/regulatory documents (e.g., in the broadband market development space) 3. Technical assistance for strategies, studies, and implementation roadmaps 4. Technical assistance for development of Terms of Reference/Bidding Docs for major activities 5. Support for establishment of strategic partnerships, donors, civil society, and technical organizations.	1. TTL 2. Technical Specialists: Digital Infrastructure; Digital Skills; Digital ID; Cybersecurity & Data; Digital Government; Digital Entrepreneurship 3. Fiduciary Specialists (FM/procurements Disbursement/M&E) and ESF focal points incl. Gender	220,000
Annually	1. Ongoing technical support for Components 1–3 2. Fiduciary, E&S Standards, and project management support 3. Continued policy dialogue/support for sector reforms; link to WBG policy lending.	1. TTL 2. Technical Specialists: Digital Infrastructure; Digital Skills; Digital ID; Cybersecurity & Data; Digital Government; Digital Entrepreneurship 3. Fiduciary Specialists (FM/procurements Disbursement/M&E) and ESF focal points incl. Gender	200,000

ANNEX 2: Detailed Project Description

Component 1: Digital Access and Inclusion.

Sub-component 1.1: Access to affordable smart devices. (US$15 million equivalent)

1. **This sub-component will facilitate wider device access, featuring the establishment of a smart device access scheme and a dedicated fund.** The scheme will target users currently facing barriers to smart device access and ownership, such as securing credit for device purchase. The scheme will be implemented jointly by RISA and BRD. Various financial instruments will be considered and deployed through a dedicated device fund. The project will finance an in-depth market assessment and feasibility study to refine key design elements of this scheme, based on local context and anticipated demand, including targeting, the selection of financing instruments, and how to best sustain the fund beyond the life of the project. Key financing instruments considered include grant-based subsidies for Rwanda's lowest income-earning households, featuring performance-based financing for device retailers, with targeting, eligibility and subsidy levels based on the stratified household income classification system, *Ubudehe,* existing device ownership, and other GoR social assistance programs. Targeting will consider level of financial need, scope for productive use, and perceived value of the device, with the aim of maximizing the coverage, inclusion, and impact of the scheme. Financing instruments leveraged will seek to maximize uptake among under-served groups, for example, targeting female-headed households to bridge the gender gap in respect to device access (see Annex 4). Other instruments that will be considered include credit guarantees, insurance, and line of credit to manage the challenges associated with access to finance for devices and high credit risk. All financial instruments leveraged under the scheme will adhere to the World Bank's policies and guidelines for FIs.

2. **The approach will leverage lessons learnt on targeting, instrument mix between subsidies and credit guarantees and implementation modalities from related schemes in-country and elsewhere**, including a global ASA on Affordable Devices (P173751) and REF project (P160699). The scheme would complement parallel initiatives to extend digital public services to those at the base of the pyramid and various social benefit schemes anchored at household level, including ongoing effort to digitize social transfers (also supported under sub-component 2.3) that form a critical part of the COVID-19 response. The scheme developed will also leverage synergies with concurrent initiatives in place and due to be launched, including financing for solar home systems also administered by BRD, and basic digital literacy training (supported under sub-component 1.2) to ensure that critical complements (ability to charge and use devices) maximize the impact and sustainability of device financing provided. Market sounding conducted suggest that device retailers, SACCOs and off-grid energy providers welcome the scheme, and synergies noted above. Key activities to be financed include:

   (a) **Capacity building for RISA and BRD, and other key scheme players**, to support the development and operationalization of the affordable device access scheme, and related fund**.** A detailed feasibility study and a scheme-specific PIM will be developed, detailing financial instruments implemented, beneficiary disbursement mechanisms, eligibility criteria and scheme administration requirements. This PIM will also detail the role that other MDAs are expected to play in supporting successful deployment of the scheme, which inter alia could include the MINLOC, Local Administrative Entities Development Agency (LODA) and the Rwanda Cooperatives Agency. Upstream and downstream capacity building may also be needed for demand- and supply-side players in the device value chain to increase their readiness and ability to support investment made through the device affordability fund.

(b) **Capitalization of the device affordability fund and operationalization of related financing instruments**, which will be implemented by the BRD in its capacity as an FI, and where the project will cover the costs of the financial instruments deployed, and any other relevant operational costs and fees, over the duration of the project period.

(c) **Independent verification,** whereby the project would finance a third-party verification agent to verify compliance for the financing schemes. A similar mechanism is already being leveraged under the REF project (P160699) financed by the World Bank, which is also managed by the BRD. This activity will be led by RISA.

(d) **Communication and outreach** through campaigns, sharing success stories and lessons learned to publicize the device affordability scheme to key stakeholders and targeted beneficiaries. This activity will be led by the RISA, in close cooperation with BRD.

Sub-component 1.2: Digital literacy for all. (US$8 million equivalent)

30. **This sub-component will help tackle Rwanda's lingering digital literacy gap through a national digital literacy scheme that will enable end-users to access and use basic digital devices and data-driven services safely and effectively.** This activity will help expand the national coverage of Rwanda's existing flagship DAP. A revamped iteration of the existing pilot scheme (version 2.0) will be scaled, based on lessons learnt from past evaluations of the DAP.[110] The new program will seek to enhance incentives for female participation (see Annex 4), and consider access requirements for persons with disabilities, including teaching devices, engaging content and material leveraged. Key activities to be financed include:

(a) **Development of a new national digital skills and M&E framework,** aligned with global best practices to enable quality assurance and consistent tracking and benchmarking of digital skills training delivery and learning outcomes over time. Support for an upfront digital skills assessment and continued evaluation of the DAP and other digital skills programs launched over the course of the project will also be financed.

(b) **Development and operationalization of the new DAP 2.0. model,** covering the incremental operating costs, content creation, training and equipment needed to deliver the new scheme over the course of the project period, as well as communication and outreach to expand uptake. The revamped design will feature the set-up of a shared digitals skills training platform, both programmatically and through a new DAP web-based portal and e-learning platform, which will allow partner agencies to contribute to national digital literacy targets, leverage shared training materials and M&E tools, thereby crowding in more players and increasing sustainability. E-learning modules and online project administration via the proposed portal will also complement in-person training.

[110] Digital Opportunities Trust (2019), DAP Proof of Concept and Final Evaluation. See: *https://www.dotrust.org/media/2019/06/2019-01-04-DAP-Proof-of-Concept-Final-Evaluation-Executive-Summary.pdf* An evaluation of the pilot stage of the DAP highlighted a number of lessons that will be considered in the re-design and launch of DAP 2.0, including but not limited to the need to (i) enhance public promotion and community outreach; (ii) consider use of and support local content; (iii) employ differentiated instruction and personalization of delivery; (iv) encourage linkages between the DAP and other ecosystem support services, factoring in the broadband and device access challenges (all tackled by other sub-components of the proposed project); and (v) consider cultural norms that could impact delivery and uptake. A study will be undertaken to design the DAP 2.0, based on these lessons and other key considerations such as sustainability, inclusion and crowding in other key actors from the private sector and civil society.

Sub-component 1.3: Last mile connectivity access. (US$33.50 million equivalent)

3. **This sub-component will expand access to high-speed broadband among select public institutions, as well as targeted public spaces to enable wider digital service provision**. Key activities to be financed include:

(a) **Support for network planning and deployment of enhanced network management solutions:** RISA will receive targeted TA to support network planning, development of technical specifications and detailed capacity requirements to enable capacity purchase, development of a closed VPN, and central NOC to expand and enhance its management of GovNet. Related TA will support the identification of sites location to be connected and include climate risks screening, formulation of adaptive strategies and development of specifications that promote energy efficiency and climate resilience. Financing will cover related services and infrastructure for VPN and NOC establishment and roll-out, as well as related capacity building and training.

(b) **Connectivity capacity purchase for select public institutions and priority locations.** The connectivity access scheme financed will be centrally managed by RISA, which will be implementing progressive cost recovery and hand-over to MDA at sectoral level to ensure sustainability, but where demand-aggregation is also expected to bring down the incremental operating costs for MDAs. Bandwidth contracts will be awarded on a competitive basis, with bidding open to all licensed operators and ISPs, covering the provision of international and domestic internet bandwidth and various sectoral and geographic lots, featuring minimum capacity and technical requirements for targeted institutions and locations that will also be gender accessible, in a given catchment area. Priority locations will include local government offices, schools, hospitals, marketplaces, taxi stands and other public access points. Given how connectivity infrastructure in use is mostly high energy-consuming coaxial cables[111], contracts will favor use of energy efficient[112] fiber-optic cables, wherever possible, particularly for sector government offices, but will otherwise be technology-agnostic to encourage the development of least-cost models for last-mile connectivity to maximize affordability and coverage. Potential bidders will need to comply with applicable regulatory standards, including new guidelines that will be supported for climate smart and resilient telecoms infrastructure, infrastructure sharing and quality of service (supported under sub-component 1.4).

(c) **Enabling infrastructure and equipment for target institutions**, particularly schools, to facilitate internet access and use in connected locations. Underserved public schools prioritized for connectivity access will be supported with sustainable energy solutions and basic IT equipment for teaching and learning, drawing on lessons learnt from the smart classrooms model spearheaded by MINEDUC. Financing will complement other school connectivity and digital education initiatives, including the WB-financed Quality Basic Education Project (P168551). Whereas, GoR's on-going school connectivity initiatives are targeting schools that already have some basic electricity and IT access, WB financing will target school that currently have no supporting infrastructure to ensure equity in access and support movement

[111] The Impact of Fiber Optic Transmission in MultiService Network in Rwanda, National University of Rwanda, 2011, https://www.memoireonline.com/04/12/5625/The-impact-of-fiber-optic-transmission-in-multiservices-networks-in-rwanda.html

[112] Research has shown that coaxial cables consume more energy than fibre optic cables; copper networks consume about 3.5W at full 100-meter reach capability while fibre networks may use less than 1W to transmit the 10-GbE signal over 300 meters, How Fiber can help make the network Greener, https://www.cablinginstall.com/cable/fiber/article/16465844/how-fiber-can-help-make-your-network-greener

toward universal coverage, enabling education reform that will rely on wider digital adoption. Similarly, interventions financed will complement and build on the Smart Classroom Program, equipment schools with IT labs, the roll-out of a Smart Education Network[113] that will connect higher education and a handful of school to fiber that are within the vicinity of related networks, but also other flagship programs such as the UN GIGA initiative where the WB is also a key partner and where WB financing will leverage the school connectivity mapping undertaken.

