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DIGITAL ECOSYSTEM COUNTRY ASSESSMENT (DECA)

Mali

APRIL 2023

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Mali

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KEY TERMS BOXES

ACRONYMS

A4AI	Alliance for Affordable Internet
ACLED	Armed Conflict Location and Event Data Project
AGEFAU	Agence de Gestion du Fonds d'Accès Universel
AGETIC	Agence des Technologies de l'Information et de la Communication
AGOA	African Growth and Opportunity Act
AJCAD	Association des Jeunes pour la Citoyenneté Active et la Démocratie
AMADER	Agence Malienne pour le Développement de l'Energie Domestique et l'Electrification Rurale
AMRTP	Autorité Malienne de Régulation des Télécommunications/TIC et des Postes
ANTIM	Agence Nationale de Télésanté et d'Informatique Médicale
APDP	Autorité de Protection des Données à Caractère Personnel
API	Agence pour la Promotion des Investissements
APPEL	Association des Professionnels de la Presse en Ligne
AQIM	Al Qaeda in the Islamic Maghreb
ASIM	Association des Sociétés Informatiques du Mali
BCEAO	Banque Centrale des Etats de l'Afrique de l'Ouest
BDM	Development Bank of Mali
CAISFF	Cellule d'Appui à l'Informatisation des Services Fiscaux et Financiers
CACTIC	Coordination des Association des Clubs TIC
CBDC	Central Bank Digital Currencies
CDCS	USAID Country Development Cooperation Strategy
CFA	West African Franc
CHEXIM	Export-Import Bank of China
CIRTIC	Centre d'Innovation de Recherche Technologique et d'Industrie Créative
CMA	Coordination des mouvements de l'Azawad
CSO	Civil Society Organization
CTRCA	Ministère de la Promotion de l'Investissement et du Secteur Privé
DECA	Digital Ecosystem Country Assessment
DFC	U.S. International Development Finance Corporation
DFS	Digital Financial Services
DGDM	Direction Générale des Douanes Maliennes
DGGC	Ministère du Commerce et de la Concurrence
DGI	Direction Générale des
DHIS-2	District Health Information System 2

DNEN	Direction Nationale de l'Economie Numérique
DO	Development Objective
EASSy	Eastern Africa Submarine Cable System
ECOWAS	Economic Community of West African States
EDC	Education Development Center
EMERGE	Empowering Malians through Elections, Reforms, and Governance Efforts
GOM	Government of Mali
GIABA	The Inter-Governmental Action Group against Money Laundering
HAC	Haute Autorité de la Communication
ICT	Information and Communications Technology
IGF	Internet Governance Forum
INSTAT	Institut National de la Statistique
IR	Intermediate Results
ISA	Institute of Applied Sciences
ISGS	Islamic State in the Greater Sahara
ISMS	Information Security Management System
ISOC-M	Internet Society of Mali
ISP	Internet Service Provider
IUG	University Institute of Management
IUT	University Institute of Technology
IXP	Internet Exchange Point
JNIM	Jama'at Nasr al-Islam wal Muslimin
MCEN	Ministère de la Communication et de l'Economie Numérique
MDM	Malinformation, Misinformation, and Disinformation
MESRS	Ministère de l'Enseignement Supérieur et de la Recherche Scientifique
MFI	Microfinance Institution
MINUSMA	The United Nations Multidimensional Integrated Stabilization Mission
ML-CERT	Mali Computer Emergency Response Team
MNLA	National Movement for the Liberation of Azawad
MNO	Mobile Network Operator
MOEF	Ministère de l'Économie et des Finances
MOJWA	Movement for Oneness and Jihad in West Africa
MSDS	Ministère de la Santé et du Développement Social
MSME	Micro, Small, and Medium-Sized Enterprises

NDGS	National Digital Government Strategy
NDI	National Democratic Institute
NGO	Non-Governmental Organization
ORTM	Office de Radiodiffusion-Télévision du Mali
POC	Point of Contact
PRC	People's Republic of China
SCSE	Service de Certification et de Signature Électronique
SDG	Sustainable Development Goal
SFD	Systèmes Financiers Décentralisés
SICA-UEMOA	UEMOA Automated Interbank Clearing System
SID	Islamic Corporation for Private Sector Development
SIGTAS	Système Intégré de Gestion des Impôts et Taxes Assimilés
SME	Small and Medium-Sized Enterprises
SMTD	Société Malienne de Transmission et de Diffusion
SO	Special Objective
SOTELMA	Société des Télécommunications du Mali
STAR-UEMOA	UEMOA Automated Transfer and Settlement System
STEM	Science, Technology, Engineering, and Mathematics
TA	Technical Assistance
TGOM	Transitional Government of Mali
TIFA	Trade & Investment Framework Agreement
UEMOA	Union Économique et Monétaire Ouest-Africaine
UNCDF	United Nations Capital Development Fund
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Conference on Trade and Development
USAID	U.S. Agency for International Development
USF	Universal Service Fund
USTTB	University of Technical Sciences, Technology, and Management of Bamako
VSAT	Very Small Aperture Terminal
WAMU	West African Monetary Union
WAMZ	West African Monetary Zone
WANEP	West Africa Network for Peacebuilding
WPF	World Press Freedom
WTO	World Trade Organization

Executive Summary

BACKGROUND

The U.S. Agency for International Development's (USAID's) Digital Strategy[1] was launched in April 2020 to achieve and sustain open, secure, and inclusive digital ecosystems that contribute to broad-based, measurable development and humanitarian assistance outcomes through the responsible use of digital technology.

The Digital Ecosystem Country Assessment (DECA), a flagship initiative of the Digital Strategy, informs the development, design, and implementation of USAID's strategies, projects, and activities. The DECA looks at three pillars of a nation's digital ecosystem: (1) digital infrastructure and adoption; (2) digital society, rights, and governance; and (3) digital economy. The DECA aims to inform how USAID/Mali can understand, work with, and strengthen the country's digital ecosystem. The section below outlines how DECA findings and recommendations can directly support USAID/Mali's Development Objectives (DOs) and Special Objective (SO). To maximize utility and impact, the section below outlines how DECA findings and each resulting recommendation can directly support USAID/Mali's DOs. The DECA does not evaluate existing programs but rather assesses Mali's digital ecosystem and identifies how USAID/Mali's current or future programming can build upon or strengthen that ecosystem. DECA findings and recommendations are mapped to USAID/Mali's Results Framework.

The USAID/Mali Country Development Cooperation Strategy (CDCS) 2022-2026 includes two DOs and one Special Objective:

1. Improved governance for stronger democratic institution
2. Solidified and deepened development gains in targeted areas
3. Improved outcomes across the humanitarian, development, and peace nexus to save lives and increase resiliency

KEY FINDINGS

Mali has made great strides in building out its Information and Communications Technology (ICT) infrastructure, but political instability and conflict hinder further investment. The Government of Mali has laid over 3,000 kilometers of fiber optic cable, has equipped schools and cyber centers with computers and satellite connections, and is actively working with mobile network operators to prioritize geographic areas for future deployment. Public authorities are also enthusiastic about complementing and pooling resources across public initiatives, such as working on rural electrification and ICT expansion. However, mobile network operators and the government face steep obstacles, as violence prevents construction of new connections and keeps deployment costs high.

The Government of Mali's commitment to digital development is aspirational, but existing services, policies, and governance are rudimentary at best. The country's digital transformation

1 USAID, "USAID Digital Strategy," *USAID,* 2021, https://www.usaid.gov/usaid-digital-strategy.

agenda is guided by *Mali Numerique 2020*, which was adopted in 2014 and has since expired. It laid out six objectives to help turn Mali into a West African tech hub by 2020. However, policies and administrative developments fell short of achieving actionable goals. For example, an e-signature certification service was established, but it does not certify e-signatures. Rather, it is a unit within the government dedicated to *promoting* e-signatures in the absence of a functioning e-signature system. Other aspirational policies could move the needle forward, but political transitions have slowed legislative momentum.

Mali does not have a central policy or regulation guiding the digitization of government services and systems. At the legal level, various gaps exist, mainly in the regulation of cybersecurity, interoperability, data protection, and open data. For example, while the Government of Mali passed the Cybercrime Law in 2019, it has yet to identify roles and responsibilities for executing cybersecurity policy. Without a clear roadmap, government services remain mostly informative and analog, the first stage in the evolution of digital government systems. At this basic level, most public sector websites can only provide static information, with little to no two-way communication or direct interaction with users. Little progress has been made over the past six years.

Mali's civil society and media have enjoyed historical freedom of expression, but new policies threaten the freedom of the press and increase organizations' needs for cybersecurity awareness and tools. Mali's rich media landscape offers the public a multitude of sources of information, and its vibrant civil society actively fights disinformation with new fact-checking verification units. However, new policies, such as the Cybercrime Law, threaten these organizations' ability to provide a meaningful check on state authority. For example, the new law empowers authorities to seize online media during an investigation and requires online digital platforms to identify their ownership, which can lead to self-censorship.

Insurgent groups are accelerating their use of social media for propaganda dissemination, and Mali's broader population needs better tools to counter disinformation. Mali's physical conflict has moved into the digital space, as various insurgent groups and global powers leverage social media to communicate their plans, spread propaganda, and target new recruits. Without a clear toolbox for identifying disinformation, members of Mali's broader population can fall victim to these tactics, escalating conflict and eroding support for Mali's military and peacekeeping forces.

Mali does not have a policy framework for guiding the development of the e-commerce sector. Domestic e-commerce and cross-border e-commerce between businesses and consumers are insignificant in Mali. Only a limited number of consumers have access to major international e-commerce companies. *Mali Numerique 2020* aimed to pass four bills related to the information society, cryptology, cybercrime, and e-commerce. While there are now laws for these first three, there is still no national strategy or law for e-commerce.

Mali's tech startup scene lacks true innovation or competition and operates informally in an unfavorable environment. There are a few innovative startups in Mali, but there is no significant competition to motivate further innovation. The major barrier to cultivating a more robust startup scene is the lack of a favorable regulatory environment. In particular, the Startup Act addresses high tax burdens, high operational costs, and the difficulties tech startups experience when trying to access capital or attract foreign investors.

This report makes a total of 11 recommendations for the international development community covering topics across the three DECA pillars. The international development community should consider programming that uses or supports elements of the digital ecosystem without deepening existing digital divides. The DECA recommendations for the international development community are listed below:

1. Expand connectivity and increase affordability for the last mile through: (1) research and demonstration and (2) support for regulatory reform in conflict environment
2. Promote digital inclusion: invest in locally relevant and accessible content
3. Collaborate with public and private stakeholders to scale existing e-learning and e-health opportunities
4. Empower CSOs, media, and citizens to counter disinformation
5. Reinforce freedom of expression online and open government principles through capacity building and developing transparency promotion platforms
6. Strengthen cyber hygiene awareness and capacity among Malian CSOs
7. Shape the building blocks of government digitization in Mali
8. Strengthen government understanding and application of cybersecurity processes
9. Support the adoption of a new comprehensive framework for the digital economy
10. Lower barriers to entry and increase usage of digital finance
11. Promote digital transformation of startups and MSMEs

ROADMAP FOR THE REPORT

Section 1 provides background on the DECA framework and goals.

Section 2 presents the key findings about Mali's digital ecosystem. This section is organized into three subsections by DECA pillar: digital infrastructure and adoption; digital society, rights, and governance; and digital economy.

Section 3 provides recommendations on how the international development community can leverage and support the digital ecosystem to achieve improved development outcomes.

Navigation tip: the navigation bar in the footer throughout this report helps you move between sections. Dark blue text will indicate the current section you are in.