Sub-component 1.4: Legal, regulatory, and institutional capacity for broadband market development. (US$4 million equivalent)

31. **This sub-component will provide upstream enabling legal, regulatory support, as well as capacity building to stimulate broadband market development.** Areas for support identified include: (a) quality of service (QoS) monitoring, and related systems deployment; (b) number portability, and related systems deployment; (c) emerging technologies, including an 5G readiness assessment and roadmap, and Internet of Things regulation; (d) spectrum management policy; (e) infrastructure sharing costing-models and regulation (building on bank-executed IFC-led TA); (f) digital content regulation and promotion; (g) climate smart and resilient digital infrastructure– policy and regulatory guidelines; and (h) gender-disaggregated telecoms industry data collection. Additional TA on legal and regulatory matters pertaining to secure data management may also be included, as needed.

Component 2: Digital public service delivery.

Sub-component 2.1: Digital identification and authentication. (US$39.30 million equivalent)

32. **This sub-component will strengthen Rwanda's ID ecosystem in support of improved online and offline service delivery and access.** NIDA will be supported to upgrade the existing ID card system, introducing a SDID as an inclusive and trusted digital identification and authentication framework, featuring the development of a new data and digital authentication layer that leverages the existing NPR, CRVS and foreigner registration systems and other authoritative data sources (See figure 2.1). Linking digital ID to digital payments and trusted data sharing will allow the GoR to develop its own re-usable 'technology stack' for scaled e-service delivery, by enabling presence-less, cashless, and paperless transactions. The appropriate adoption of emerging and decentralized approaches to digital ID will empower citizens and residents with opportunities to control their personal data and position Rwanda to be a global leader in the area of identification. The envisioned SDID system will comply with ten *Principles on Identification for Sustainable Development* and align with other international best practices to maximize the socio-economic benefits and development impacts that stem from trusted and inclusive ID systems, while mitigating key risks. During implementation, special attention will be paid to ensuring: (a) inclusion, removing any barriers to ID access and usage, by ensuring that all persons in Rwanda can easily obtain an identity credential (including ensuring that cost is not an obstacle for the poor) and having exceptional handling processes in place so that no person entitled to a certain service is denied access; (b) application of robust personal data protection practices, in compliance with PDPP law (2021), including data minimization, purpose specification, lawful processing, strict limits on data retention, data accuracy, accountability, transparency, consent and user-empowerment, and use of privacy- and security-by-design approaches; (c) adherence to open standards and, where appropriate, the use of open application programming interfaces, to promote interoperability, scalability, flexibility and country ownership; and (d) consultative and human-centered design approaches to inform the

[113] See: https://ubuntunet.net/members/nren/rwednet/

implementation and use of the SDID. The design of this sub-component was informed by considerable due diligence, including an ID4D Diagnostic for Rwanda completed in 2016,[114] qualitative end-user research carried out in 2020[115], a 'Single digital ID' feasibility study supported by the AfDB in 2021, and a review of the enabling legal environment, including the newly adopted PDPP law (2021). Activities to be financed include:

(a) **Upstream stakeholder engagement and advisory services**, including: (i) engagement with citizens, residents, relying parties and other key stakeholders and (ii) advisory services for the preparation of bidding documents, legal and regulatory support, as needed, to inform SDID implementation.

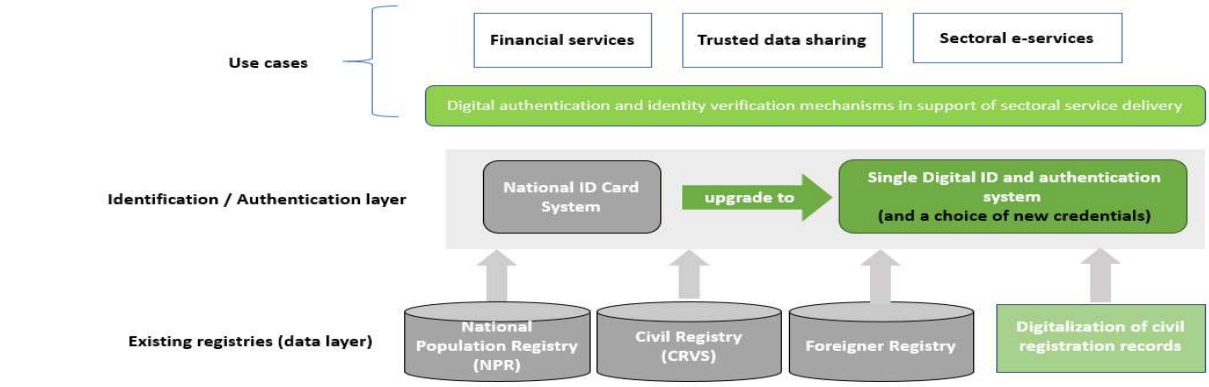
(b) **Digitization and indexing of civil registration records,** converting paper-based birth and death certificates, marriage registration forms and other civil registration documents into digital formats and indexing them, with the aim of facilitating SDID pre-registration and improving the customer experience when accessing e-services that require proof of vital events, while also safeguarding important paper archives from climate related events (such as flood and fires). The modality and scope of records digitization will be refined through dedicated technical assistance.

(c) **Establishment of a new SDID** that will include: (i) upgrades to PKI and central back-end IT infrastructure, featuring network equipment and data storage, to create a solid basis for greater performance, functionality, security, data protection, and scalability ahead of the deployment of the new SDID system; (ii) hardware and software development for the new SDID, which is expected to enable increased biometric capabilities for up to ten fingerprints and two irises to promote accessibility and to enable the establishment of uniqueness for use cases that require higher levels of assurance[116]; (iii) new digital identity credentials; (iv) new identity verification mechanisms, in support of both online and in-person transactions in Rwanda, with possible cross-border application[117], employing proven and emerging technologies such as a new ID card,[118] a mobile ID, verifiable credentials, decentralized IDs and digital wallets, and (v) registration operations, including pre-registration activities for the SDID, expanding registration options in remote areas and extending ID coverage to children under the age of 16 (with the consent of parents or guardians, while adhering to child protection norms) to facilitate enhanced education, health and social protection service delivery. This will include support for pre-requisite process re-engineering, change management, related software development and hardware upgrades.

(d) **Strengthening of the ID ecosystem**, will support: (i) deployment of effective channels for grievance redress, creating accessible mechanisms and processes to enable citizens and residents, who face challenges with registration or using their credentials (including in cases of verification failure), to seek timely recourse, inter alia through a new online complaints portal, call center, and a grievance tracking management platform; and (ii) communications and community outreach to drive SDID adoption and effective usage.

[114] See: https://pubdocs.worldbank.org/en/573111524689463285/Rwanda-ID4D-Diagnostic-Web040318.pdf
[115] See: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/279741611941779893/peoples-perspectives-on-the-national-id-birth-registration-and-birth-certificates-in-rwanda
[116] This will, to the extent possible, leverage Rwanda's existing national PKI and will finance the required upgrades.
[117] This, for example, includes the work of the African Union Commission to develop a continental framework for interoperability and mutual recognition of digital IDs in Africa.
[118] The specifications of the new card will be based on a comprehensive cost-benefit analysis.

Figure 2.1: Rwanda's 'to-be' ID ecosystem and Project investments planned



MAP:
Grey : what exists
Green: what is planned to be financed by the Digital Rwanda project

Sub-component 2.2: Government data management, sharing and analytics. (US$10.70 million equivalent)

33. **This sub-component will improve the GoR's ability to securely manage, share, analyze and harness data for improved service delivery, policy development and planning, on the back of shared data frameworks, platforms, infrastructure, and big data analytic capabilities**. Activities financed will support the operationalization of the 2017 Rwanda National Data Revolution Policy and build on the 2013 Open Data Readiness Assessment. Key activities to be financed include:

(a) **Development of National and big data governance and management frameworks**, including technical assistance through feasibility studies, data sharing guidelines, templates, standards, and protocols as well as related training to support the development of enabling legal, strategic and policy frameworks for improved interoperability, data management, sharing and processing, including geospatial data, big data, and AI, which will benefit all of government and policy makers across sectors. In developing related frameworks, RISA will need to work closely with the MINICT, RURA and NISR.

(b) **Operationalization of the Government Data Hub**, including related software, hardware, hosting, and TA for deploying and operationalizing the hub at RISA, in close collaboration with sectoral MDAs that produce large amounts of data.[65] This activity will include support for cataloguing and tagging, including with standardized geospatial tags, cleaning and formatting government data for upload, and anonymizing data for release, including related training. This activity will also make government data sets available to the public in machine-readable and anonymized formats and engage citizens and businesses in the prioritization, curation, and expansion of available open data to catalyze demand as well as commercial use as part of private sector innovation.

(c) **Upgrading of the GESB,** operated by RISA, to focus on the functionality of the Government Data Hub and enable seamless data exchange between key government registries managed by various MDAs, allowing them to securely share their data and support efficiency gains that save energy. Support will also be provided for system upgrades, training on the GESB's maintenance and operation, as well as any technical assistance required to support systems integration at MDA-level.

(d) **Implementation of strategically selected big data use cases** to demonstrate the value of big data analytics in priority sectors (e.g., Health, Education, Social Protection and Agriculture), with some use

cases also employing machine learning and AI methods, and directly supporting climate change adaptation and COVID-19 response through analysis of climate data.

Sub-component 2.3: E-services in key sectors. (US$30.5 million equivalent)

36. **This sub-component will expand the availability of high-quality transactional e-services in key sectors.** Key activities to be financed include:

(a) **Support for strategic planning and design of e-services** that are primed for digitization and prioritized for financing through a rigorous annual selection process. TA will be provided for development of "as-is" and "to-be" models for selected priority e-services to support related process re-engineering and development of functional requirements and technical specifications. This will also cover support for end-user consultations, including dedicated focus groups with vulnerable user-groups to inform design.

(b) **Development of select priority e-services in key sectors**. Support provided will be anchored in the recent public e-services inventory conducted by RISA, which has already identified a handful of services primed for end-to-end digitization, based on expected social and economic impact. However, as noted above, priority e-services to be financed will be selected in close collaboration with sectoral MDA, with due consideration to readiness (including technical capabilities at the MDA-level, ability to leverage shared platforms funded under the project and solutions introduced under sub-components 2.1, 2.2, and 2.4, as well as cost) and the expected overall impact (including, but not limited to, estimated no. of end users, frequency of use, efficiency gains expected, scope for supporting COVID-19 response and recovery). Financing provided will cover aspects such as software development, systems integration, hardware and IT equipment, and data hosting requirements. Some priority e-services have already been identified for implementation starting in year one, including: (i) a new e-Parliament system to increase transparency and citizen participation in the legislative processes; (ii) a centralized electronic archiving system to support efficient records management within Government; (iii) a unified business registry system for the Office of the Registrar General of Rwanda to lower the administrative barriers to starting a business, increase legal compliance and access to finance; (iv) an upgraded building permit management information system to address the exponential increase in housing demand. To enable streamlined and digital G2P payments, the project will also finance the digitization of existing paper-based records and information systems managed by SACCOs. This will build on work initiated under the Strengthening Social Protection Project (P162646) to digitize social cash transfers that target low-income households, designed to expand government's use of digital G2P payments and stimulate uptake of digital financial services. This activity is also viewed as auxiliary to investments made under sub-component 1.1. that will boost access to smart devices among Rwanda's low-income households, thereby equipping them with the means to receive digital payments.