SECTION 1:

About this Assessment

USAID's Digital Strategy[2] aims to improve USAID development and humanitarian assistance outcomes through the responsible use of digital technology and to strengthen the openness, inclusiveness, and security of digital ecosystems. The Digital Strategy and the DECA are part of USAID's holistic approach to helping achieve the Sustainable Development Goals (SDGs).[3]

As part of the Digital Strategy implementation, the DECA examines three broad areas to better understand the opportunities and challenges in a country's digital ecosystem:

- Digital Infrastructure and Adoption
- Digital Society, Rights, and Governance
- Digital Economy

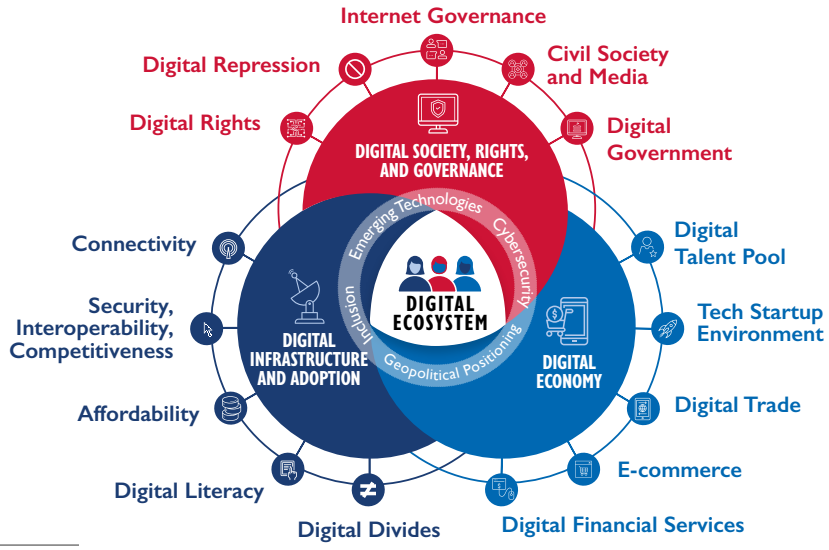
KEY TERMS | BOX 1: What is a digital ecosystem?

A digital ecosystem comprises stakeholders, systems, and an enabling environment that together empower people and communities to use digital technology to access services, engage with each other, and pursue economic opportunities.

The Mali DECA took place between May 2022 and October 2022. It included desk research, consultations with USAID/Mali, and nine weeks of virtual interviews. It involved a total of 63 interviews with stakeholders from civil society, academia, the private and public sectors, international development organizations, and USAID/Mali technical offices.

Rather than act as an authoritative source on the country's digital ecosystem, the DECA is intended to be a rapid assessment of opportunities and challenges tailored to USAID's programmatic priorities and thus may not cover all of USAID/Mali program offices and projects in-depth.

FIGURE 1: The Digital Ecosystem Framework



2 USAID, "USAID Digital Strategy."

3 United Nations, "The 17 Goals | Sustainable Development," *United Nations Department of Economic and Social Affairs*, accessed October 7, 2022, https://sdgs.un.org/goals.

SECTION 2:

DECA Findings

Successive governments in Mali have set ambitious targets for digitalization. In 2015, the *Ministère de la Communication et de l'Economie Numérique* (MCEN) was the lead architect of *Mali Numerique 2020*,[4] the country's digital agenda. The agenda laid out six objectives designed to leverage information and communications technology (ICT) to further the country's economic and social goals by 2020. These goals included improving private sector productivity, pushing telecom infrastructure into last-mile communities and hard-to-reach areas of the country, and advancing e-government reforms to improve efficiency in public administration. However, unlike digitization—which simply refers to transforming existing physical information into a digital format—digitalization requires transforming the processes, culture, and overall landscape of a digital ecosystem. In Mali, digitalization has been hamstrung by external events shaping the country's political and security environment for more than a decade.

Against this backdrop, Mali's political crises have made it difficult to respond to the security situation and maintain continuity across administrations. Two coups in ten years, followed by the consolidation of power, shaped Mali's current political environment. In March 2022, the transitional government announced a new, 24-month timeline for elections which led to the lifting of a trade embargo imposed by the Economic Community of West African States (ECOWAS) and its subsidiary, *Union Économique et Monétaire Ouest-Africaine* (UEMOA) (see Box 1).

Another area of uncertainty regarding the transitional authority's efforts to restore stability is its relationship with regional coordinating bodies. On May 13, 2022, the Transitional Government of Mali (TGOM) withdrew from the G5 Sahel, a security alliance with Burkina Faso, Chad, Mauritania, and Niger, which was formed in 2014.[5] It is also not clear how Mali's impasse with the G5 has impacted the development work of the Sahel Alliance, an international coalition of 26 member states for stability and development in Mauritania, Mali, Burkina Faso, Niger and Chad.[6] As of 2020, the Alliance coordinated 390 projects in Mali, the highest number of projects in any Sahel country (followed by Burkina Faso with 255).[7] Some of the Alliance's work in Mali has focused on the emergency development activities of the Konna Economic Recovery and Stabilization Project, which seeks to facilitate the resumption of economic activity and trade in the area.

However, Mali has still made strides in developing its digital ecosystem. Mobile network operators (MNOs) have deployed broadband in major cities. The government has laid fiber optic cables connecting Mali with several of its contiguous neighbors and major cities. A vibrant civil society and an active media environment fight disinformation, and digital health and education stakeholders continue to experiment with new tools

4 Ministère de l'Economie Numérique de l'Information et de la Communication, "Mali Numerique 2020: Stratégie Nationale de Développement de l'Economie Numérique," accessed April 2022, https://communication.gouv.ml/wp-content/uploads/2021/01/DraftMN2020.pdf.

5 Agence France-Presse, "Mali withdraws from G5 Sahel regional anti-jihadist force," *France 24,* May 16, 2022, https://www.france24.com/en/africa/20220515-mali-withdraws-from-g5-sahel-regional-anti-jihadist-force.

6 Permanent Mission of France to the United Nations in New York, "Sahel," *Permanent Mission of France to the United Nations in New York,* 2022, https://onu.delegfrance.org/sahel-10433#The-Coalition-for-the-Sahel.

7 Alliance Sahel, "Alliance Sahel Dashboard," *Alliance Sahel,* accessed April 2022, https://opendata.alliance-sahel.org/portfolio.

and techniques to make telehealth and remote learning possible. These successes are significant in light of the country's recent turmoil. If elections in 2024 result in a peaceful and democratic transition of power, Mali may be able to draft a new roadmap for the future.

BOX 1: An overview of recent events in Mali

- **2002:** Amadou Toumani Toure wins 2002 presidential election as an independent with 65 percent of the vote
- **March 2012:** Mali military deposes President Toure, citing his inability to effectively manage unrest in the north, unrest linked to the Taureg secessionist movement MNLA and an influx of Al Qaeda in the Islamic Maghreb (AQIM) affiliated fighters from the Libyan conflict[8]
- **April 2012:** Under pressure from ECOWAS, the military junta selects Dioncounda Traore to lead a transitional government
- **June 2012:** MNLA and Islamist groups *Ansar Dine* and the Movement for Oneness and Jihad in West Africa (MOJWA) enter into conflict over imposing Sharia law in MNLA territories
- **November 2012:** ECOWAS authorizes intervention force with 3,300 soldiers to stabilize the situation in the north with a timeframe of one year
- **January 2013:** France launches Operation Serval with agreement from President Traore to counter advance of MOJWA and *Ansar Dine*
- **July - August 2013:** Ibrahim Boubacar Keita wins 2013 presidential election with 77 percent of the vote; MINUSMA formally takes over responsibility for security from France
- **2014:** France launches anti-insurgent intervention Operation Barkhane as a follow-up to Operation Serval
- **2015:** President Keita signs the Agreement on Peace and Reconciliation in Mali with several armed groups, including the *Coordination des mouvements de l'Azawad* (CMA), to formally end the conflict in the north
- **2018:** President Keita is re-elected with 67 percent of the vote amid continued violence throughout the country
- **March 2020:** Mali holds first round of parliamentary elections, but proceedings are marred by the kidnapping of opposition leader Soumaila Cisse by JNIM, violence at polling stations, and bombings
- **August 2020:** Malian military deposes President Keita amid protests over mishandling of the insurgency in the north, problems with legislative elections in March, the COVID-19 pandemic, and unresolved, alleged irregularities in the election two years prior
- **September 2020:** Military junta selects Bah Ndaw to lead the transitional government for a period of 18 months; Colonel Assimi Goita, a member of the junta, becomes Prime Minister; ECOWAS makes lifting of sanctions contingent on Mali naming a civilian Prime Minister; Ndaw selects Moctar Ouane for the position

8 Adam Nossiter, "Soldiers Overthrow Mali Government in Setback for Democracy in Africa," *The New York Times,* March 22, 2012, https://www.nytimes.com/2012/03/23/world/africa/mali-coup-france-calls-for-elections.html.

BOX 1 (CONTINUED): An overview of recent events in Mali

- **May 2021:** Tension between the civilian transitional government and the military boils over into a consolidation of power, with Interim President Bah Ndaw and Prime Minister Moctar Ouane detained and ousted from power; Colonel Goita is then named Interim President
- **May 2021:** ECOWAS and UEMOA suspend Mali's membership
- **January - June 2021:** Militant groups, including JNIM and the ISGS, continue to destabilize the country
- **June 2021:** France announces the end of Operation Barkhane in the first quarter of 2022
- **December 2021:** ECOWAS and UEMOA impose financial sanctions and a trade embargo closing borders with member states
- **January 2022:** Mali's transitional government announces that elections will be delayed for another five years; ECOWAS tightens sanctions in response; U.S. Africa Command confirms Russian paramilitary group Wagner Group has deployed to Mali
- **March 2022:** UEMOA votes to end sanctions, while ECOWAS upholds sanctions after the National Transition Council postpones the February elections for up to 5 years
- **April 2022:** French military releases satellite images showing Wagner Group mercenaries staging a massacre for use in a disinformation campaign against French forces
- **May 2022:** Mali's transitional authorities withdraw from the G5 Sahel
- **June 2022:** President Goita announces the delay of elections for two years
- **July 2022:** ECOWAS removes all sanctions after the transitional government submits a timetable to hold elections within 24 months of March 29, 2022
- **August 2022:** France withdraws last troops, ending its nine-year deployment in Mali

PILLAR 1: DIGITAL INFRASTRUCTURE AND ADOPTION

Digital Infrastructure and Adoption refers to the resources that make digital systems possible and how individuals and organizations access and use these resources. Digital infrastructure includes geographic network coverage, network performance, internet bandwidth, and spectrum allocation as well as telecom market dynamics around security, interoperability, and competitiveness. This pillar also examines behavioral, social, and physical barriers and opportunities for equitable adoption (digital divides, affordability, and digital literacy)—who uses or does not use digital technologies and why.

KEY TAKEAWAYS: DIGITAL INFRASTRUCTURE AND ADOPTION

FINDINGS

- Public authorities and the private sector have shown clear enthusiasm for expanding connectivity, but instability, and violence hinder investment.
- While the cost of mobile data has fallen, consumers continue to pay high tariffs to MNOs. The regulator continues to pressure prices to come down.
- COVID-19 catalyzed investments in e-learning platforms and pathways.
- Major investments in digital health continue to be piloted in the sector, but coordination between actors and capitalizing on linkages between platforms remain key concerns.

RELEVANT RECOMMENDATIONS

1. Expand connectivity and increase affordability for the last mile through: (1) research and demonstration and (2) support for regulatory reform in a conflict environment
2. Promote digital inclusion: invest in locally relevant and accessible content
3. Collaborate with public and private stakeholders to scale existing e-learning opportunities.

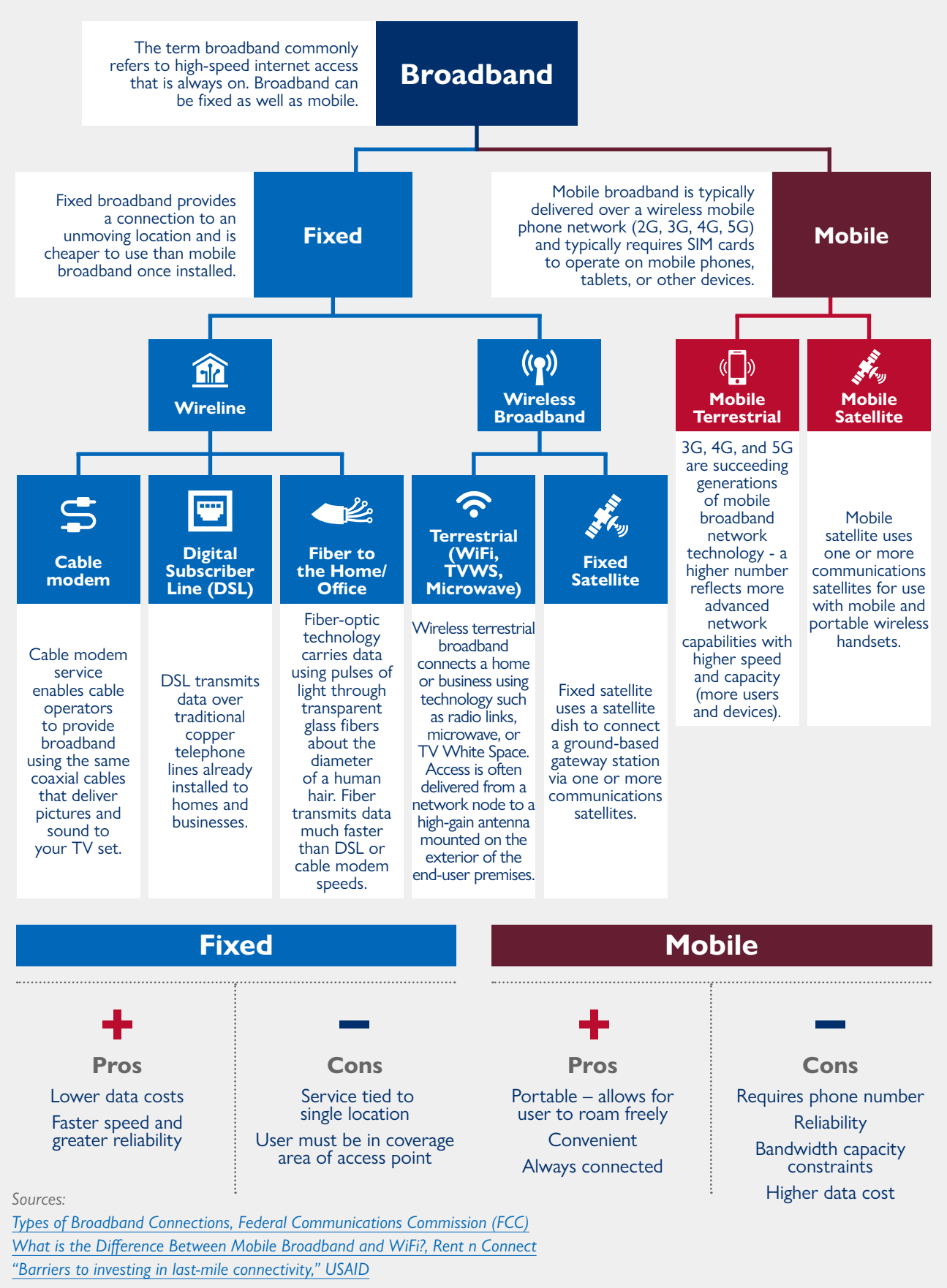
INTRODUCTION

Mali's digital ecosystem grew exponentially over the last two decades. Public authorities laid over 3,000 kilometers of fiber optic cable, worked to connect schools and set up local cyber cafes, and leveraged private sector funds to expand internet access to unconnected communities. Three MNOs—Orange Mali, Malitel, and Alpha Telecom—have entered the market since 2000, with a fourth, Mobilis, poised to enter the market soon. These MNOs have launched 2G, 3G, and 4G broadband services in Bamako and regional capitals. In 2018, Orange Mali piloted 5G in Bamako, as operators increasingly look to improve the reliability and quality of the internet they provide.

However, continued instability and violence in Mali, particularly in the north of the country, have prevented both public and private actors from pursuing many of their digitalization objectives. Armed groups routinely scuttle telecommunication investments and attack new construction projects. Deployment and maintenance initiatives are also expensive, leaving large areas of the country with poor or nonexistent telecommunication service.

COVID-19 catalyzed renewed interest in expanding digital health and education services and in utilizing digital reporting platforms. Private and public sector actors are currently examining ways to provide digital educational materials and training in low-resource environments and to increase the utilization of real-time data reporting and surveillance. MNOs and the government are also interested in expanding the country's telehealth capabilities. Similarly, higher education authorities have laid plans for a virtual university that will encourage remote learning at the tertiary level.

FIGURE 2: A quick introduction to digital connectivity



Sources:

Types of Broadband Connections, Federal Communications Commission (FCC)
What is the Difference Between Mobile Broadband and WiFi?, Rent n Connect
"Barriers to investing in last-mile connectivity," USAID

1.1. CONNECTIVITY AND CRITICAL INFRASTRUCTURE AMID A CRISIS

In 1989, the Government of Mali (GOM) established its first telecommunications company - the *Société des Télécommunications du Mali* (SOTELMA). For 12 years, SOTELMA monopolized the sector as both the country's regulator and its sole provider of fixed and mobile services. SOTELMA lost its monopoly in 2000 when the sector liberalized. Between 2002 and 2012, the GOM licensed two new MNOs - Orange Mali (then Ikatel) and Alpha Telecom. SOTELMA itself, which launched mobile operations as Malitel, was then privatized in 2008 and acquired by Maroc Telecom, Morocco's main telecom provider, in 2009. Today, a fourth operator—Mobilis, a subsidiary of the Algerian telecoms company Algerie Telecom—is poised to enter the market over the next few years.

As Mali's telecommunications sector liberalized, the GOM also restructured the sector's oversight authorities. With more capital and operators entering the market, public authorities determined it necessary to disaggregate regulation and operation to better foster competition. In 2011, the GOM replaced the *Comité de Régulation des Télécommunications* with the *Autorité Malienne de Régulation des Télécommunications/TIC et des Postes* (AMRTP).

Mali's telecom liberalization coincided with an explosion of mobile subscribers, increased mobile broadband use, and expanded internet access. Mobile cellular subscriptions nearly tripled from 7,440,383 in 2010 to 21,882,251 in 2021, representing 125 mobile subscriptions per each 100 inhabitants, a growth rate of 194 percent.[9] By comparison, during the same time period, global mobile cellular subscriptions experienced a growth rate of 64 percent.[10] Mobile broadband subscriptions grew even more dramatically, increasing more than a hundred fold from 63,484 in 2010 to 8,768,933 in 2021.[11] Today, there are 46 active mobile-broadband subscriptions per each 100 inhabitants, and the number of subscribers continues to rise.

Internet access has also increased over the past ten years. In 2011, only 2.2 percent of the population reported access to the internet.[12] By 2019, that figure had grown to 22 percent.[13] By comparison, the percentage of individuals using the internet globally doubled during the same time period.[14] However, most of those internet-connected households are located in Mali's urban areas. Only 10 percent of households living in rural areas reported access to the internet versus 50 percent of households in urban areas.[15,16]

Violence by armed groups is also a significant barrier to connectivity expansion. Between January 2022 and September 2022, the Armed Conflict Location and Event Data Project (ACLED) reported 3,555 fatalities in Mali.[17] As illustrated in Figure 3, militants committed eight attacks across Mopti, Segou, and along the outskirts of Bamako in just two days in July 2022.[18] One of the recent coordinated attacks happened only 15 kilometers (10 miles) from Bamako, at the Kati military camp.[19]

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9 ITU, "Mobile Cellular Subscriptions," *ITU*, last updated 2022, https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx.

10 Ibid.

11 ITU, "Mobile Broadband Subscriptions," *ITU*, last updated 2022, https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx.

12 ITU, "Percentage of Individuals using the Internet," *ITU,* last updated 2022, https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx.

13 Ibid.

14 Ibid.

15 ITU, "ITU Digital Development Dashboard: Mali", *ITU,* 2022, https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/Digital-Development.aspx.

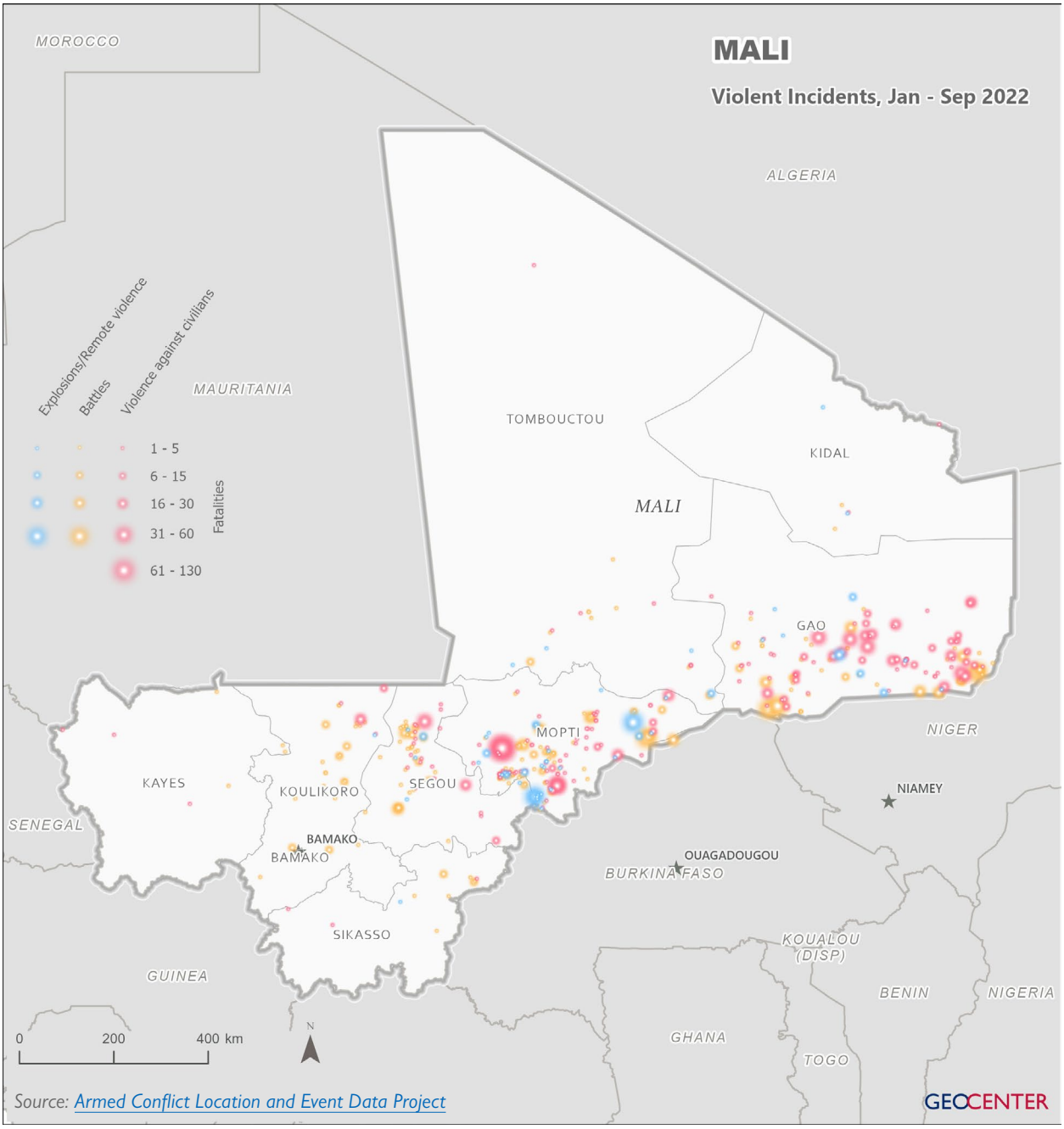
16 The ITU's methodology does not provide which specific urban and rural areas they include in their statistical analysis.

17 ACLED, "ACLED Dashboard: Mali", *ACLED,* 2022, https://acleddata.com/dashboard/#/dashboard.

18 Jules Duhamel, "Overview of the 21 - 22 July coordinated attacks in Mali," July 23, 2022, *Jules Duhamel,* https://julesduhamel.wordpress.com/2022/07/23/overview-of-the-21-22-july-coordinated-attacks-in-mali/?utm_source=substack&utm_medium=email.

19 Fadimata Kontao, "Militants attack Mali's main military base, situation 'under control'," *Reuters,* July 22, 2022, https://www.reuters.com/world/africa/heavy-gunfire-heard-main-mali-military-base-2022-07-22/.

FIGURE 3: Overview of coordinated attacks in Mali, 2022



LAYING THE BUILDING BLOCKS FOR BROADBAND

Mali's fiber optic backbone is managed by the *Société Malienne de Transmission et de Diffusion* (SMTD), a public limited company created in 2015. SMTD manages the country's television broadcasting, fiber optic network, and a data center for the GOM.[20] According to SMTD, Mali is one of the only countries in West Africa that centralizes all three functions in a single entity. Neither Côte d'Ivoire, nor Benin, nor Burkina Faso, nor Senegal have similar structures. This centralization can have some advantages. For example, SMTD can optimize the administrative and operating costs of its institution. However, in practice, each of the three SMTD functions constitutes a distinct business unit with specific competencies, specific services, and a specific demand.

In 2001, one of Mali's first fiber optic cables connected the country to Sonatel's network in Senegal.[21] A second connection to Côte d'Ivoire was completed in 2008, and a third connected Mali with Morocco, Mauritania, Burkina Faso, and Niger in 2015.[22] In 2016, Algeria, Mali, Niger, and Chad proposed to construct a 4,500-kilometer backbone network in partnership with the African Development Bank and the European Union.[23] While the network was projected to be complete by June 2021, it is unclear if this project has been finalized. That same year, Vodafone also connected Mali and Niger to its Ghana fiber optic network.[24]

Today, Mali's terrestrial fiber optic network includes 4,737 kilometers of operational fiber across the country. Orange Mali operates the longest network, extending from the border with Senegal through Bamako and all the way to Bourem in the north. SOTELMA's fiber optic network terminates in Sevare, but a proposed line would extend it to Gao. ECOWAS has also proposed a fiber optic cable connecting Mopti with Thiou in Burkina Faso. Currently, ECOWAS and the TGOM have proposed constructing an additional 2,197 kilometers, including a link from Gao up to the Algerian border.