(d) **Flagship sectoral digitization initiative: Health Sector.** This activity will help transform service delivery in the health sector by enabling the full digitization and integration of the existing digital health systems introduced[119] across multiple points of care with the aim to improve the quality of patient services and facilitate the work of health care providers. Support will tackle gaps highlighted by the COVID-19 pandemic, but also aid in climate change adaptation by tackling projected rise of health infections by 10-

[119] A number of information systems have been put in place including the integrated routine reporting Health Management Information System, EMR, Logistics Management Information System, Mobile Community based information System (RapidSMS), Health Resource Tracking Tool, Laboratory Information System, Blood Bank Information System (eProgesa), Product Regulatory Information Management System and Telemedicine Network.

30 percent[68] due to extreme weather events. Support will be anchored in Rwanda's new Healthcare Digital Transformation Blueprint, informed by data management, interoperability standards and sectoral enterprise architecture already developed by the MoH and RISA, as well as forthcoming feasibility studies for the EMR and Hospital Information Management System. Key elements to be supported include: (a) TA for enabling frameworks for secure health data handling, including classification of patient data and health records; (b) scaled roll-out of a new HIE platform that will connect disparate systems in place and new systems introduced; (c) further development of the existing EMR system, making it more comprehensive, standardized and fully automated, and supporting its set-up and use at more health facilities; (d) improved data hosting for key systems deployed using a hybrid cloud-based solutions; and (e) basic IT and network equipment purchase and installation at health care facilities. Support provided will be closely aligned with activities financed under sub-components 2.1, 2.2 and 2.4, in respect to application of digital ID and trust services, integration with the GESB, use of the Government Data Hub and shared hosting solutions, as well as data and security standards established. It will also be enabled by connecting select hospital and health posts to broadband connectivity (financed under sub-component 1.3).

(e) **Comprehensive capacity building and change management** to create a cadre of digitally savvy government leaders, IT professionals and service users, strengthening the GoR's digital workforce and facilitating the successful development, deployment, maintenance, and uptake of e-services financed. The activity will support(i) a public sector training needs assessment and digital skills development plan; (ii) specialized training for high-level Government officials; (iii) training of government IT professionals in charge of developing and maintaining Government's core IT systems and e-service delivery at central and sectoral levels (including RISA's CDOs and their support teams); and (iv) TA for change management, related communication and awareness to ensure effective uptake of e-services developed, including any technical and targeted end-user training.[120]

Sub-component 2.4: Cybersecurity resilience and data protection. (US$19.50 million equivalent)

34. **This sub-component will strengthen the GoR's capacity to mitigate risks associated with the expansion of digital public services by enhancing its capabilities to detect, prevent, respond, mitigate, and recover from cybersecurity attacks as well as manage data protection.** Key activities to be financed include:

(a) **Strengthened cybersecurity operational capacity**, which will feature support for (i) the development of institutional and policy frameworks for the newly established NCSA and existing Rw-CSIRT, including the development of strategies, work and action plans, as well as standard operating procedures; (ii) technical and operational capabilities, featuring hardware, software, platforms, and systems for the NCSA and technical upgrades for the national CSIRT and the Security Operations Center to support the management of key operational and technical functions; (iii) capacity building and awareness raising programs**,** including training for key stakeholders and facilitation of cybersecurity professional certifications, and (iv) support for international partnerships and collaboration with other cybersecurity agencies, CSIRTs or relevant associations, including support for staff exchanges.

(b) **Foundations for data protection operationalization** that will finance (i) the development of policy and institutional frameworks that support the establishment of a new DPO and its operationalization in line with the principles laid out in the adopted PDPP law (2021); (ii) the DPO's technical and operational

[120] That would be complementary or build on the DAP (under sub-component 1.2), which seeks to boost the digital skills of the general public to use e-services.

capacity, including the equipment, software applications and IT platforms needed to, for example, establish a registry of data controllers and data processors, and dedicated complaints mechanism; and (iii) capacity building and awareness raising programs, including substantive training for data protection officers and awareness raising campaigns for the public at large on the handling of personal data (also supported under sub-component 2.1).

Component 3: Digital Innovation and Entrepreneurship.

Sub-component 3.1: Regional digital entrepreneurship hub. (US$22 million equivalent)

35. **This sub-component will improve the survival and growth rates of technology-enabled startups in Rwanda and strengthen Rwanda's position as a regional 'test bed' for innovation**. The project will finance technical assistance and capacity building for key government agencies to foster the enabling environment for digital innovation and entrepreneurship; offer financing on a competitive basis to ESOs to enhance their operations and programs; finance the launch of an international acceleration program to strengthen the pipeline of investible startups and for catalytic interventions to boost financing for startups, thereby addressing challenges both on the supply and the demand-side. Key activities to be financed include:

(a) **Support for enabling strategies, policies and institutions for digital innovation** that will, inter alia, include support for the introduction of a new 2021-2026 Smart Rwanda Master Plan, a new National Innovation Strategy, and other relevant innovation policy and legal instruments. Support will also be provided to agencies mandated to enable the development of Rwanda's innovation and entrepreneurial ecosystem, with financing for training, TA, operating costs associated with industry consultation etc. Support will be provided to key institutions that support the innovation agenda, including the MINICT, RISA, the RDB and KIC.

(b) **Performance-based grants for ESOs that serve digital startups,** which aim to encourage quality-based and self-sustaining ESO models that offer better services, and entrepreneurship support programs. Competitively selected ESOs will have to demonstrate their ability to contribute toward the achievement of their performance contracts to reduce the risk of funding non-viable or non-performing entities, as well as reliance on donor funding. Through the innovation window under the performance contract for ESOs, innovation challenges to catalyze new public sector services using newly available data sets could be introduced and/or solutions to other digital access challenges identified. In addition, beneficiary start-ups could be engaged to help improve the government data hub's data sets as appropriate. This intervention will also support the creation of new programs based on priorities informed by the strategies developed (under activity (a)), including in areas such as cybersecurity, fintech among others. There will be a performance-based grant agreement between RISA and each beneficiary.

(c) **Launch of an international accelerator that serves digital startups**, with financing support provided to attract a high-quality international player to the local market, allowing local startups to benefit from their existing expertise, market linkages, curricula, networks of mentors and investors and brand power. The international acceleration program is expected to also attract startups to Rwanda, thereby supporting internationalization of the market and expanding the pipeline of investible startups.

(d) **Early-stage finance mobilization for digital innovation,** including support for investment events to attract external investors and regional entrepreneurs, training programs for angel investors and fund managers. Options will also be explored on appropriate mechanisms for providing financing to catalyze early-stage investments to be managed by a suitable FI such as the BRD. Instruments selected could

potentially serve as a fund-of-funds to catalyze private sector investment, whereby the project would contribute financing to capitalize the fund as well as overhead fees. By enhancing technical support and access to early-stage finance focused on high-growth potential startups, the interventions under Component 3 will also complement the Access to Finance for Recovery and Resilience project, which aims to increase access to finance and support recovery of MSMEs, focusing on the provision of credit through microfinance institutions and banks.

Sub-component 3.2: Next generation capabilities for the digital economy. (US$7.5 million equivalent: of which US$3.75 million from IDA, US$3.75 million from AIIB)

36. **This sub-component will equip young Rwandans with advanced 21st-century digital skills, boosting local capacity to contribute to digital entrepreneurship and innovation.** Key activities to be financed along the two-pronged approach described earlier include:

(a) **Further development of the RCA** managed by the MINICT (in collaboration with MINEDUC), with TA and financing support allowing the RCA to: (i) scale-up to one additional campus, (ii) develop a more effective operating and training model (based on a demand-driven curriculum and in close collaboration with the private sector), covering CapEx and OpEx costs for the project duration. CapEx cost will include works to retrofit and equip new sites with requisite equipment, whereas OpEx will be tapered out over time to ensure sustainability, covering the costs such as the recruitment of specialized trainers and industry workshops etc. Support will also be provided for tracer surveys to track students' transition to further education and/or employment, and employer satisfaction with graduates, where appropriate.

(b) **Performance-based grants for technology bootcamps** and other innovative digital technology skills training models that support their expansion and operations. These will be disbursed in tranches against different milestones, such as employment rates. There will be a performance-based grant agreement between RISA and each beneficiary.

(c) **PhD scholarships for highly specialized digital training**, such as AI, robotics, blockchain, supporting a total of approximately 14 scholarships awarded on a competitive basis, managed by the Higher Education Council, in collaboration with MINICT and MINEDUC. Supported scholars will be required to support Government's digital development initiatives during their PhD training and for at least two years following graduation. Related financing will be subject to an agreement between RISA and the beneficiaries.

ANNEX 3: Detailed Economic and Financial Analysis

Summary

1. **The project is expected to contribute to accelerated GDP growth, innovation and job creation, long-term government cost savings and revenue increases as well as improved well-being**. Enhanced telecom market regulation, improved accessibility and affordability of broadband services and devices is expected to result in greater digital access and kick-start a more dynamic digital economy, with economic opportunities available to more people. Digitalization of the economy is also expected to bring tangible opportunities for services development and exports, including of digital solutions, digitally enabled services, and high-end expertise. Movement toward greater adoption of transactional e-services by Government, including increased application of digital authentication to access government services and digitally enabled identity verification modalities, is expected to improve government's efficiency and result in decreased labor costs and time savings, by inter alia allowing more services to be delivered and accessed remotely. Digital entrepreneurs and individuals supported by the project, with enhanced skills and opportunity/job pathways in the digital economy, would not only be better positioned to get higher paying jobs but could also generate employment opportunities for others that help propel future growth.

2. **The economic and financial analysis undertaken follows a standard Cost-Benefit Analysis (CBA) methodology.** The model relies on available secondary data and reasonable assumptions, based on prior WB experience cited below, which informs a cash flow and financial analysis for three different scenarios: Optimistic, Pessimistic and Neutral. When possible, the model also ran sensitivity assessments that quantified the benefits and costs attributable to the project against current baseline indicators. Based on the CBA conducted the overall Net Present Value (NPV) for the entire project in the neutral scenario is estimated at US$ 92 million, with a discount rate of 16.5 percent [121] and is expected to demonstrate an IRR of 37 percent over a ten-year period. The CBA for the optimistic and pessimistic scenarios result in an NPV of US$193 million and US$15 million, respectively, and an IRR of 53 percent and 20 percent respectively.