20 The national data center currently hosted by SMTD is not fully operational. Currently, it is being developed into a Tier III data center, which refers to system redundancies and resiliency. For example, a tier I data center offers no redundancy of critical systems, while a tier III data center dual redundancy for power & cooling equipment. There are no service-level agreements in place to ensure its operational effectiveness.

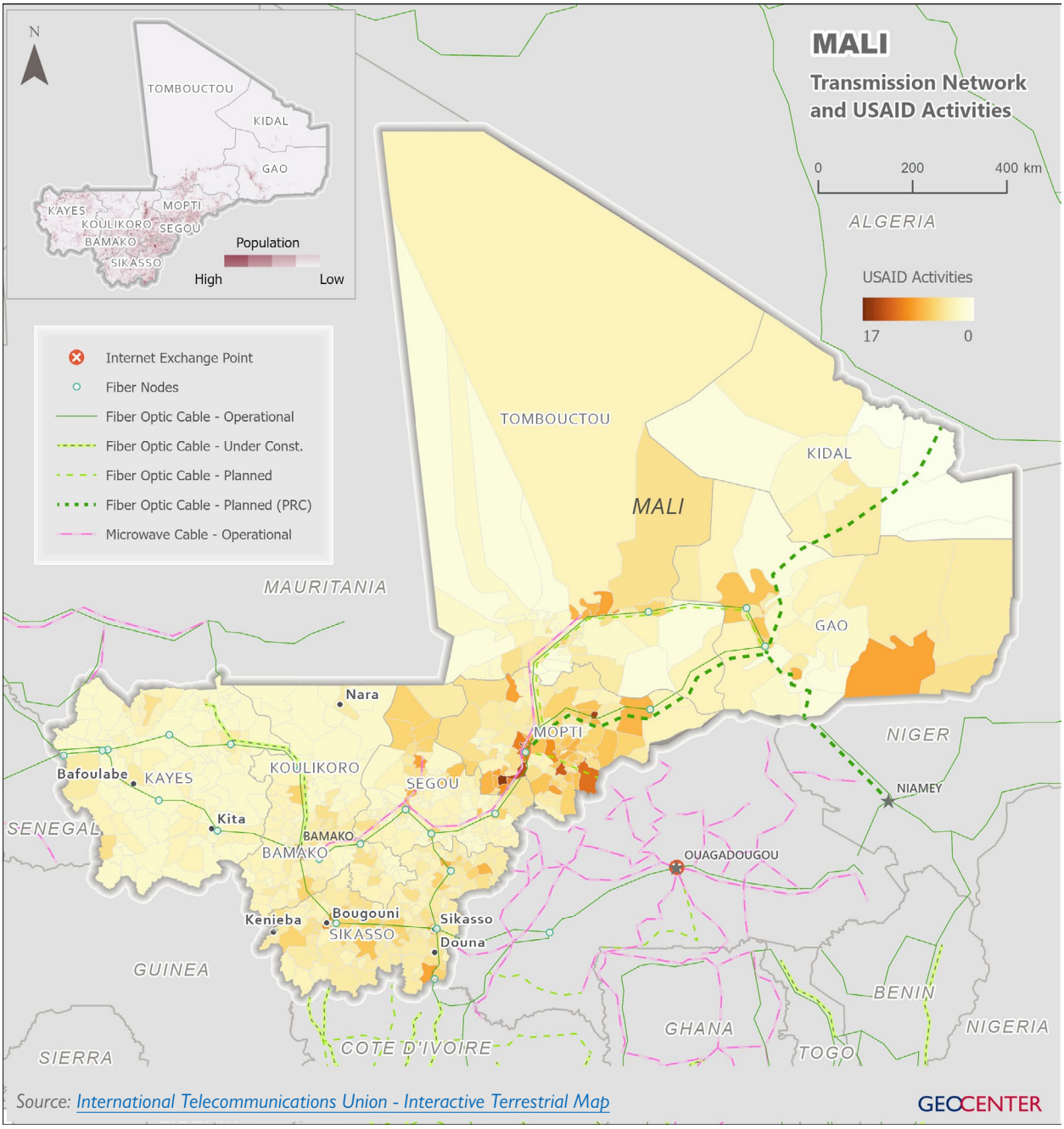
21 Henry Lancaster, *Mali: Telecoms, Mobile and Broadband - Statistics and Analyses* (Sydney: Paul Budde Communication Pty Ltd, 2022), 88.

22 Ibid.

23 Ibid.

24 Lancaster, *Mali: Telecoms, Mobile and Broadband - Statistics and Analyses*, 89.

FIGURE 4: Mali's fiber optic backbone network



In 2015, the GOM estimated the cost of implementing its *Mali Numerique* digital action plan to be approximately $382 million, $188 million of which was to be dedicated to broadband development.[25] Many of these investments were financed by the People's Republic of China (PRC) and affiliated companies. Since 2011, the Export-Import Bank of China (CHEXIM) has committed three loans totaling $273 million for the expansion of ICT infrastructure

25 Ministere de l'Economie Numerique, de l'Information et de la Communication, "Politique nationale de developpement de l'economie numerique," *UNESCO*, May 2015, https://en.unesco.org/creativity/sites/creativity/files/qpr/politique_nationale_de_development_de_l_economie_numerique.pdf.

in Mali.[26] This includes the 2011 Fiber Optic and Telecommunication Modernization Project,[27] which detailed plans for two cable segments from Gao to the Algerian and Nigerien borders, and includes the 2014 National Broadband Network Project,[28] which laid cables along three roads from Bamako to Kouremale, Mopti to Gao, and Markala to Timbuktu (all routes highlighted in Figure 4 above). Given the timing of the CHEXIM loans, it is unclear whether the GOM factored in these loans in their 2015 estimated cost or if scopes differed across projects. Huawei is also a frequent partner on public and private sector projects in Mali. In 2015, the GOM signed a $62.5 million contract with Huawei to construct a fiber optic network connecting Timbuktu and Gao.[29] In 2017, Telecel acquired equipment from Huawei to complete building out its local network.[30] SMTD is also working with Huawei and CHEXIM to launch a Tier III data center with cloud services to house government data.[31]

Interviewees across the private and public sectors emphasized how Mali's dependence on other countries for access to submarine cables increases service costs. Two interviewees from the private sector highlighted that when customers benchmark costs in contrast with those in coastal countries, these are not often appropriate comparisons. This is because coastal countries have direct access to submarine fiber optic cables, whereas Mali-based operators pay interconnection charges through Senegal, Burkina Faso, Côte d'Ivoire, or Mauritania, thus increasing the costs to the customer. Infrastructure-sharing agreements for backbone networks and consortium partnerships for submarine cables are some ways in which other landlocked countries have brought prices under control. One such example is the Eastern Africa Submarine Cable System (EASSy), which has nine landing stations across several countries and provides backhaul for at least 12 landlocked countries. However, this space is not dedicated; every country transports traffic from the landing station. EASSy provides the submarine cable at the landing station. MNOs and infrastructure companies that are members of the EASSy consortium are able to connect to the submarine cable and distribute using their own backhaul.

Another option is to provide enough data centers with enough content content that middle infrastructure can use to transport traffic. Google, Meta, Akamai, and other private companies can install caching servers - i.e., a high-speed data storage layer which stores a subset of data - in places with high consumption of their data for easy access. Google has installed caching servers as part of their content delivery network in Johannesburg, Lagos, and Mombasa.[32] With caches, content can be hosted and accessed locally, which can lower latency.[33,34] This lower latency improves performance, in particular for delivering video content, and can lead to increased usage and traffic growth.[35] Caches are often installed in African internet exchange points, allowing multiple internet service providers (ISPs) to access the content stored in the cache and to share the cost of international

26 Boston University Global Development Policy Center, "Chinese Loans to Africa Database: Mali," *Boston University Global Development Policy Center,* accessed October 2022, https://www.bu.edu/gdp/chinese-loans-to-africa-database/.

27 Aiddata, "China Eximbank provides RMB 276,800,000 government concessional loan for Fiber Optic and Telecommunications Modernization Project," *Aiddata,* accessed October 2022, https://china.aiddata.org/projects/30652/.

28 Aiddata, "China Eximbank provides RMB 493 million government concessional loan for National Broadband Network Project," *Aiddata,* accessed October 2022, https://china.aiddata.org/projects/36438/.

29 Telecompaper, "Mali gives Huawei more time to complete national broadband network," *Telecompaper,* November 14, 2017, https://www.telecompaper.com/news/mali-gives-huawei-more-time-to-complete-national-broadband-network--1220213.

30 Lancaster, *Mali: Telecoms, Mobile and Broadband - Statistics and Analyses,* 34.

31 Public sector interviewee, Interview by DECA Team, July 2022, online.

32 Google, "Cache locations," *Google,* accessed October 2022, https://cloud.google.com/cdn/docs/locations.

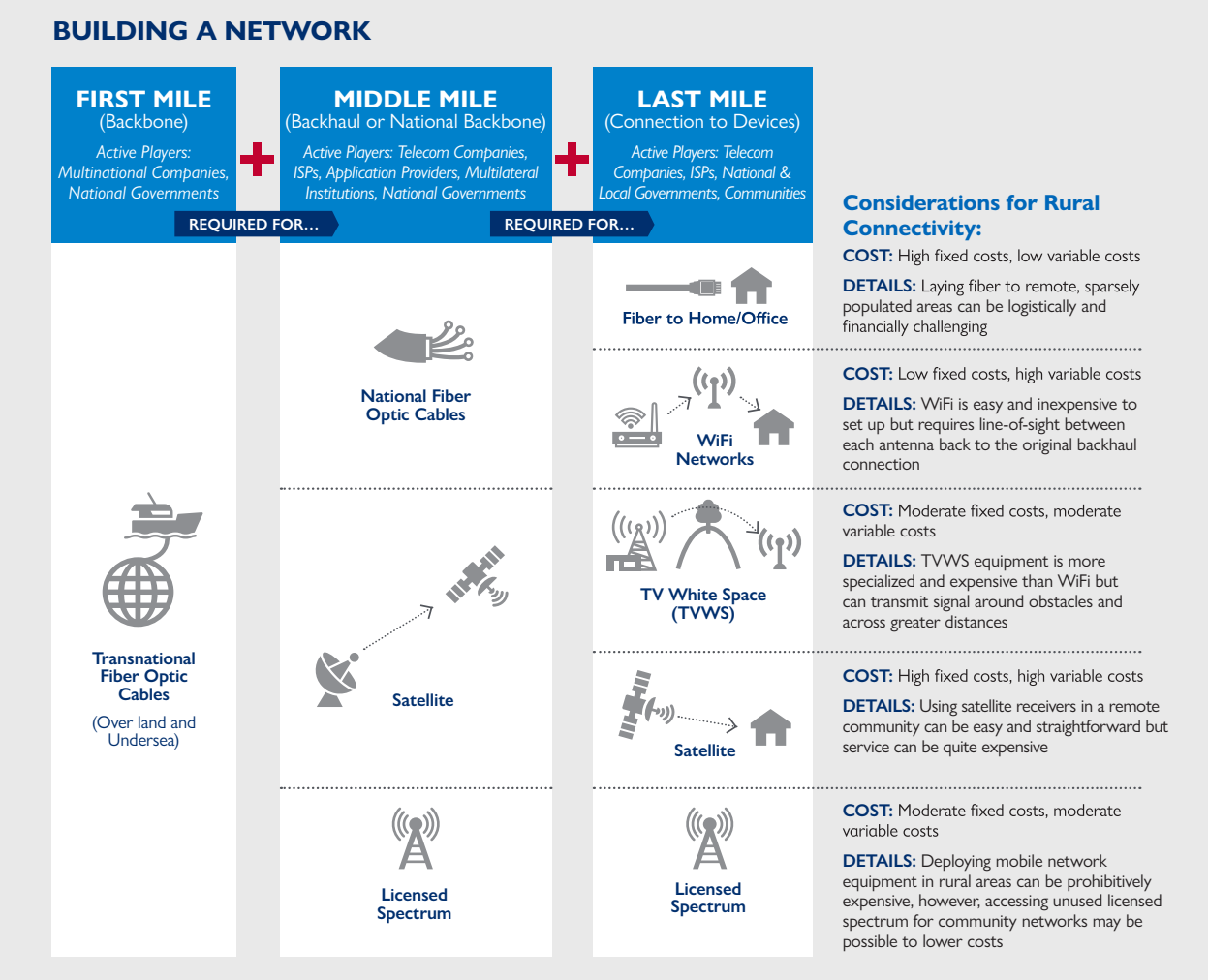
33 Balancing Act, "Google cache servers drive interconnection in Africa," *Balancing Act,* August 19, 2011, https://www.balancingact-africa.com/news/telecoms-en/22779/google-cache-servers-drive-interconnection-in-africa.

34 Latency describes delays in communication over a network. Lower latency is desirable.

35 Balancing Act, "Google cache servers drive interconnection in Africa," *Balancing Act,* August 19, 2011, https://www.balancingact-africa.com/news/telecoms-en/22779/google-cache-servers-drive-interconnection-in-africa.

transit required to populate the cache.[36] However, it should be noted that the surge in overall traffic due to better performance can offset the latency gains.

FIGURE 5: Building a network



According to one telecom market expert, broadband in Mali is essentially concentrated in Bamako and the regional capitals.[37] Several neighborhoods in Bamako have received fiber-to-the-home connections,[38] and, as shown in Figure 4, Mali's backbone is heavily concentrated around large cities. In addition, one public sector interviewee suggested that while some cities, such as Timbuktu, have received fiber, the cables are not yet operational.[39]

To help subsidize the expansion of connectivity infrastructure, the TGOM operates a Universal Service Fund (USF). Mali's USF is managed by the *Agence de Gestion du Fonds d'Accès Universel* (AGEFAU), which is housed within the MCEN. Mali's USF collects one percent of operator revenue each year to plan activities for areas that are not yet covered by any of the operators.[40] According to AGEFAU, they are currently working with

36 Balancing Act, "Google cache servers drive interconnection in Africa."

37 Telecom market expert, Interview by DECA Team, June 2022, online.

38 Public sector interviewee, Interview by DECA Team, July 2022, online.

39 Ibid.

40 Ladcomm Corporation and GSMA, *Sub-Saharan Africa - Universal Service Fund study* (London, UK: GSMA, 2014), 76. https://www.gsma.com/publicpolicy/wp-content/uploads/2016/09/GSMA2014_Report_SubSaharanAfricaUniversalServiceFundStudy.pdf.

two operators to cover ten locations across three regions of the country.[41] In June 2022, operators started meeting with local authorities to select sites for installation at each location, which include villages in Kenieba, Bafoulabe, Kita, Nara, Douna, Sikasso, and Bougouni (see Figure 4).[42] AGEFAU hopes to complete the project by the end of 2022.[43]

KEY TERMS | BOX 2: Last-Mile Connectivity and Universal Service Fund

Last-Mile Connectivity[44] is where end users access the internet using devices (mobile phones, laptops, tablets, computers) through local access networks.

A Universal Service Fund[45] is a mechanism designed to promote network infrastructure development in areas that commercial access providers deem uneconomical. Essentially established as subsidy programs, USFs are resourced through contributions drawn from the revenues of telecommunications operators. USF funds are often applied to help de-risk or otherwise complement network investments in underserved (or unserved) areas. In many cases, USFs target projects that serve schools, hospitals, and other anchor institutions where demand for services can be aggregated.

Over the past decade, Mali's USF has been no stranger to controversy. In 2014, the USF became embroiled in a dispute between the AMRTP, which managed the fund at the time, and the government over using funds for non-telecom related, post-conflict reconstruction.[46] In 2016, the *Contrôle Général des Services Publics* published a report accusing the AMRTP of financial impropriety and of having used USF funds for staff holidays and equipment procurement.[47] In January 2016, the GOM transferred management of the USF from AMRTP to AGEFAU. In 2022, there remains disagreement about whether the funds are being put to the best use.

MOBILE BROADBAND: TRIALS AND TRIBULATIONS

Interviewees across the public, private, and non-profit sectors emphasized how the explosion of mobile telephony played a significant role in Mali's digital transformation. More than two-thirds of Mali's population has access to 3G connectivity, and more than one third has access to 4G connectivity.[48] Orange Mali is the country's market leader, followed by SOTELMA/Malitel, and then Alpha Telecom/Telecel. A fourth operator, Mobilis, plans to enter the market over the next few years.

SOTELMA/Malitel launched 3G services in Mali in 2012, and Alpha Telecom's 3G network came online in 2018, principally in Bamako. Orange Mali launched 4G services in March of 2018. Both Malitel and Orange promote how extensive their networks are in the country. Malitel reported 8 million mobile subscribers in 2021,[49] and Orange boasts coverage of "over 97 percent of the populated areas."[50] GSMA, the mobile network operator industry organization, published coverage maps for both Malitel and Orange based on self-reported coverage

41 AGEFAU, Interview by DECA team, June 2022, online.

42 Ibid.

43 Ibid.

44 John Garrity and Aminata Amadou Garba, "The Last-Mile Internet Connectivity Solutions Guide Sustainable Connectivity Options for Unconnected Sites," *ITU Publications,* 2020, https://www.itu.int/en/ITU-D/Technology/Documents/LMC/The%20Last-Mile%20Internet%20Connectivity%20Solutions%20Guide.pdf

45 Ladcomm Corporation and GSMA,"Survey of Universal Service Funds: Key Findings," GSMA, 2013, https://www.gsma.com/publicpolicy/wp-content/uploads/2016/09/GSMA2013_Report_SurveyOfUniversalServiceFunds_KeyFindings.pdf.

46 Ladcomm Corporation and GSMA, *Sub-Saharan Africa - Universal Service Fund study,* 76.

47 Mali ACTU, "Mali : Une Administration Erigée en Mafia," *Mali ACTU,* September 24, 2021, https://maliactu.net/mali-une-administration-erigee-en-mafia/.

48 GSMA, "Mobile Connectivity Index: Mali", *GSMA,* 2022, https://www.mobileconnectivityindex.com/#year=2021&zoneIsocode=MLI&analysisView=MLI.

49 Lancaster, *Mali: Telecoms, Mobile and Broadband - Statistics and Analyses,* 59.

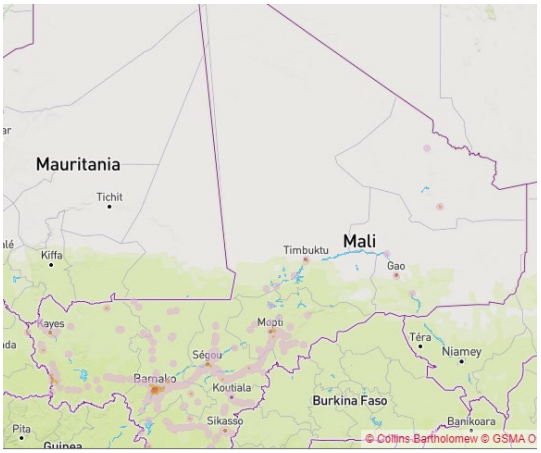
50 Telecom market expert, Interview by DECA Team, June 2022, online.

data (see Figure 6), which paint different pictures than the companies like to advertise. These maps illustrate that Orange is the leading provider of high-speed 4G services, although exclusively in Bamako. Orange also provides 3G services in the major regional hubs, including Mopti, Timbuktu, and Gao in the north, but coverage is mostly nonexistent outside of major cities. While Malitel's 3G and 4G services are much more limited, it reports greater country-wide 2G coverage than does Orange.

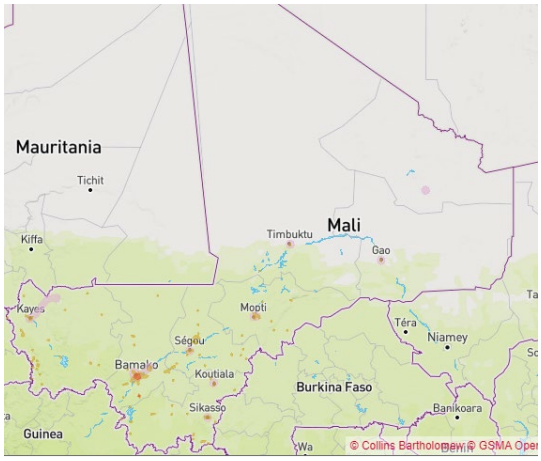
Orange also piloted 5G services in Bamako in 2021.[51] The move came seven months after testing 5G services in Senegal as part of the company's strategic priority to launch 5G services across all of its African markets.[52] According to one telecom market expert, the move aligns with the company's goal to "prepare for the future, so that when the operators or providers of these services arrive, they will find that the infrastructure is already there."[53] However, in 2022, Orange Mali made an internal decision to not go forward with 5G deployment.

FIGURE 6: Geographic network coverage maps

Orange Mali: 59% market share



Malitel: 38% market share



Key
- 2G (GSM)
- 3G
- 4G (LTE)

Source: GSMA Network Coverage Maps

Mali's network coverage is largely confined to the south of the country, and concern about infrastructure security majorly limits opportunities for more national coverage and network availability. Violence and stability hinder major construction and telecom expansion projects. In 2017, five local construction workers were murdered while laying cable for a Chinese telecom firm near the village of Dianke, Niafunke, Timbuktu.[54] In 2021, rebels destroyed cell phone towers outside Gao and Timbuktu to the north, disrupting banking services and communications.[55] Interviewees emphasized that insecurity is the most pressing concern for MNOs. One private sector interviewee highlighted that their company's ICT infrastructure investments in certain regions of Mali, have been "totally destroyed by terrorists."[56] He added that they "destroy our batteries…solar panels. They destroy everything. The operators are suffering a lot to redeploy their equipment."[57] Some sources

51 Tech Gist Africa, "Mobile operator Orange Mali has announced the launch of a 5G pilot in Mali," *Tech Gist Africa,* July 15, 2021, https://www.techgistafrica.com/mobile-networks/mobile-operator-orange-mali-has-announced-the-launch-of-a-5g-pilot-in-mali/.

52 Muriel Edjo, "Orange teste avec succès la 5G au Mali," *Agence Ecofin,* July 8, 2021, https://www.agenceecofin.com/operateur/0807-89917-orange-teste-avec-succes-la-5g-au-mali#:~:text=Tester%20la%20%235G%20en%20avant,la%20Modernisation%20de%20l%27Administration.

53 Telecom market expert, Interview by DECA Team, June 2022, online.

54 Agence France-Presse and Channels Television, "Five Workers Laying Fibre-Optic Cables Murdered In Mali", *Channels Television,* December 10, 2017, https://www.channelstv.com/2017/12/10/five-workers-laying-fibre-optic-cables-murdered-in-mali/.

55 Nick Roll and Alhousseini Alhadji, "Jihadist attackers have a new target in Mali: telecom towers," *Rest of World,* October 27, 2021, https://restofworld.org/2021/jihadist-attackers-have-a-new-target-in-mali-telecom-towers/.

56 SOTELMA, Interview by DECA Team, July 2022, online.

57 Ibid.

suggest that these attacks are part of a strategy to isolate communities and consolidate control of remote areas.[58] Attacks raise anxiety by cutting off communications and disrupting commerce by shutting down essential mobile money services.[59] In this context, according to one public sector interviewee, telecom providers lose three to four base stations per week.[60] Between January and June 2022, operators lost 15 billion West African Francs (CFA) (approximately $24.6 million USD) in infrastructure costs alone, not including lost revenue.[61]

BOX 2: Satellites as a solution?

The precariousness of connectivity infrastructure and the costs of redeployment have left large areas of Mali bereft of internet access. According to one USAID implementing partner, across several towns in the north—including Timbuktu, Gao, Kidal, Menaka, and Taoudeni—connectivity is barely strong enough to send a WhatsApp message, even in the early hours of the morning.[62] Armed group activity also often plunges areas into internet blackouts for weeks, making communication difficult. In this context, civil society and international development stakeholders have suggested satellite technology could be a solution.

Interviewees in civil society emphasized the role that very small aperture terminal (VSAT) two-way satellites[63] could play in this context. One peacebuilding interviewee explained that using VSATs could help bypass telecommunication pylons,[64] which are often destroyed by radical groups.[65] Other USAID implementing partners have also started to use VSATs in the north, particularly in their field offices, to avoid costly delays.