3. **Limitations.** The novelty of several components (particularly those related to device affordability, introduction of digital authentication, advanced skills and cybersecurity) result in limited data available today to make an accurate estimation of the expected economic and financial returns associated with related activities supported by the project.

Model assumptions for Component 1

4. **The project's activities supporting the increase in fixed and mobile broadband penetration are estimated to increase GDP from US$** 6 **million in 2026 to US$ 35 million by 2031**. Fixed broadband subscriptions are expected to increase from 0.14 subscriptions per 100 people in 2020 to 1.0 subscriptions per 100 people by 2025, on the back of project activities that will connect more locations to the network, including with fiber (e.g. sector office), though support for demand stimulation (device, literacy etc.) and enabling regulation for digital infrastructure investment (sub-components 1.1, 1.2, 1.3 and 1.4). Similarly, mobile broadband subscriptions (3G and 4G) per 100 people, are expected to increase from 19.10 subscriptions per 100 people in 2020 to 30.0 subscriptions per 100 people by 2025. These estimates leverage broadband multipliers from the WB and ITU:

[121] World Bank Data, Lending interest rate for Rwanda.

(a) **For every 10 percent increase in fixed broadband there is a 1.40 percent increase in GDP growth.** Source: Kim, Y., Kelly, T., & Raja, S. "Building broadband: Strategies and policies for the developing world", 2010. (More conservative figures were used to estimate the excepted impact through the project for each scenario: Neutral 1 percent; Pessimistic 0.5 percent; Optimistic 0.8 percent);

(b) **For every 10 percent increase in mobile broadband there is a 2.50 percent increase in GDP growth.** Source: ITU, "Economic Contribution of Broadband, Digitization, and ICT Regulation: Econometric Modelling for Africa", 2019. (More conservative figures were used for each scenario: Neutral 1.5 percent; Pessimistic 1 percent; Optimistic 2 percent);

(c) **For every 1 percent increase in broadband penetration there is a 0.30 percent increase in jobs.** Source: Information Technology and Innovation Forum (ITIF), "The Economic Benefits of ICT", 2013. (Pessimistic 0.20 percent; Neutral 0.30 percent; Optimistic 0.40 percent).

5. **Support for increased digital literacy at scale is expected to lead to higher employability of those trained, and subsequently job growth.** Project activities (sub-component 1.2) will increase coverage of widely needed basic digital literacy (with the focus on low-entry-tech skills). Using the ITU jobs multiplier, the project expects to generate some 16,241 jobs over a ten-year period. Using the respective multipliers for the optimistic and pessimistic scenarios, component 1 expects to create 21,654 and 10,827 jobs, respectively. Increased access to jobs will have a positive impact on drivers such as unemployment, diversification of the economy and household income, but also contribute to gender balance in the workforce, where specific measures have been taken to attract more women to ICT-enabled jobs (see Annex 4).

Model assumptions for Component 2

6. **The public sector is expected to benefit from cost savings, on the back of the productivity gains associated with digitizing its service delivery.** Gains have been quantified based on previous WB IPFs, featuring investments in digital ID and e-services, and best practices countries like Estonia and Moldova:

(a) **GDP multiplier:** Using official figures from the Government of Estonia[122], we estimate an increase of 0.45 percent in GDP per year, as a result of the operationalization of a data sharing platform (Enterprise Service Bus) and digital ID verification and authentication capabilities. This multiplier is used for the optimistic scenario, while the neutral scenario applies a more conservative figure: 0.30 percent. (Neutral: 0.30 percent; Pessimistic 0.10 percent; Optimistic 0.45 percent);

(b) **Savings from digitization of service delivery:** To estimate the savings that arise from transitioning from paper-based to digital-enabled service delivery, the model leverages the savings figures observed in Moldova. An in-depth assessment done in Moldova concluded that prior to digitization, the cost of handling, storing, and processing a document reached US$ 3.5 per document. After digitization, this cost went down to US$ 0.75, a 79 percent unitary cost reduction[123]. This reduction is used for the optimistic scenario, while a 60 percent reduction is used for the neutral scenario (Neutral: 60 percent; Pessimistic 40 percent; Optimistic 79 percent).

(c) **Savings from streamlining social protection payments by investing in the digitalization of SAACOs and identity verification modalities:** Approximately 40 percent of the adult population in Rwanda receive

[122] See: https://e-estonia.com/wp-content/uploads/eestonia-guide-2018.pdf
[123] Government of Moldova, "Feasibility study on enhancing citizens access to Administrative Services at local level".

some kind of transfer from the Government on a monthly basis. By supporting digital identity verification modalities and digitalization of SAACOs, the project will contribute to the overall agenda for streamlining cash transfers in Rwanda, expected to result in reduction of "ghost" beneficiaries, better budget transparency and accounting of government funds. This will help reduce the operational costs for both the GoR and beneficiaries. To estimate these savings, the model leveraged the economic assessment conducted in Albania in 2017 for different substitution scenarios and savings at the economy level. These scenarios include savings from changing cash for electronic credit transfer, cash for debit card, cash to online money, mash to e-money among others[124]. Different adoption rates of the different substitution scenarios were applied for the three scenarios i.e., optimistic, neutral, and pessimistic.

7. **Some expected project impacts are hard to quantify due to the lack of data or methodological limitations, as is the case for cyber security.** Project activities will help to improve cybersecurity readiness and resilience. While there are few studies and assessments that evaluate the impact in economic terms of cybersecurity investments, there is growing evidence pointing to the possible economic losses and disruptions stemming from increasing cyberattacks, including those related to critical information infrastructure (such as airports, electrical grid, traffic management systems, etc.) and losses associated with that. Investment supported will thus help stem current losses recorded. However, for the purposes of this project, the following assumption was used: According to the paper "Integrating cost–benefit analysis into the NIST Cybersecurity Framework via the Gordon–Loeb Model", an investment of US$ 7 million to reach NIST Tier 4 results in at least US$ 0.64 million additional benefits. This means that for each dollar invested, a return of approximately 9.1 percent can be expected. This yield has been integrated in the model as a proxy.

Model assumptions for Component 3

8. **A stronger entrepreneurship ecosystem is expected to support increased productivity through improved firm performance and better employment opportunities, generating jobs and higher salaries**. It is important to highlight that this economic analysis is only able to measure some of the direct benefits stemming from project activities but cannot forecast the value to constituents and positive externalities, which can be predicted but not measured. The economic and financial analysis estimates the difference in cash flows to beneficiaries (startups) supported through the project (component 3.1). Startups are categorized into four categories (Star, Sustained, Subsistence, and Fail), which are expected to achieve the following results due to project interventions:

   (a) **Increased firm performance:** Due to investments in early-stage finance mechanisms supported and the improvement of ecosystem support services delivered throughout project implementation, the model expects the startup failure rate to decrease compared to baseline figures, based on best practice baseline scenario data from Kenya[125].

   (b) **Increased employment and salaries:** In terms of employment generated, the model estimates different employment levels by startup category and job level (founder or employee). The model also assumes that jobs created by entrepreneurs will receive an estimated monthly salary of US$580, which is significantly higher than the average salary for unskilled workers in Rwanda (US$52).

[124] Data from the report "The Retail Payment Costs and Savings in Albania" https://documents1.worldbank.org/curated/en/318231529480715381/pdf/19-6-2018-15-31-4-WBRetailPmtAlbaniaWEBFinal.pdf
[125] Data from Kenya Industry and Entrepreneurship Project (P161317) See: *https://projects.worldbank.org/en/projects-operations/project-detail/P161317*

9. **Investments in next generation capabilities are likely to result in an increase in salaries and employment, and enhance innovation owing to skills upgrades.** The impacts considered in the next generation capabilities economic (sub-component 3.2) analysis are: (i) the monetized value of jobs created with a substantial increase in salaries, and (ii) innovation and entrepreneurship stemming from a skills upgrade.

   (a) **Increase in salaries:** The model assumes that trainees will have greater access to better paid jobs. Advanced skills workers will receive an estimated monthly salary of US$517, which is higher than the average salary for professional workers in Rwanda – US$383.

   (b) **Increase in employment:** The model assumes that bootcamp trainees will be more employable. The percentage of advanced skills workers starts at 15 percent for the neutral scenario (20 percent for optimistic and 8 percent for pessimistic) and grows steadily until year 5. PhD and RCA graduates hired post-graduation only kick-in after year 3, since it is assumed that PhD students need at least two years to graduate and the RCA program lasts three years.

   (c) **Entrepreneurship:** The model assumes that some of the trainees and PhD students that participate in project-funded activities, will apply the acquired skills to innovation and entrepreneurship. The model expects 12 startups to be developed in year 2 in a neutral scenario, 15 in the optimistic and 8 in the pessimistic. By the end of year 5, 16 startups are expected in the neutral scenario. For the optimistic scenario, the number of startups is expected to reach 19, and in the pessimistic scenario, the model expects 10 startups to be created.

ANNEX 4: Identified Gender Barriers and Proposed Actions

1. **Findings from the gender analysis done for the project are presented below in Figure 4.1 and Table 4.1.** Several gender gaps were identified and related actions included in the project design, consistent with existing national gender policies and gender-specific targets for ICT adopted, as noted in Section IC, and wider research on important interventions and design choices that affect women's access to digital services.[126] They are also aligned with the core pillars of the WB Gender Strategy, 2016-2023, focused on: (i) Improving Human Capital Endowments; (ii) Removing Constraints for More and Better Job; (iii) Removing Barriers to Women's Ownership and Control of Assets; and (iv) Enhancing Women's Voice & Agency and Engaging Men & Boys.