Private sector stakeholders have also started to invest in satellite technology. In March 2022, Orange Mali connected with Intelsat to deliver 3G and 4G connectivity through satellite.[66] While this partnership is one of the first in West Africa, leveraging satellite technology to fill gaps in similar contexts is nothing new. Vodacom also recently partnered with Intelsat in the Democratic Republic of the Congo to expand connectivity to rural communities.[67] Starlink, the SpaceX-owned service which hopes to manage 42,000 satellites by 2027,[68] received regulatory approval from Nigeria and Mozambique in May 2022.[69] While the company has already received two licenses in Nigeria and has started marketing to consumers, its price point—a one-time fee of $599 USD coupled with a $110 USD monthly subscription—has raised concerns that it will be far from affordable for the rural end users it hopes to reach.[70]

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58 Adam Sandor (@adam_sandor), "Recently collected data from #Ansongo and #Gao has come in on the effects of the @Orange_Mali network disturbances over the past few weeks. Jihadist actors (notably ISGS for the areas mentioned above) have targeted telephone antennae…", *Twitter,* August 27, 2021, https://twitter.com/adam_sandor/status/1431283035341733901.

59 Ibid.

60 Public sector interviewee, Interview by DECA Team, July 2022, online.

61 Ibid.

62 Implementing partner interviewee, Interview by DECA Team, June 2022, online.

63 VSATs are equipped with 3.8-meter or smaller dish antennae (typically between 75 centimeters and 1.2 meters) and enable two-way communication between satellites and a terrestrial radio station. Since they require few parts, they are easy to scale and are a popular alternative in remote areas without existing connectivity infrastructure, including moving locations such as ships and trucks.

64 Telecommunication towers are land-based towers that form a cell, i.e., the land around its transmitters, which enable sending and receiving data through cell networks. A group of towers forms a cell network. Individual towers have a small range, so constructing a larger network can be expensive and challenging, especially in remote areas.

65 Peacebuilding interviewee, Interview by DECA Team, June 2022, online.

66 Randal Barney, "Orange Mali Selects Intelsat for 3G and 4G," *World Teleport Association,* March 3, 2022, https://www.worldteleport.org/news/597722/Orange-Mali-selects-Intelsat-for-3G-and-4G.htm#:~:text=Orange%20Mali%20SA%20has%20selected,president%20of%20networks%20at%20Intelsat.

67 Melanie Mingas, "Telesat and Intelsat win new Africa contracts," *Capacity,* March 1, 2022, https://www.capacitymedia.com/article/29s0o0pndhnkxnuapsfsw/latest-news/telesat-intelsat-win-africa-contracts.

68 Daniel Iyanda, "Elon Musk's Starlink satellite internet targets late 2021 launch in Africa," *Space in Africa,* March 2, 2021, https://africanews.space/starlink-satellite-internet-target-africa-coverage-late-2021-2022/.

69 Alexander Onukwue, "Starlink is coming to Africa, but who will use it?," *Quartz,* May 31, 2022, https://qz.com/africa/2171730/starlink-is-coming-to-africa-but-who-will-use-it.

70 Ibid.

SPECTRUM MANAGEMENT

Currently, Mali has allocated several spectrum licenses. Telecel operates a 3G band at 2100 MHz, Malitel operates a 3G band at 2100 MHz and a 4G band at 1800 MHz, and Orange Mali operates a 3G band at 2100 MHz and two 4G bands - one at 1800 MHz and one at 2600 MHz.[71]

Mali is one of the least affordable markets in terms of spectrum pricing in Africa. According to the GSMA, 480 MHz of spectrum costs a mobile network operator six percent of market revenue annually.[72] Of the five countries more expensive than Mali, two are its contiguous neighbors - Niger and Burkina Faso.[73] While ECOWAS advises that spectrum prices should be set on the basis of opportunity cost, such as through auction, many countries in the region follow a different methodology.[74] In Mali, spectrum prices are set as a percentage of operator revenue.[75]

KEY TERMS | BOX 3: Radio Spectrum, ISPs, and MNOs

Radio Spectrum refers to the range of frequencies of electromagnetic radiation that are used to deliver radio transmissions. A critical function of telecommunications sector regulatory authorities is to designate specific frequency ranges (or bands) for different purposes, including telecommunications (but also for applications such as radio astronomy or industrial uses). Some bands (e.g., WiFi) are unlicensed, meaning that anyone can use them without seeking explicit prior permission.[76] Licensed spectrum[77] requires users (e.g., commercial cellular networks or FM radio broadcasters) to secure a regulator's approval prior to use. Licenses are typically assigned through spectrum auctions, which seek to establish the economic value of spectrum (a finite natural resource).

Internet Service Providers (ISPs) deliver access to end users using both fixed-line and wireless technologies. Wireless ISPs (especially those in rural areas) often seek to take advantage of low licensing and equipment costs by delivering service using unlicensed spectrum. ISPs range in size and scope from small, local providers to providers with international and even global reach.

Mobile Network Operators (MNOs) provide voice and data services primarily via wireless terrestrial networks. MNOs typically use licensed spectrum bands, which, due to the fact that they are not shared, tend to deliver a higher quality, more reliable (and more expensive) service.

Spectrum allocation is managed by Mali's national regulator, AMRTP. AMRTP conducts annual audits in Bamako and other regions to evaluate the efficiency of the frequency bands. These audits are organized and planned by AMRTP, examine whether operators are complying with their allocations, and identify any illegal use of frequency bands. They also coordinate with neighboring countries to avoid frequency interference.

One public sector interviewee highlighted that AMRTP faces several challenges in spectrum management. First, while AMRTP conducts annual audits, they do not reach everywhere. AMRTP's spectrum monitoring system only exists in a few regions in Mali. Second, AMRTP has faced challenges trying to stop the use of unauthorized boosters in Mali. Boosters, or cell signal amplifiers, work by amplifying the weak signal being sent to and from

71 HBR Radiofrequency Technologies, "Mali," *HBR Radiofrequency Technologies,* accessed October 2022, https://halberdbastion.com/intelligence/countries-nations/mali.

72 Xavier Pedros, et al., *Effective Spectrum Pricing in Africa: How successful awards can help drive mobile connectivity* (London, UK: GSMA, 2020), 26, https://www.gsma.com/spectrum/wp-content/uploads/2020/11/Effective-Spectrum-Pricing-Africa.pdf.

73 Ibid.

74 Georgiana Pop and Gonçalo Coelho, "Competition Across the Radio Spectrum in West Africa: Regional and National Aspects," *Competition Policy International,* January 6, 2021, https://www.competitionpolicyinternational.com/competition-across-the-radio-spectrum-in-west-africa-regional-and-national-aspects/.

75 Ibid.

76 While permissions are not required for unlicensed spectrum use, users are typically limited to technical parameters (such as transmission power or antenna specifications).

77 Mitchell Barker, "Licensed vs unlicensed spectrum," ITWeb, ITWeb Limited, 2013, https://www.itweb.co.za/content/KrxP3jMBLomvA2ye.

a mobile phone to a nearby tower. They often involve a set of antennas that capture the signal outside of a building and strengthen and distribute the signal within a building via a few internal antennas. While some boosters are legal in many countries, others can be made too powerful and may disrupt service to everyone in the vicinity.[78] In Mali, boosters are illegal, and ownership risks a fine of 100 million CFA (approximately $148,070 USD) and five years' imprisonment.[79] Given the heterogeneous quality of internet access in Mali, many people use boosters to improve the quality of the network. Unfortunately, this has caused interference and, according to AMRTP, is "one of the causes of the poor quality of the network."[80]

1.2. LACK OF AFFORDABILITY AND INCLUSIVITY DRIVE INEQUITY IN ACCESS

Competition and pressure from AMRTP have driven costs down for data, devices, and telecommunication in general. However, in recent years, competition alone has not been enough to force operators to lower their tariffs. As a result, data in Mali remains more expensive than in most of the Sahel. In addition, Mali's low levels of literacy prevent many from accessing text-based digital tools, but public and private stakeholders are working to create more inclusive options.

DATA IS EXPENSIVE IN THE SAHEL

Interviewees across the public and private sectors highlighted how the cost of internet access in Mali has improved over the past few years. According to one private sector interviewee, "Before, you had to spend 5,000 or 10,000 francs to have a maximum of 2.5 or 3 gigabytes; now, with 10,000 francs, you have more than 20 gigabytes."[81] One public sector interviewee pointed out that over the past two decades, the cost of a SIM card fell enormously, from 300,000 CFA in 2000 to just over 500 CFA today.[82]

Mali also launched an internet exchange point in 2018.[83] An internet exchange point (IXP) is the physical infrastructure through which different ISPs and content delivery networks connect and exchange internet traffic. IXPs help shorten the physical distance that data needs to travel. Interviewees across the public sector and civil society emphasized how this development reduced the cost of internet access.

However, internet access remains very expensive for most Malians. According to the Alliance for Affordable Internet (A4AI), one GB of data costs 5.04 percent of the average monthly income in Mali, far exceeding the A4AI's international target of one GB for 2 percent or less. ECOWAS endorsed the 1-for-2 target in 2017. One civil society interviewee emphasized that, for the average, cash-strapped Malian, connectivity costs are hard to accommodate. They added, "if you have to live on that salary, pay for the house, pay for food, pay for medicine, and have access to the internet…the internet will be extremely expensive."[84]

78 Louise Matsakis, "Unlicensed Signal Boosters Get a Boost From Amazon," *Wired,* August 30, 2019, https://www.wired.com/story/unlicensed-signal-boosters-amazon/.

79 Aujourd'hui-Mali, "Dégradation de la qualité des services des télécommunications à Bamako et environs : L'AMRTP ouvre la chasse aux boosters dans le Grand marché Les fautifs risquent 5 ans d'emprisonnement et 100 millions F CFA d'amende," *Maliweb,* June 5, 2021, https://www.maliweb.net/economie/telecom/degradation-de-la-qualite-des-services-des-telecommunications-a-bamako-et-environs-lamrtp-ouvre-la-chasse-aux-boosters-dans-le-grand-marche-les-fautifs-risquent-5-ans-demprisonnement-et-100-mill-2930750.html.

80 Public sector interviewee, Interview by DECA Team, July 2022, online.

81 DoniyaBlown, Interview by DECA Team, July 2022, online.

82 Public sector interviewee, Interview by DECA Team, July 2022, online.

83 "Mali Internet Exchange," accessed October 2022, https://www.mlix.ml/.

84 Civil society interviewee, Interview by DECA Team, July 2022, online.

These tradeoffs can be particularly acute for women in Mali, who already face steep obstacles to earning an income. For example, women are often forced to work smaller, less-fertile agricultural plots than their male counterparts, which limits their income-generating ability and overall agricultural productivity.[85] Women's access to entrepreneurial financing is also more limited than it is for men, which distorts how quickly women entrepreneurs can grow their businesses.[86] Finally, women in Mali must also balance household chores with income-generating activities, curtailing the amount of time they can devote to earning money.[87] In this context, high data prices may disproportionately affect women's ability to access the internet.

Public and private sector interviewees also agree that the cost of internet access remains not just a barrier for the average citizen but also for creative entrepreneurship. According to one private sector interviewee, the cost of the internet limits Mali's startups' "ability to compete with other startups in the sub-region."[88] Higher connectivity prices are often passed on to consumers, reducing the viability of businesses that depend on connectivity.

In Mali, competition alone has not been enough to drive down costs further. For several years following the market entry of Telecel, the country's third MNO, neither Orange Mali nor Malitel were willing to reduce their prices. In 2018, AMRTP benchmarked with countries in the sub-region and found that rates were high in Mali when compared to countries like Burkina Faso and Niger. With this information in hand, AMRTP "forced [MNOs] to lower their tariffs."[89] However, the TGOM continues to demand that telecom providers lower their costs even further.[90] Given Mali's difficult enabling environment, lowering tariffs can be difficult for operators, who are also contending with conflict-related losses and maintenance.

DESIGNING TECHNOLOGY FOR MALI'S LINGUISTIC DIVERSITY AND ILLITERATE POPULATION

Mali is one of the least literate countries in West Africa. Less than one third of adults in Mali can read and write. French is the primary language of instruction,[91] and very few textbooks are available in local languages, despite an effort by the GOM to introduce more local languages into the national curriculum.[92] Over the past decade, literacy rates have remained consistent. Literacy rates are even lower for women; only 22.1 percent of women can read and write compared to 40.4 percent of men.

Mali's poor literacy rates influence whether or not people use digital technology. One USAID implementing partner indicated that since one of their tools is not yet voice-enabled, people who cannot read or write cannot access the information.[93] A recent survey of ICT implementers in the agricultural sector found that nearly half reported high illiteracy rates as a major constraint.[94] Local cooperatives also struggle to get their members to

85 USAID, *Digital Agricultural Ecosystem in Mali* (Washington, D.C.: USAID, 2022), 7, https://developmentgateway.org/wp-content/uploads/2022/10/DAI_Report_vFinal_copyedited_2QL4hED-1.pdf

86 African Policy Dialogue Mali, *Obstacles to the Development of Women's Economic Activity in the Formal and Informal Sectors in Mali* (Bamako, Mali: African Policy Dialogue Mali, 2022), 4, https://includeplatform.net/wp-content/uploads/2022/07/Workshop-1-Mali-English.pdf.

87 Ibid.

88 Donilab, Interview by DECA Team, June 2022, online.

89 Public sector interviewee, Interview by DECA Team, July 2022, online.

90 African Wireless Communication, "Mali government demands lower internet prices," *African Wireless Communications,* June 7, 2021, https://www.africanwirelesscomms.com/news-details?itemid=3874.

91 French is the official national language, but there are 11 languages of instruction in Mali. French is used as the language of instruction in "écoles classiques" while in "écoles à curriculum," which represent half of Mali's primary schools, students transition to French halfway through Grade 4.

92 Aline Meysonnat and Ignancio Torrano, *Prospective evaluation of GPE's country-level support to education: Mali - Second Annual Report* (Washington, D.C.: ITAD, 2020), 69, https://www.globalpartnership.org/sites/default/files/document/file/2020-05-country-level-prospective-evaluation-mali-Year-2.pdf.

93 CARE, Interview by DECA Team, June 2022, online.

94 USAID, *Digital Agricultural Ecosystem in Mali,* 18.

use online marketplaces, even years after the marketplaces have been deployed in the field.[95] Mamadou Gouro Sidibé, the founder of Lenali (see Box 3)—a grassroots, voice-based social media app for Malians—came up with the idea after watching a supermarket manager struggle with a text-based messaging app.[96]

BOX 3: Lenali - vocalizing social media

Mamadou Gouro Sidibé founded Lenali in 2017 to help build a more inclusive digital platform for Mali's large illiterate population to communicate, interact, and transact. Sidibé's vision for Lenali came to him after witnessing a shop owner struggle to read a text message he received in French.[97] Many Malians remain illiterate, including in their local languages, and marketing themselves and their businesses on popular platforms, such as Facebook, can be challenging.

Lenali enables users to post, comment, and "like" using voice alone. While popular messaging apps, such as Viper and WhatsApp, include voice message options that are very popular in Mali, Lenali takes the idea one step further. By helping to build a voice-enabled online community, Lenali allows users to market themselves to a much broader audience. Early adopters reported not only reaching new customers but increasing their revenues as well.[98] One year after launching, Lenali reported approximately 27,000 users.[99] Two years later, that figure had grown to 73,500 users.[100]

Lenali has also worked with development practitioners outside the entrepreneurship space. In 2019, Lenali partnered with Mali Health to develop a health information system targeting 400 women.[101] The pilot intended to leverage Lenali's technology to help participants access essential health information in their local language, Bambara.[102] Participants were able to interact verbally with medical professionals through the app and learn more about child and maternal health topics.[103]

Crucially, Mali's poor literacy rates also affect how people use digital technology. WhatsApp is one of the most commonly used messaging platforms in Mali. Many users take advantage of its voice-enabled functionality to send and receive voice notes rather than texting. Implementing partners also rely on the platform to reach their field teams. One interviewee emphasized that implementers must take both Mali's high illiteracy rates and popularity of WhatsApp into account when designing programs. He added that if you are tracking the spread of infectious diseases "and you want to inform the population…instead of going through SMS…broadcast these alerts vocally and in the different languages of the country."[104]

Women's disproportionately low levels of literacy in Mali heighten their risk of being left behind when digital tools are deployed in the field. Without voice-enabled functionality and in a country where few women have completed formal schooling, programs providing educational courses and training, for example, may not reach their intended beneficiaries. In addition, digital marketplaces to help women sell goods, such as UN Women's e-commerce platform Buy From Women, will not be as effective without voice-to-text options.

95 Ibid.

96 Caroline Dubois, "Malian entrepreneur fights digital exclusion for the illiterate with voice-based social media app," *How we made it in Africa,* May 27, 2019, https://www.howwemadeitinafrica.com/malian-entrepreneur-combating-digital-exclusion-for-illiterate-population-with-voice-based-social-media-app/63289/.

97 Amelia Nakitimbo, "Lenali, the Malian app empowering illiterate small-business owners, " *Africanews,* August 14, 2019, https://www.africanews.com/2019/08/14/lenali-the-malian-app-empowering-illiterate-small-business-owners/.

98 Ibid.

99 Chris Giles, "Why Mali has its own homegrown version of Facebook," *CNN,* April 9, 2018, https://www.cnn.com/2018/01/25/africa/mali-facebook-social-media-lenali.

100 Amelia Nakitimbo, "Lenali, the Malian app empowering illiterate small-business owners."

101 USAID, "Mali Health," March 1, 2021, *USAID,* https://womenconnectchallenge.s3.amazonaws.com/media/uploads/malihealth_factsheet.pdf.

102 Ibid.

103 Ibid.

104 Implementing partner interviewee, Interview by DECA Team, June 2022, online.

Interviewees also emphasized the need to account for Mali's linguistic diversity in efforts to improve and expand technology use in the country. One interviewee from the public sector highlighted that when they install local service centers and train the community on how to use them, they must make sure to take language into account.[105] While it can be a challenge to implement, he added, offering the training in the local language pays dividends.[106] He said that when young people come to Bamako from these areas and while they may not have been able to attend school, they know how to connect to WiFi, use WhatsApp, and call their parents at home.[107]

Mali's linguistic diversity presents challenges for enabling voice-based digital services. AI-based tools for interconverting speech and text are not available for many African languages; Sahelian languages are particularly poorly-supported. It limits the kind of features that platforms like Lenali are able to provide and makes it more difficult to interact with technology using speech. While not a problem unique to Mali, the lack of language diversity in ICT impacts how services can be operationalized in a way that would make the most sense for many end-users.

INADEQUATE ENERGY ACCESS HINDERS CONNECTIVITY EXPANSION

Interviewees across the public and private sectors, as well as from civil society, highlighted unreliable and/or largely nonexistent access to electricity as a major constraint to technology adoption and expansion. According to one interviewee from the *Ministère de l'Enseignement Supérieur et de la Recherche Scientifique* (MESRS), "There are frequent power outages at certain times of the year, and large sums are invested in fuel for the generators."[108]

Only 50.6 percent of the country's population has access to electricity. Mali's population is distributed across a vast distance, and the national grid is concentrated in the south (see Figure 7). Energy security is also a concern for a country beset with cyclical political instability. While access to electricity has steadily increased since 2000, access is disproportionate between urban centers in south and central Mali (where 80 percent of the population has regular access to electricity) and more rural regions in the north (where electricity access may be lower than two percent).[109]

105 AGEFAU, Interview by DECA Team, June 2022, online.

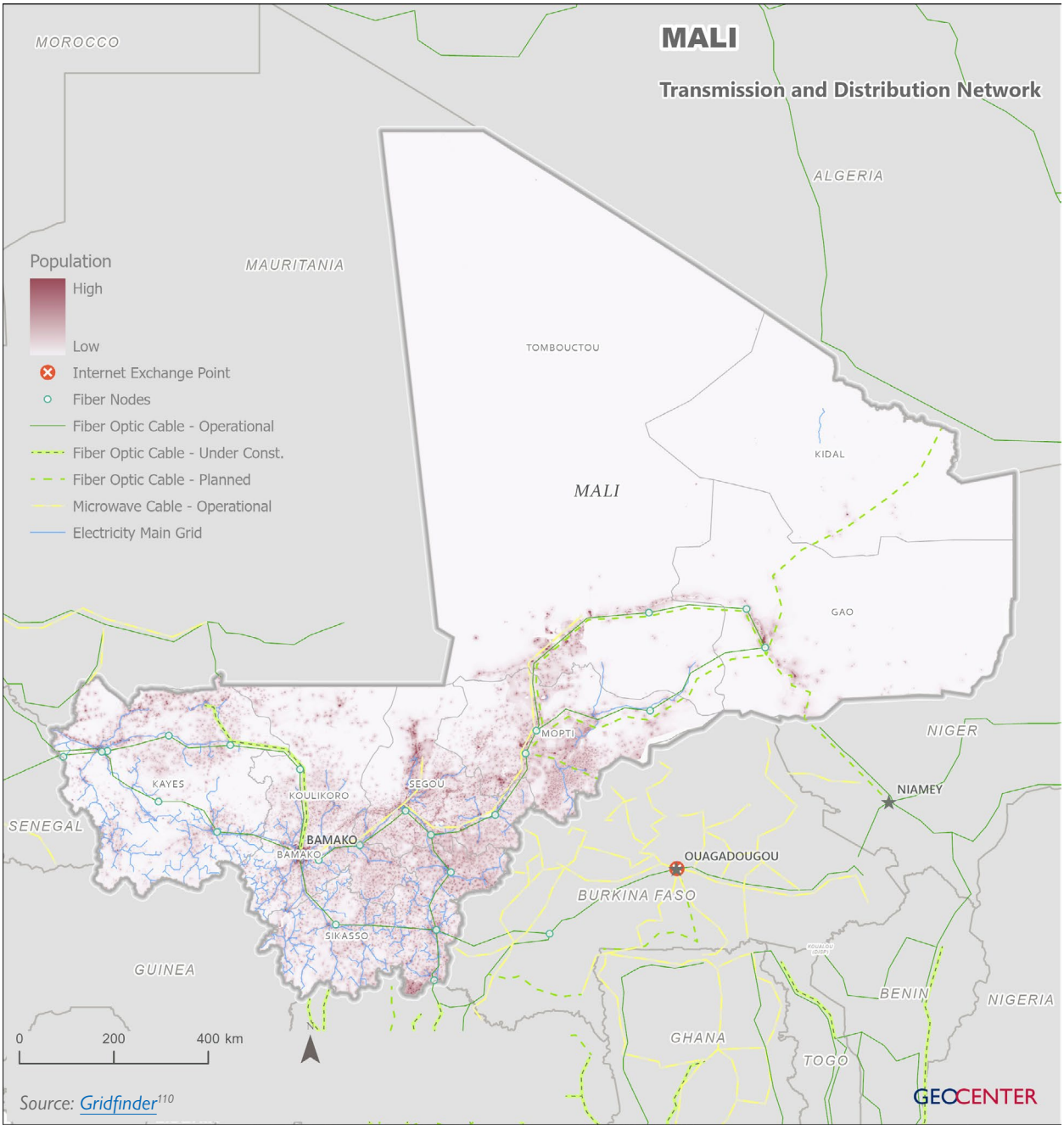
106 AGEFAU, Interview by DECA Team, June 2022, online.

107 Ibid.

108 MESRS, Interview by DECA Team, July 2022, online.

109 Dirk Druet, Rida Lyammouri, and David Mozersky, *From Renewable Energy to Peacebuilding in Mali* (Washington, D.C.: The Stimson Center, 2021), 12, https://www.stimson.org/wp-content/uploads/2021/06/Stimson_FinalRelease_June25.pdf.

FIGURE 7: Mali's national electric grid



In this environment, electricity users compensate by expending resources on alternative energy sources. Interviewees from MNOs highlighted that in places without reliable energy, their organizations often need to make additional investments in solar panels or generators. One interviewee from a USAID implementing partner highlighted that, while in some regions program participants can easily recharge their equipment, in "some localities a solar kit was provided with the tablets to recharge them."[111]

110 Gridfinder is an open source tool for predicting the location of electricity network lines, using nighttime lights satellite imagery and OpenStreetMap data. The brown backbone connections are verified, whereas the green ones are inferred based on a statistical model. More information can be found here and here.

111 EDC, Interview by DECA Team, June 2022, online.

Public authorities are enthusiastic about synergies to pair renewable energy with other investments in ICT. Dr. Dackouo Tyéri, Deputy Director General of the *Agence Nationale de Télésanté et d'Informatique Médicale* (ANTIM), indicated that they are working with the *Agence Malienne pour le Développement de l'Energie Domestique et l'Electrification Rurale* (AMADER) to complement the digitalization of community health centers with solar energy investments through the implementation of the SanDI project.[112] Another interviewee from AGEFAU highlighted the potential of pooling resources with AMADER to add solar panels to universal service centers, thereby reducing the cost of installing both separately.[113]

1.3. DELIVERING SERVICES IN THE WAKE OF HEALTH SECURITY THREATS AND INSTABILITY

Mali's crises have impacted how well services can be delivered across the country's vast expanse. Over the past decade, tens of thousands of children have found themselves displaced and without access to education. In this context, girls are disproportionately impacted by school closures. While girls may not be more likely to be displaced than boys, they do face other challenges, including exposure to exploitative practices outside of school and more limited educational opportunities. At the same time, the COVID-19 pandemic put additional pressure on schools, forcing them to close in the interest of public health and straining the country's healthcare system. In this context, private and public stakeholders are working to introduce new, remote options for education and healthcare, to digitize existing ones, and to improve how these services can be resilient in the future.