Figure 4.1: Key identified gender gaps within the ICT sector in Rwanda

Table 4.1: Summary of proposed actions to address identified gaps in Gender in ICT

ANALYSIS: **Gender gaps identified**	**ACTIONS:** **Proposed actions taken to address gaps**	**INDICATORS:** **How bridging the gap will be measured**
Component 1: Digital Access and Inclusion Women and girls have weaker access to digital tools and services, exemplified by lower access to broadband.		
Weaker access to broadband: 18.5 percent male-headed households versus 3.2 percent female-headed households have access to the internet, which mean that women are left out of the digital economy and fail to receive the digital dividends associated with being online.[127]	Many barriers to digital access (digital literacy, device access) are in turn characterized by gender gaps, resulting in weak digital access among women overall. **Actions proposed below will aim to boost women's access to broadband.**	**Broadband penetration among women** *(PDO level indicator)* Target = 50 percent
Lower digital literacy level: Digital literacy levels are 7 percent for women versus 11 percent for men.[128] While digital literacy levels are low across the board, preventing digital access and usage, more women are illiterate than men, which also means that women are likely to face a	**Ensure that digital literacy training provided is designed to accommodate women and encourage their participation to expand digital literacy training coverage and attainment among women** (Digital Ambassadors Program - sub-component 1.2), by inter alia: • Ensuring that re-design and outreach around the DAP scheme is informed by consultations with women.	**Percentage of women trained in digital literacy** *(Intermediate level indicator)* Target= 40 percent

[126] GSMA (2020), Reaching 50 Million Women with Mobile: A Practical Guide. See: *https://www.gsma.com/mobilefordevelopment/reaching-women-with-mobile/*
[127] NISR (2018), EICV5, Gender Thematic Report. See: htts://www.statistics.gov.rw/publication/eicv5thematic-reportgender
[128] Ibid.

ANALYSIS: Gender gaps identified	ACTIONS: Proposed actions taken to address gaps	INDICATORS: How bridging the gap will be measured
steeper learning curve.[129] Several factors may also deter women from participating in training, when offered, including the chosen modality, time, location, and perceived relevance.[130]	• Hiring female trainers to ensure that women feel safe and can relate to their trainers – e.g., ensuring 50-50 gender parity in hiring of Digital Ambassadors. • Developing relevant training material and tailored curricula/content for women, in priority sectors such as Education, Finance, Agriculture, and Health. • Delivering training in locations convenient and safe for women, and at times suitable for women. • Complementing training with flexible options for accessing training material – e.g., allowing it to be juggled with domestic work and/or childcare.	
Lower ownership of smart devices: 54.4 percent of female-headed households own a mobile phone versus 71.1 percent for male headed households.[131]A key factor affecting device ownership is that the affordability barrier faced in acquiring a device is often starker for women, based on existing household incomes figures. Weaker ownership of assets that can be used as collateral also make women less attractive clients for prospective lenders.	**Ensure that women are equipped with broadband-compatible smart device to enable internet access through access to enabling financing.** This will be achieved through (Device access scheme - sub-component 1.1), featuring: • Demand assessment and scheme design that will be refined through consultation with women. • Proactive outreach and communication to reach women and female-headed households – e.g., leveraging women-run associations to promote the scheme. • Earmarked targets for reaching female-headed households, using financial instruments selected – e.g. including possible incentives for operator to sign-up women.	**Female-headed households that receive financing support for smart devices** *(intermediate level indicator)*. Target= 50 percent
Component 3: Digital Innovation and Entrepreneurship Women remain underrepresented within digital innovation and entrepreneurship, and the ICT sector workforce overall.		
Weaker participation in digital start-up and innovation ecosystem. Stakeholder consultations suggest that women are under-represented**,** inter alia due to weaker access to tailored support services and training that would equip them to access wider opportunities presented by digital jobs, and in the absence of incentive that encourage them to	**Ensure that better ecosystem support services are on offer for female innovators and entrepreneurs to ensure they succeed.** This will be achieved through (Sub-component 3.1), featuring: • Mentorship and challenge programs tailored for women. • Performance-based targets for supporting female-founded startups to encourage entrepreneurship/self-employment in the ICT sector.	**Percentage of female-owned digital startups supported creating and/or levering a digital technology solution** *(PDO level indicator).*

[129] WB (2018). 68 percent for adults (female) over the ages of 69 compared to 78 (male) (based on UNESCO data). See: https://data.worldbank.org/indicator/SE.ADT.LITR.FE.ZS?locations=RW
[130] UN -Equals Global Partnership (2019), Taking Stock: data and evidence on gender equality in digital access, skills and leadership
[131] NISR (2019), EICV 5, 2016-17.

ANALYSIS: Gender gaps identified	ACTIONS: Proposed actions taken to address gaps	INDICATORS: How bridging the gap will be measured
access related services and training. This is exemplified by lower participation in the ICT sector overall. Only 26 percent of those employed in the ICT sector are women, while 74 percent are men.[132]	• Ensuring access to early-stage financing for women - e.g., through earmarked funds and/or financing mechanisms	*Target=30 percent*
Lower access to advanced digital skills training. Several factors help explain why women are under-represented within the digital start-up and innovation ecosystem and have weaker access to jobs in the sector. Key among them is lower attainment of advanced digital skills and access to relevant training. Women are under-represented in science, technology, engineering, and math (STEM) education**.** Women tend to have both lower enrollment and completions rates. Only 35 percent of graduates from STEM programs in tertiary education are women.[133]	**Ensure that more women access and complete advance digital training programs made available to enable access to employment.** This will be achieved through (Next generation capabilities for the digital economy - sub-component 3.2): • Promoting related training opportunities to women. • Maintaining a 50-50 gender parity in each class intake in advanced digital skills institutes supported such as the Rwanda Coding Academy to ensure access (sub-component 3.2) • Institutionalizing career guidance and coaching to make sure girls are mentored to pursue and complete STEM programs. • Supporting women-only trainings events such as Boot Camps. • Ensuring that training facilities are equipped to accommodate women - e.g., with sanitary and hygiene products. • Considering linking to complementary schemes that enable childcare. • Making more PhD scholarships available to women that strengthens the existing reward schemes for best female performers in STEM.	**Percentage of female graduates from specialized digital skills training employed or in education within 12 months after completion** *(intermediate level indicator)*. Target= 35 percent
Component 4: Project Management and Institutional Coordination A lack of gender data in respect to ICT sector participation prevents effective action.		
Weak access to gender-disaggregated ICT sector data, collected regularly, prevents the formulation of effective policies, programs, and policy-makers' ability to track progress over time.	**Ensure the collection of gender-disaggregated industry data.** This will be achieved through (Regulatory TA – sub-component 1.4; Gender data collection – component 4), featuring: • TA for the industry Regulator to enable the collection of data from operators in respect to women subscription levels and services usage. • Collection of gender-data as part of the project-level M&E.	Broadband penetration among women *(PDO level indicator)* Target = 50% This would be a new data point introduced in the

[132] NISR (2018), EICV5, Gender Thematic Report.
[133] WBG Gender Data Portal (2018). See: *https://databank.worldbank.org/id/2ddc971b?Code=SE.TER.GRAD.FE.SC.ZS&report_name=Gender_Indicators_Report&populartype=series*

ANALYSIS: Gender gaps identified	ACTIONS: Proposed actions taken to address gaps	INDICATORS: How bridging the gap will be measured
		quarterly telecom statistics report published.

ANNEX 5: Support for Climate Change Adaptation and Mitigation

A. Climate vulnerability context

1. **Rwanda has been identified as being highly vulnerable to climate change.** Rwanda ranks 153 out of 177 in the Notre Dame Global Adaptation Index (13th on vulnerability and 95th on readiness), indicating high vulnerability but low readiness to combat the effects of climate change.[134] High vulnerability to climate change, as highlighted by the WB' climate risk assessment[135], stems from rising temperature levels and variable rainfall patterns, inducing high risks of flooding and landslides due to Rwanda's hilly terrain, which inter alia impacts energy security (as hydropower has emerged as a key energy source), increases the risk of vector borne disease-transmission, and damages physical infrastructure including digital. Since the early 2000s, the frequency and severity of disasters, particularly caused by floods, landslides, and droughts, have significantly increased, with increasing impact of human casualties as well as economic and environmental losses. Moving forward, natural disasters are due to the increase in both frequency and intensity. The risk and intensity of flooding through increased frequency and intensity of heavy rainfall events is expected to increase. Additionally, the country's eastern and central areas are expected to experience increased aridity and drought, with significant impact on livelihoods[136] Factors contributing to low readiness inter alia include limited use of energy-efficient and resilient infrastructure, limited e-waste management and inadequate preparedness due to lack of climate change forecasting. The economic costs of climate change are estimated at upwards of 1 percent of GDP each year by 2030.[137]

B. Plan for addressing climate vulnerability

2. **Rwanda is committed to ensuring its future stability and prosperity through mainstreaming climate change into all sectors of the economy and achieve climate resilience and low carbon development**.[138] The World Bank Climate and Disaster Risk Screening Report for the project provides a 'moderate' risk rating for the project's and highlights the need to strengthen institutional and technical capacity to enhance climate resilience. In line with these recommendations, the project has placed an emphasis on investments in climate-smart infrastructure, capacity building and expansions of digital services that help increase response capacity and reduce Rwanda's climate footprint. The project is thus expected to have a positive impact on Rwanda's adaptive capacity and support climate change mitigation – and thus contribute to Rwanda's 2020 Updated Nationally Determined Contributions (NDS) targets, featured in the Paris Agreement. See table 5.1.

[134] Notre Dame Environmental Change Initiative (ND-GAIN) (2019) Country Index, Vulnerability and Readiness.
[135] WB (2021), Climate Risk Profile: Rwanda See: https://climateknowledgeportal.worldbank.org/sites/default/files/2021-09/15970-WB_Rwanda%20Country%20Profile-WEB.pdf
[136] WB (2021), Climate Risk Profile
[137] Downing, T., Watkiss, P., Dyszynski, J.; et al (2009). Economics of Climate Change in Rwanda.
[138] Republic of Rwanda (2011). Green Grown and Climate Resilience – National Strategy for Climate Change and Low Carbon Development. Kigali. October, 2011. see: https://cdkn.org/wp-content/uploads/2010/12/Rwanda-Green-Growth-Strategy-FINAL1.pdf

Table 5.1: Climate change risks, capacity gaps, related project interventions and potential impact

Adaptation

Climate change risks linked to the project	Corresponding project interventions and financing
Natural disasters, including flooding and landslides, are expected to adversely impact network and connectivity infrastructure deployed, as well as contribute to the deterioration of older infrastructure, and adversely impact the cost of infrastructure maintenance.[139] Climate-induced changes in rainfall patterns increase the risk of flooding and landslides in Rwanda, which could damage existing and future critical digital infrastructure, resulting in network and service outages that leave communities unconnected. Heavy rainfall events are especially common in northern and western provinces, where flash flood events can trigger landslides and mudslides, leading to infrastructure damage.[140] For example, in 2016, floods and landslides blocked roads, destroyed bridges, and damaged 1,425 homes in Gakenke district[141] and similar events could affect project-related sites where infrastructure will be deployed, especially in northern and western provinces. Specific risks include: flooding of buildings that house server rooms (e.g. the network operations center); duct and silt damage; scoured cables and damaged foundations; cable heave from uprooted trees stemming from flooding and landslides etc. Moreover, in the wake of adverse weather events, maintenance and repair of digital infrastructure is inherently challenging due to Rwanda's hilly terrain, which increases the likely impact and duration of network disruption.	**Sub-component 1.3 – Last mile connectivity access** (US$ 33.5 million, of which approximately 67 percent will support **climate risk mapping, implementation of adaptive strategies and use of climate-resilient and climate-proof digital infrastructure technologies and investments** as part of the efforts to expand access to high-speed broadband among select public institutions, as well as targeted public spaces (e.g., local government offices, schools, marketplaces), across the country. Specifically, the project will: • Support network planning and deployment of enhanced network management solutions, including TA which will map locations to be connected and support development of technical and design specifications, **factoring in climate data, climate-induced risks and resilience measures (e.g. climate proofing and, if necessary, relocating critical assets).**[142] (~$US 0.45 million). • **Based on this mapping, the adaptive design-measures will be identified and integrated into planning and tender specifications** for the Network Operations Center (~$US 1 million) and connectivity capacity purchase (~$US 18 million) to ensure more climate resilient infrastructure investments informed by climate data.
Climate-induced energy insecurity could adversely affect reliable access to internet and digitally enabled services. Digital infrastructure is highly dependent on a reliable energy supply. Rwanda's energy sector is heavily dependent on environmental resources with around half of its electricity coming from hydropower and more than 80 percent of the population depending on wood fuel for their daily energy needs. This makes the country highly	**Sub-component 1.3 – Last mile connectivity access** • **Energy resilience:** Enabling infrastructure and equipment for targeted institutions, particularly schools, will include **support for sustainable energy solutions** (e.g. off-grid solar solutions) (~$US 2.8 million), where missing, to enable reliable broadband access and use in connected locations. *(part of the 67% estimate for 1.3).*

[139] WB (2021), Climate Risk Profile: Rwanda
[140] WB (2021), Climate Risk Profile:
[141] USAID (2018), Rwanda Climate Change Risk Profile
[142] WB (2019), No broken link -The Vulnerability of Telecommunication Infrastructure to Natural Hazards

Climate change risks linked to the project	Corresponding project interventions and financing
vulnerable to climate change and natural disasters.[143] For example, variable rainfall and evaporation, where droughts also reduce the generating capacity of hydroelectric dams, and floods increase soil erosion and siltation that can damage dams[144], and subsequently interrupt energy supply for critical information infrastructure. Rwanda is committed to increasing the share of renewable energy in its power generation.[145]	
As described, climate change adaptation is a government priority but there are gaps in capacity and the enabling environment to manage climate change risk adequately in the telecom sectors (and more broadly). Integrating climate change data and risks into relevant Government policies and planning processes has been identified as a key gap that needs to be bridged. [146]	**Sub-component 1.4 – Legal, regulatory, and institutional capacity for broadband market development** (US$4 million, approximately 2.5 percent of which will be channeled towards **enabling policy and regulatory development for climate change adaptation** (and mitigation) in the telecoms sector. *Also see mitigation table.* • The MINICT and industry regulator will be supported to **adopt a new climate smart and resilient digital infrastructure policy and regulatory guidelines**, informed by international best practice[147], on the back of targeted TA (~$US 0.1 million) and related capacity building.
Paper-based government records are critical to essential service delivery are also highly vulnerable to climatic events such as floods. Approximately 40 percent of all civil records in Rwanda still exist and are stored in paper-based format,[148] making them vulnerable and recovery almost impossible should any adverse weather events such as flooding inundate local public government offices, where paper records are kept. This risk could be reduced by digitalizing critical paper records such as birth and death registration and backed-up electronically.	**Sub-component 2.1 – Digital identification and authentication** (US$39.3 million) • Of which approximately 12.7 percent will support the **digitalization of select civil records, which will improve disaster recovery capacity**: (i) TA will support the planning of this activity, which **will consider climate data and flooding risk when prioritizing and sequencing local office locations to target** for paper records digitization (~US$ 0.2 million); (ii) Digitization and indexing of civil registration records (~US$ 4.8 million) will allow digital records to be stored electronically and on the government cloud, allowing for **back-up and retrieval of birth, death, marriage record electronically in the event of a climate related calamity,** increasing resilience and service delivery capacity as part of the effective disaster risk management.
Efficient mechanisms for identification will be key to boosting response capacity to climate-related	• Of with approximately 79 percent will **support the roll-out of a new single digital ID system** as an inclusive and

[143] WB (2021), Climate Risk Profile: Rwanda
[144] USAID (2018), Rwanda Climate Change Risk Profile.
[145] Republic of Rwanda (2020), Updated Nationally Determined Contribution. See: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Rwanda%20First/Rwanda_Updated_NDC_May_2020.pdf
[146] Ibid.
[147] For example: Operational energy Efficiency for Users; Technical Global Key Performance Indicators for Fixed Access Networks and Environmental Engineering; Assessment of mobile network energy efficiency.
[148] Internal MINICT consultations

Climate change risks linked to the project	Corresponding project interventions and financing
events and natural disasters. Providing people with a choice of identity credentials (such as a plastic card, virtual or mobile based), and introducing efficient identity verification mechanisms, significantly contribute to the ability of the government to provide uninterrupted and targeted services to people in the aftermath of climate events and natural disasters. For example, the ability to seamlessly verify the identity of beneficiary just based on fingerprints.	trusted digital identification and authentication framework in support of improved and uninterrupted online and offline service delivery, which is key during climate induced disasters and that can enable rapid disaster response (~US$ 31.2 million).
Weak weather and climate data analysis capacity prevents effective adaptative strategies and policy responses to climate change. Government lacks the technology, frameworks, and know-how to collect, manage and analyze climate data effectively in ways that support increased preparedness – e.g. for use in predictive forecasting and more advanced analysis that factors in uncertainty in modeling, and that explores impact across sectors.[149] Capabilities for handling climate change data has been identified as a key gap that needs to be bridged to boost Rwanda's response capacity, including technical capacity to analyze e.g. hydro-met data and project impacts across sectors, and in the event of health and natural disaster events.[150]	**Sub-component 2.2 – Government data management, sharing and analytics** (US$10 million, of which approximately 5 percent will be channeled towards **big data use cases that support climate change adaptation analytics/forecasts**). The wider sub-component will improve the GoR's ability to securely manage, share, analyze and harness data for improved service delivery, policy development and planning, on the back of shared data frameworks, platforms, infrastructure, and big data analytics capabilities: • The governance data hub and related analytic capabilities introduced will be leveraged to directly support strategic data analytics use cases that support climate change adaptation and mitigation, financed by the project (~$US 0.5 million). Related support will inter alia involve: (i) **collating and cleaning relevant climate data** (e.g. temperature, precipitation) in machine-readable formats, building on wider support provided for geo-spatial data collection; and (ii) **developing and applying relevant analytical models to climate impact and response analysis** that can feed into policy-making, with potential to apply AI. Related models may also draw on health related data to map climate-induced project impacts across sectors including health (see next point).
Climate change is projected to have health effects, particularly on the rate of infectious diseases, that need to be actively mitigated. Rwanda is highly vulnerable to the adverse health impacts of increasing temperatures, increased aridity in some areas and risks of extreme rainfall. In Rwanda, vector-borne diseases that are expected to increasingly impact human health due to climate change are malaria, tick bite fever and	**Sub-component 2.3 – e-Services in key sectors** (US$32.3 million. • Of which approximately 36 percent will target **e-health initiatives that will boost the country's ability to deal with the increased burden of infectious diseases** due to climate change**.** The sectoral flagship digitization initiative in the health sector will help transform and improve service delivery by enabling the full digitization and integration of existing digital health systems**,**

[149] Global Climate Adaptation Partnership UK (2014), Future Climate for Africa, Rwanda Pilot. See: https://cdkn.org/wp-content/uploads/2014/05/Rwanda-FCFA-final-report-vs-2.pdf
[150] WB (2021), Climate Risk Profile: Rwanda

Climate change risks linked to the project	Corresponding project interventions and financing
schistosomiasis.[151] Infectious diseases are estimated to increase by between 10-30 percent in Rwanda, due to changes in climatic factors.[152] Rwanda has experienced a temperature increase of 1.4°C since 1970 and this is expected to rise to 2.0°C by the 2030s. This will, for example, make previously malaria-free highlands highly suitable for malaria in decades to come, with populations at risk increasing by 150 percent by 2050.[153] Water contamination from increased flooding is also expected to raise the risk of diarrheal disease, typhoid, cholera, and hepatitis A.[154] While Rwanda has made some progress in supporting health sector reform through digitization, COVID-19 has demonstrated that further investment is needed to boost response capacity to infectious diseases, which would be required to adapt to the growing health impacts stemming from climate change. Gaps in existing systems for monitoring, preventing, and effectively responding to increasing rates of infection due to climate change, has been identified as a key gap.[155]	**boosting the sector's adaptative capacity and increasing information-sharing**, which has been identified as critical to adaptation.[156] A new and upgraded health information systems, health information exchange and health data cloud will **increase the health care system's response capacity, allowing for improved health data management, as well as better health mapping, monitoring, and forecasting of diseases and health issues, including climate change induced health issues** (~$US 12.5 million). This will allow the sector to better respond to potential climate-related hazards.
Efficient and remote mechanisms for delivering social assistance to exposed and vulnerable groups in the aftermath of climate related emergencies will be key to boosting response capacity to climate events.[157] Digitizing and streamlining safety nets payments will translate into more timely support for population affected by climate-related disasters and the ability of government to rapidly and efficiently deliver the social assistance needed in the event or drought, floods or other natural disasters.	**Sub-component 2.3 – e-Services in key sectors** (US$32.3 million. • Of which approximately 9.6 percent will target the digitization of SACCOs (~$US 3 million), which is key to supporting wider efforts to digitize safety nets cash transfers and key to enhancing the resilience of vulnerable groups.

Mitigation

GHG mitigation potential	Project interventions and financing
Renewable energy generation See adaptation table on energy mix in Rwanda.	**Sub-component 1.3 – Last mile connectivity access** • **Renewable energy:** As noted 1.3 will include **support for sustainable energy solutions** (e.g. off-grid solar

[151] Ibid
[152] Swedish International Development Agency (2019), Rwanda Environment and Climate Change Analysis. See: https://sidaenvironmenthelpdesk.se/digitalAssets/1748/1748556_environment-and-climate-change-analysis-rwanda-2019-06-05.pdf
[153] Ministry of Foreign Affairs of the Netherlands (2018), Climate Change Profile, Rwanda. See: *https://www.government.nl/binaries/government/documents/publications/2019/02/05/climate-change-profiles/Rwanda.pdf*
[154] WB (2021), Climate Risk Profile: Rwanda
[155] Ministry of Health (2017). Fourth Health Sector Strategic Plan, July 2018–June 2024. See: *http://moh.gov.rw/fileadmin/templates/Docs/FINALH_2-1.pdf*
[156] Ibid
[157] WB (2021), Climate Risk Profile: Rwanda

GHG mitigation potential	Project interventions and financing
	solutions) (~$US 2.8 million), where missing, to enable reliable broadband access.
Telecommunications networks with energy efficiency levels that meet best practices. The most frequently used connectivity network infrastructure in Rwanda is currently high-energy consuming copper cables.[158] The project will prioritize investments in climate smart digital infrastructure, encouraging a shift away from high-energy-consuming coaxial cables and investment in more energy-efficient alternative technologies when expanding network infrastructure. [159]	**Sub-component 1.3 – Last mile connectivity access** (US$ 33.5 million, of which approximately 67 percent will support **energy-efficient digital infrastructure investments** as part of efforts to expand access to high-speed broadband among select public institutions, as well as targeted public spaces, across the country): • Investments in core network management infrastructure, such as the new Network Operations Center (~$US 1 million), and connectivity capacity purchase (~$US 18 million) will **apply use of energy-efficient fiber optic cables. Regulatory guidelines developed for climate-smart and energy-efficient infrastructure** will guide planning and design (see below) to ensure that network expansion includes relevant energy efficiency requirements in tenders.
Policy support and technical assistance for climate change mitigation related to telecommunications infrastructure. Currently, there is no policy or regulatory guidelines in place to encourage climate-smart and energy-efficient investment in digital infrastructure.	**Sub-component 1.4 – Legal, regulatory, and institutional capacity for broadband market development** (US$4 million, approximately 2.5 percent of which will be channeled towards enabling policy and regulatory development for climate change mitigation (and adaptation) in the telecoms sector): • The MINICT and industry regulatory will be supported to **adopt a new climate smart and resilient digital infrastructure policy and regulatory guidelines**, informed by international best practice[160], on the back of targeted TA (~$US 0.1 million) and related capacity building. As noted above, these guidelines will be applied to investments in network expansion, supported under sub-component 1.3.
Digitization of service delivery or internal operations, leading to a substantial reduction in travel or material use. Currently, service-users often need to physically travel to access/utilize public services. While the GoR has made progress in expanding e-services, only a handful are fully digitized end-to-end, which means they require physical presence and transport to services access points at some stage in the process, which contributes to related GHG emissions. Many	**Sub-component 2.1 – Digital identification and authentication** (US$39.3 million, of with approximately 65 percent will **support the roll-out of a new transformative single digital ID system**): • The new digital ID system (SDID), including digital ID credentials, digital verification mechanisms, e-signature capabilities is one of the **core building blocks for securely scaling e-service delivery that can cut down on the need to travel** (~US$ 31.2 million), thus contributing to reduced GHG emissions. The new digital

[158] National University of Rwanda (2011), The Impact of Fiber Optic Transmission in Multi-Service Network in Rwanda. See: https://www.memoireonline.com/04/12/5625/The-impact-of-fiber-optic-transmission-in-multiservices-networks-in-rwanda.html
[159] Cabling (2011), How Fiber can help make the network Greener. See: https://www.cablinginstall.com/cable/fiber/article/16465844/how-fiber-can-help-make-your-network
[160] For example: Operational energy Efficiency for Users (OEU); Technical Global KPIs for Fixed Access Networks (ETSI) and Environmental Engineering (EE); Assessment of mobile network energy efficiency (ETSI).

GHG mitigation potential	Project interventions and financing
governments records and systems are still in paper-based form, prompting significant use of related resources.	services will also consume energy but as noted the e-government activities focus on shared and reusable building blocks for e-services leading to energy efficient services (Component 2). **Sub-component 2.3: e-Services in key sectors (US$32.3 million)** will expand the availability of high-quality transactional end-to-end e-services in key sectors, reducing the need to travel and use of paper. A key example, includes: • Digitization of Savings and Credit Co-operatives (SACCOs) (~$US 3 million), which will support the digitization of existing paper-based records and information systems managed by SACCOs, enabling the digitization of social cash transfers.
Energy efficient telecommunication Consolidation of public back-end systems reduce energy consumption from duplicate data collection and storage.	**Sub-component 2.2 – Government data management, sharing and analytics** (US$10 million, of which approximately 25 percent will be channeled towards **facilitating improved data exchange and consolidated hosting capable of generating significant efficiency gains)** • Upgrading of the GESB (US$ 2.5 million) will enable seamless data exchange between various MDAs, allowing them to securely share their data, which will help reduce use of duplicate systems. To the extent possible energy efficiency considerations will be factored into design.
Reducing emissions by off-setting and expanding e-waste management. Rwanda currently generates approximately 10-15k tons of e-waste per year.[161] The project will invest in hardware and IT equipment that adds to this challenge (e.g., by stimulating increased access and ownership of smarts device that are likely increase in circulation, eventually leading to increased e-waste, when de-commissioned).[162] While Rwanda has regulation in place in respect to e-waste management and has introduced e-waste management facilities, these lack the scale needed to offset the increase in e-waste expected, as digital adoption accelerates. [163]	**Sub-component 4: Project Management** (US$10 million, of which approximately 2.5 percent will support **expanded e-waste management**); • The project will **scale-up e-waste collection centers, at district level**, working with Enviroserve (Rwanda's e-waste recycling facility), and provide any complementary training and communications support needed to ensure the use of said facilities, by expanding the coverage of framework contracts in place (~US0.25 million). Enviroserve is a regional front-runner in digital waste recycling and waste management.[164]

[161] RURA (2020), Creating a safe environment and job opportunities for Rwanda through Sustainable E-waste Management. See: https://rura.rw/index.php?id=104&tx_news_pi1%5Bnews%5D=986&tx_news_pi1%5Bday%5D=13&tx_news_pi1%5Bmonth%5D=11&tx_news_pi1%5Byear%5D=2020&cHash=9e4f16e1662b59a7181cc4f7af3bba7c
[162] MINICT internal stakeholder consultations
[163] ILO (2012), The Global Impact of e-waste. See: http://www.saicm.org/Portals/12/Documents/EPI/ewastesafework.pdf
[164] https://enviroserve.rw/

ANNEX 6: IDA19 Digital Commitments Applicable to the Project

IDA19 Theme	Area	Policy Commitments related to digital development	Relevant project component
Governance and Institutions	*Public service delivery*	Support at least 12 IDA countries to adopt universally accessible[165] GovTech solutions[166].	Component 2: Digital public service delivery
Jobs and Economic Transformation	*Creating and connecting to markets*	To help close the digital infrastructure gap, IDA will support 25 IDA countries to double their broadband penetration (16 on the African continent), including eight in landlocked countries, by 2023. At least 15 countries to improve skills considering the differential constraints facing young women and men, and people with disabilities. IDA will conduct 20 pilots in 'economic transformation IDA projects' to estimate indirect and/or induced jobs where feasible, jobs reporting will be disaggregated by the poorest quintile, gender, FCS, disability and youth	Component 1: Digital Access and Inclusion
	Building capacities and connecting workers to jobs	50 percent of entrepreneurship and Micro, Small and Medium Enterprises (MSME) projects will incorporate digital financial services and/or digital entrepreneurship elements – and ensure they address particular constraints facing women and people with disabilities.	Component 3: Digital Innovation and Entrepreneurship
Gender and Development	*Removing constraints for more and better jobs*	At least 60 percent of IDA19 financing operations for digital skills development will support women's access to higher productivity jobs, including online work.	Component 1: Digital Access and Inclusion Component 3: Digital Innovation and Entrepreneurship
	Removing barriers to women's ownership of and control over assets	All IDA19 financing operations for Digital Development will support women's increased access to and usage of digital services.	Component 1: Digital Access and Inclusion Component 2: Digital public service delivery

[165] Universally accessible' means that GovTech services are designed so that they can be accessed, understood, and used by all people, regardless of disability, age, use of assistive devices, location or means of Internet access. It applies to hardware and software.

ANNEX 7: Linkages/synergies with other projects

P Number	Project	Brief project description and links to this project
P169597	Digital Economy Readiness and 4G Network Repositioning Assessments (completed)	Provided options for optimizing uptake of 4G, infrastructure leasing cost models and future roll-out of 5G, which informs project design across component 1 activities, particularly 1.3 on last-mile connectivity and 1.4 on regulatory support.
P172880	Rwanda: supporting digital ID and digital birth registration initiatives (completed)	Provided support for end-user research on the use of national ID and informed the roll-out of digital birth registration. Forms basis for design of sub-component 2.1.
P171407	East and Horn of Africa Regional Digital Project (pipeline)	Supporting regional harmonization to create a more integrated digital market in the Horn of Africa and in East Africa. This complements national-level investments and potentially enhances their impact through the expansion of a regional market.
P168551	Rwanda Quality Basic Education for Human Capital Development Project (active)	Providing support to improve teacher competency and student retention and learning in basic education. Sub-component 1.2 design on basic digital skills borrows learnings, and sub-component 1.3. that include support for school connectivity enables education reform.
P252350	Rwanda Priority Skills for Growth (PSG) (active)	Providing support for expanding opportunities for the acquisition of quality, market-relevant skills in selected economic sectors through trainings. Complementary training programs on basic digital skills under sub-component 2.1. and advanced digital skills under 3.2.
P162646	Strengthening Social Protection Project (active – due to close)	Providing support to improve the effectiveness of Rwanda's social protection system, notably the flagship Vision 2020 Umurenge Program (VUP), for targeted vulnerable groups, and is supporting the digitization of safety nets payments. Here device access, skills and support for digitization of SACCOs provided by the digital project will be highly complementary.
P160699	Renewable Energy Fund (active)	Providing support to increase electricity access in Rwanda through off-grid technologies - e.g. through financing (subsidy-based grants etc.) for solar home systems. Also managed by BRD. Sub-component 1.1 on device financing borrows learnings and will explore complementarities.
PI72954	Rwanda - Energy Access and Quality Improvement Project	Providing access to modern energy for households, enterprises, and public institutions and enhance the efficiency of electricity services. Will explore complementarities under sub-component 1.3, as critical supporting infrastructure.
P175273	Access to Finance for Recovery and Resilience project	Increasing access to finance and support recovery and resilience of businesses affected by the COVID-19 pandemic. Sub-component 3.1 will strengthen the pipeline of businesses and catalyze early-stage financing and therefore complement this project.
P170376	Kigali Environmental Management and Climate Compatible Development Program	Providing support to improve access to basic services, enhance infrastructure resilience and strengthen integrated urban planning and management to further adaptation to adverse climate change events. Inform climate analysis.
P172153	Rwanda NDC Deep Dive: Advancing Financial Innovation to scale up Climate Action	Providing support to advance financial innovation to accelerate climate change ad adaptation and mitigation in line with its Nationally Determined Contribution. Inform climate analysis.

ANNEX 8: Assessment of Financial Intermediary

Development Bank of Rwanda

1. **BRD will be acting as an Implementing Agency (IA) and financial intermediary (FI) for interventions supporting device affordability under Component 1 and for catalyzing early-stage finance under Component 3 of the project.** The BRD will be consequently entering into a subsidiary agreement with MINECOFIN. BRD is currently the IA of several WB projects, including the REF Project and the Rwanda Housing Finance Project, and has familiarity with WB FI requirements and procedures. However, there is still a need for the BRD to undergo a FI assessment and to develop a FIF that is specific to the present project. Based on these, as well as the fiduciary, E&S standards and technical assessments, the project will finance TA and capacity building activities for the BRD to support project implementation.

2. **The underlying problems that BRD-implemented activities look to solve are (i) the high cost of broadband-enabled smart devices and (ii) the lack of early-stage finance for young startups.** While a majority (67 percent) of households own mobile phones, these are predominately basic feature phones that subsequently prevent usage of mobile broadband (3G and above).[22] Facebook Connectivity research suggests that close to 80 percent of the Rwandan adult population (6 million, aged 16-64) are unable to purchase a US$30 smartphone, based on global device affordability benchmarks and current household income levels in Rwanda. A key challenge for device access and affordability is high credit risk, which is currently hampering private sector-driven and market-based mechanisms for solving the device affordability and access challenge. Another challenge that the project is looking to address is the absence of diverse funding channels that would typically be available in more developed entrepreneurial markets, such as venture capital funding, angel investors, and seed-stage investment, which currently contribute to the high failure rate of startups in Rwanda.

3. **Sub-component 1.1: Access to affordable smart devices. This sub-component will provide financing support to facilitate wider device access, featuring the establishment of a smart device access scheme and dedicated fund.** The scheme will target potential users currently facing barriers to smart device access and ownership, such as securing credit for device purchase. The scheme will be implemented jointly by RISA and BRD. Various financial instruments will be considered and deployed through the device fund. The project will finance an in-depth market assessment and feasibility study to refine key design elements of the scheme, based on local context and anticipated demand, including targeting, the selection of financing instruments to be deployed, and how to best sustain the fund beyond the life of the project. Key financing instruments considered include grant-based subsidies for Rwanda's lowest income-earning households, featuring performance-based financing for device retailers, with targeting, eligibility and subsidy levels based on the stratified household income classification system, *Ubudehe,* existing device ownership[167], and other GoR social assistance schemes, including links to digitization of safety nets payments and digital literacy programs. Targeting of different *Ubudehe* household categories will consider the level of financial need, scope for productive use, and perceived value of the device, with the aim of maximizing the coverage, inclusion, and impact of the scheme. Other instruments that will be considered include credit guarantees, insurance, and line of credit to manage the challenges associated with access to finance for devices and high credit risk. All financial instruments leveraged under the scheme will adhere to the World Bank's policies and guidelines for FIs noted above.

[167] An inventory of device ownership among low-income household was recently conducted by RISA.

4. **Sub-component 3.1 aims to improve the survival and growth rates of technology-enabled startups in Rwanda and strengthen Rwanda's position as a 'test bed' for innovation**. Support will be provided to create an enabling strategic, policy, regulatory and institutional environment that is conducive to stimulating growth of digital innovation, businesses and startups, positioning Rwanda as a regional digital entrepreneurship hub. The interventions to support early-stage finance mobilization for digital innovation would include support for investment events to attract external investors and regional entrepreneurs, training programs for angel investors and fund managers. RISA will also undertake a feasibility study to inform potential financing to catalyze early-stage investments. The feasibility assessment will explore various options to identify the appropriate mechanisms to strengthen and catalyze early-stage investments, including the establishment of an early-stage financing window or a fund of funds. The interventions will be based on the principles of avoiding any market distortions, ensuring sufficient FI capacity and supporting market creation. If deployed, this activity would also leverage the BRD as the FI and AI for channeling funds to private entities.

5. **In the absence of a dedicated agency with experience of risk capital provision to SMEs in Rwanda, a range of alternatives have been identified and appraised.** The BRD was found to be the most appropriate candidate as it is familiar with long-term finance, albeit loans rather than equity, has experience of analyzing risk in business settings through the management of loan guarantee programs and has the mandate to establish additional specialist FI. However, there is a need to strengthen its capabilities and, in the first instance, to partner it with an experienced advisory agent which can both aid it in establishing good practice approaches from the start and provide on-the-job training to build its internal capabilities in the risk capital field.

6. **The BRD's changed its legal status into a public company and received a National Bank of Rwanda (BNR) banking license in August 2011.** BRD was initially incorporated in August 1967 with the objective of providing support for priority areas identified in Government programs and Rwanda's development strategies. Since 2015, the key aspects of its business strategy are to increase resource mobilization, build strong partnerships and support well-focused investments and growth to maximize development impact. The BRD has a diversified ownership structure with Class A and Class B shares, where Class B shareholders are majority private owned. BRD''s shareholding is currently as follows: Agaciro Development Fund (65.9 percent), Rwanda Social Security Board (32.2 percent), Belgium Government (1.2 percent), SONARWA (0.46 percent), and Bank of Kigali (0.14 percent). It also established a wholly owned subsidiary—the Business Development Fund —which focuses on providing guarantees to stimulate SME access to finance. The BRD Board currently has nine members[168], four of which are independent members with relevant experience in the banking and financial sector.

7. **BRD is regulated and supervised by the BNR.** In addition to complying with prudential regulations for commercial banks, the BRD is also expected to comply with the Directive on activities and special liquidity norms for Development Banks. The bank acts both as wholesaler and retailer, providing short, medium- and long-term funding to priority sectors – particularly agriculture, exports, energy, housing, and education. In addition to direct lending, BRD participates in co-financing arrangements, jointly with other local or foreign FIs, in economically strategic projects. In supporting this project, the BRD would thus add an additional priority sector – namely, ICT – and would need additional support in this area through targeted capacity building provided for under the project.

[168] BRD charter allows up to 11 members.

8. **The BRD offers a variety of financial products.** The main business includes: (a) credit lines facilities to finance working capital needs (13.7 percent of portfolio), including short, medium- and long-term investment loans to projects in priority sectors (76 percent of total portfolio), and (b) equity participation in any company provided it does not exceed 25 percent of the company's portfolio[169] (9.7 percent of the portfolio). In addition, other services provided by the BRD business include (a) guarantee funds to cover the risks of prospective projects in areas such as sustainable development, trade finance and payment system facilities to facilitate trade; and (b) advisory services and capacity building to clients. For transactions with tenors greater than 12 months, the sector lending exposure to SMEs is as follows: Agriculture - 12 percent, Education - 5 percent, Energy - 8 percent, Exports - 21 percent, Housing - 13 percent, and Infrastructure - 31 percent.

9. **The governance structure for a potential funds of funds managed by the BRD would be based on international best practice and would be informed by the feasibility study undertaken by RISA.** Relevant provisions would include the establishment of an independent Investment Committee (IC), which would have the responsibility to select those who will be responsible for the General Manager role in child funds that are envisaged to be created under the proposed fund of funds model. The BRD would partner with a specialized advisory agent and create a dedicated fund or agency. The independent IC would be appointed by the Board of the BRD. A representative of the Board could potentially be the chairman of the IC. The Committee would comprise of people with prior fund management experience as well as legal and relevant technical and commercial backgrounds. There would be calls for the General Partners to make investments with Limited Partners based on a legal agreement.

Financial Performance

10. **The BRD is compliant with most BNR prudential requirements.** BRD's financial condition ended with positive income, at the close of the third quarter of 2020, based on increasing return on equity (ROE) and return on assets (ROA). The Bank complies with capital adequacy requirements (CAR) [170] for banks. As of September 2020, the total CAR for the Bank was 21.9 percent against required total capital of 15 percent and core capital was 16.4 percent against minimum of 10 percent. The Nonperforming Loan (NPL) ratio stood at 6.3 percent for the same period, compared to 7.5 percent in 2019. The NPLs, as a result of the COVID-19 pandemic, are expected to still be above 5 percent by the end of 2020. BRD's liquidity ratios are above minimum ratios required by the BNR. The liquidity coverage ratio (LCR) stands at 386 percent above the 100 percent required by the BNR.

11. **The BRD's main sources of funding comprise** (a) equity from shareholders (24 percent); (b) reserves, lines of credit (70 percent); and (c) corporate bonds and other instruments (6 percent). The BRD borrows and lends in both local and foreign currencies.

[169] With the exception when the company is 100 percent owned by BRD as a subsidiary.
[170] The Regulation No. 06/2017 of 19/05/2017 on Capital Requirements requires banks to be adequately capitalized by having a total capital of not less than 12.5 percent of total risk-weighted assets of which 10 percent is core capital. In addition to the minimum capital adequacy ratios stated in Article 20 of the Regulation, a bank shall have and hold a capital conservation buffer of 2.5 percent of the total risk-weighted assets over and above these minimum ratios

Table 9.1. Financial Soundness Indicators (%)

	2017	2018	2019	2020
CAR	12.8	17.93	19.0	21.9
LCR	145.9	189	705	386
Tier 1 Capital Ratio	8.1	13.0	14.0	16.4
NPLs	16.3	19.3	7.5	6.3
ROE	−51.6	0.03	1.8	
ROA	−90.0	0.01	0.5	

Pricing Policy and Interest Rates

12. **The BRD's current lending limits are as follows:** small loans are in the amount of RWF 50 million to RWF 1 billion (US$50,000 to US$1 million); medium loans are between RWF 1 billion to RWF 3 billion (US$1 million to US$3 million); and large loans range between RWF 3 billion and up to 25 percent of bank core capital. The feasibility study for early-stage finance support will also identify specific areas where BRD may need capacity building to manage risk capital, if appropriate.

13. **The BRD uses a loan pricing model, where interest rates charged follow the following guidelines**: (a) funding cost incurred, (b) operating costs of servicing the loan, (c) risk premium to compensate the bank for default risk, and (d) a profit margin/sustainability factor on each loan that provides the bank with adequate return on capital. The BRD may allow for pricing exceptions from the established standard interest rates. Some of the exceptional cases may include Libor-based loans, loans based on other benchmarks such as T/Bills, co-financing deals not based on bank pricing models, syndicated facilities where the bank is invited to participate and special projects. The feasibility studies undertaken by RISA will establish if subsidies would be appropriate and justified to support the device affordability scheme and the specific fee structure to support early-stage finance, if any, based on the aforementioned principles.