DISTANCE LEARNING IN A DESERT

In recent years, Mali's education sector has struggled with several destabilizing crises. Cyclical armed conflict, particularly in the north, has closed schools and disrupted schooling for hundreds of thousands of children. COVID-19 added an additional challenge. In 2020, all schools closed for eight months as part of the country's pandemic response. For primary education alone, that included 13,000 schools.

In this environment, public authorities explored investments in remote learning. In 2020, the *Ministère de l'Education Nationale* convened a technical expert committee to develop lessons to be broadcast through the *Office de Radiodiffusion-Télévision du Mali* (ORTM), the country's national broadcaster. ORTM broadcast lesson plans targeted at secondary school students for 90 minutes per day during the week. Critics, however, highlighted that the final design process excluded private sector stakeholders and the broader educational community.[114,115] It was also difficult to identify how many students connected to watch the lessons and to evaluate the educational outcomes of the project.[116] One key reason for this was the lack of a digital education management system which could have facilitated the collection of data from remote schools all over the country and influenced operational programming.

112 ANTIM, Interview by DECA Team, July 2022, online.

113 AGEFAU, Interview by DECA Team, June 2022, online.

114 Ouestaf News, "Covid-19 au Sahel : flop de l'enseignement à distance, selon des syndicalistes," *Ouestaf News,* January 1, 2021, https://www.ouestaf.com/covid-19-au-sahel-flop-de-lenseignement-a-distance-selon-des-syndicalistes/.

115 Education sector expert, Interview by DECA Team, 2022, online.

116 Ibid.

BOX 4: Digitizing education in low-resource settings - DoniyaBlown

In early 2020, DoniyaBlown CEO Drissa Doumbia remembers being invited by the *Ministère de l'Education Nationale* to conduct an inventory of how much of the country's national curriculum had been digitized. He found only "some content for the primary level…some mathematics…and some private content."[117] He added, "it was a catastrophic inventory."[118] Doumbia's organization has made it its mission to make more educational resources available.

DoniyaBlown is a Malian startup that specializes in the digitization of educational content. The organization follows a three-pillared approach to improving Mali's digital educational ecosystem: (1) developing multimedia pedagogical content, (2) making that content accessible in low-resource settings, and (3) coaching students and teachers. In 2019, DoniyaBlown was recognized by Total Mali, the French multinational energy company's Mali base of operations, as one of three local startups of the year, winning 8 million CFA (about $13,881 USD).[119]

DoniyaBlown operates in an early-stage environment. One education sector interviewee emphasized that digital in schools is "still in the embryonic stage."[120] School administrators often equate digitalization solely with building and equipping computer rooms, ignoring teacher training. Few schools have access to the internet. Many do not have a digital student management system, which would allow parents to pay fees, consult grades, and check school results remotely.

Other private sector and development actors are designing and developing digital educational resources. In March 2020, Ada Ouologuem, a 32-year-old telecommunications engineer and entrepreneur, launched So Kalan, an e-learning platform.[121] So Kalan houses 20 online lessons, with subject matter spanning from the humanities to the sciences and targeted at secondary school students.[122] The Education Development Center (EDC), a USAID implementing partner, has worked to expand access to teacher training via lesson plans uploaded to tablets and USBs for teachers to use in low-resource environments. The startup DoniyaBlown (see Box 4) has made it its mission to make school digitalization a reality in Mali.

Mali's tertiary educational authorities have also explored integrating more digital resources into higher education. Since 2013, the MESRS has been working to establish a virtual university in Mali. The university's mandate would be two-fold: to support existing higher education institutions to offer more distance education options and to offer its own diplomas and other certifications in partnership with MCEN.[123] MESRS' vision is that the virtual university will serve as a model for how other local universities can design, develop, and disseminate digital content. However, MESRS noted that the virtual university has been slow to set up due to financial resource constraints and a lack of formal legislative guidance.[124] MESRS also mentioned the efforts of Famib Group, a private IT company based in Bamako, to set up a private virtual university for IT professionals.[125]

117 DoniyaBlown, Interview by DECA Team, July 2022, online.

118 Ibid.

119 Aïchatou Konaré and Mali ACTU, "Mali : 'Startupper' : Total révèle des génies," *Mali ACTU,* March 20, 2019, https://maliactu.net/mali-startupper-total-revele-des-genies/.

120 Education sector expert, Interview by DECA team, 2022, online.

121 Swiss Contact, "So Kalan: My Class at Home: The E-Learning Platform in Mali," *Swiss Contact,* October 10, 2020, https://www.swisscontact.org/en/news/so-kalan-ma-classe-a-la-maison-la-plateforme-de-e-learning-au-mali-1.

122 Ibid.

123 MESRS, Interview by DECA Team, July 2022, online.

124 Ibid.

125 Ibid.

FERTILE, YET FRAGMENTED: A GLIMPSE INTO DIGITAL HEALTH IN MALI

Over the past decade, public authorities in Mali have moved to digitize healthcare in both rural and urban areas. For example, ANTIM, with support from Global Affairs Canada,[126] launched a few initiatives to improve connectivity in community health centers. ANTIM introduced solar panels, PiBox mini servers, and the open source hospital information system OpenClinic GA into some community health centers.[127] ANTIM indicated that they digitalized a dozen of the 65 reference health centers, which provide first referral care and act as links between community health centers and hospitals, and are working to digitalize five out of the 13 hospitals.[128,129] By the end of 2022, ANTIM hoped to do the same with 20 additional community health centers, which provide basic preventive, curative, and behavioral healthcare at the base of Mali's health pyramid (see Figure 8).[130]

In June 2016, the GOM, in partnership with USAID, initiated the rollout of District Health Information System 2 (DHIS-2) to replace an outdated health information system.[131] By September 2019, the *Ministère de la Santé et du Développement Social* (MSDS) had deployed DHIS-2 in 98 percent of community health centers.[132] The system is designed to support both centralized and operational level decision-making (i.e., at the community and district levels). Interviewees from the public, academic, and international development sectors agree that the new system has helped health officials make better decisions. As one interviewee put it, "The proper use of DHIS-2 can actually contribute to making the right decisions, because the data will go back up and [for example] we will know that there are such a number of malaria cases in Mali, the largest number of cases is in this region."[133] An emblematic use case came in early 2021, when public health officials leveraged DHIS-2 to balance a limited COVID-19 vaccine stock with priority groups' needs.[134] Officials also used the system for epidemiological surveillance and treatment management.[135]

Digital health practitioners have also worked to integrate DHIS-2 with OpenClinic GA. DHIS-2 is an aggregate data warehouse used to facilitate data sharing from health facilities to higher authorities in the public health system. OpenClinic GA is a hospital information management system that captures administrative, financial, imaging, pharmaceutical, and other data at the clinical level. In 2018, ANTIM and other stakeholders tested mapping data elements of DHIS-2 onto OpenClinic GA at Segou Hospital in order to improve patient identification and management.[136]

126 Global Affairs Canada, "Le Canada améliore l'accès des femmes et des filles à des services de santé tenant compte de l'égalité des genres au Mali," *Global Affairs Canada,* August 28, 2019, https://www.canada.ca/fr/affaires-mondiales/nouvelles/2019/08/le-canada-ameliore-lacces-des-femmes-et-des-filles-a-des-services-de-sante-tenant-compte-de-legalite-des-genres-au-mali.html.

127 ANTIM, "L'informatisation des CSCom-U," accessed October 2022, *ANTIM,* http://41.73.116.155:8000/antim/index.php/actualites/244-l-informatisation-des-cscom-u.

128 Mali's healthcare structure resembles a pyramid. The first level includes community health centers, or Centres de Santé Communautaire (CSCom); the second level includes reference health centers, or Centre de Santé de Référence (CSRef); and the third and fourth levels include regional and national hospitals.

129 ANTIM, Interview by DECA Team, July 2022, online.

130 Ibid.

131 USAID and MEASURE Evaluation, *L'expérience du Mali dans le déploiement du DHIS2 (District Health Information Software, version 2)* (Chapel Hill, NC: MEASURE Evaluation, 2019), 18, https://www.measureevaluation.org/resources/publications/tr-20-407-fr.html.

132 Ibid, 26.

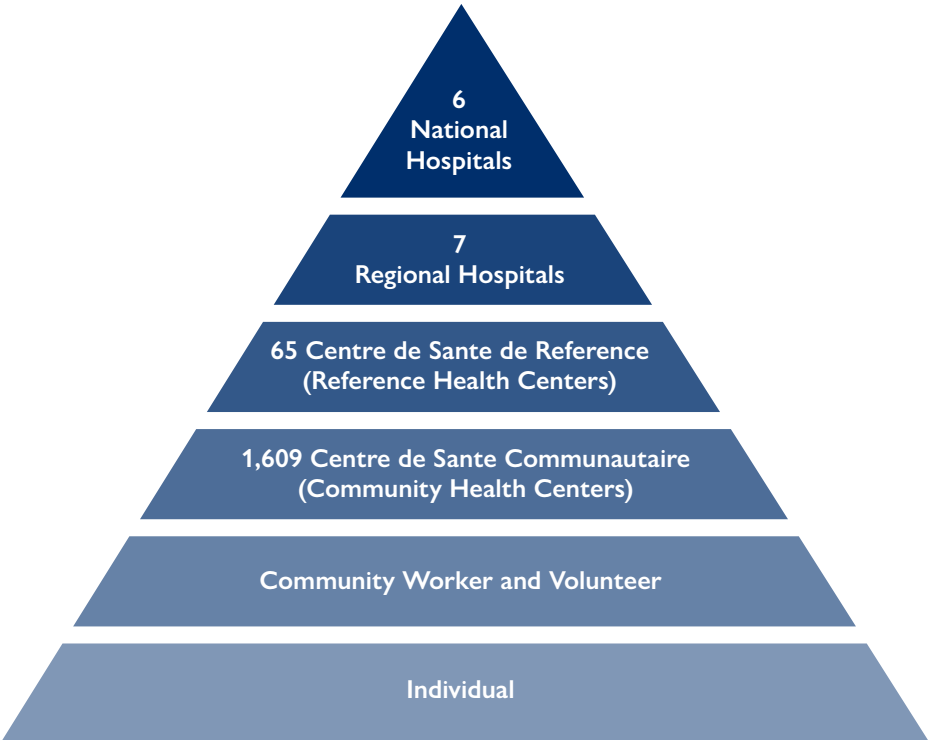
133 Regional expert, Interview by DECA Team, August 2022, online.

134 DHIS-2, "Mali's COVID-19 Vaccination Management System Highlights Importance of Local Ownership of DHIS2," *DHIS-2,* https://dhis2.org/mali-covid-vaccination/.

135 Ibid.

136 Dr Ousmane Ly, "Interopérabilité entre le SIH 'OpenClinic' et DHIS2 : les défis et les enseignem ents tirés d'une m ise en œ uvre réelle au Mali" (presentation, The 4th Annual Meeting of the ID4Africa Movement: Harmonization of Identity Schemes, Abuja, Nigeria, April 25, 2018), https://www.id4africa.com/2018_event/Presentations/DH1/2_DH1_2_Mali_Dr_Ousmane_Ly.pdf.

FIGURE 8: Mali's public health pyramid



Public authorities have also worked to strengthen communication across Mali's vast healthcare network. ANTIM leverages a public-private partnership with the country's MNOs to operate a network of 2,000 interconnected mobile phone lines. These channels allow community health workers to connect and report patient data. In addition, with the advent of COVID-19, the MSDS (through ANTIM) set up a toll-free call center to raise awareness about the disease. The call center, "36061," operates 24 hours a day, seven days a week and receives an average of 1,000-1,500 calls per day. Calls are free for users with the support of operators.[137]

Other stakeholders continue to work to strengthen human capital in digital health. In 2018, the *Fondation Pierre Fabre* announced an inter-university degree focused on e-health.[138] In partnership with the University of Bamako, Cheikh Anta Diop in Dakar, and Felix Houphouet-Boigny in Côte d'Ivoire, the degree focuses on the conceptual methods and the management of digital health projects. According to a regional expert, demand for the program far outstrips supply.[139] Decision makers receive 100-200 applications every year for only 20 slots.[140]

However, big gaps remain across Mali's wide reaching healthcare network. Interviewees from the public and academic sectors indicated that stakeholder coordination remains weak. While digital tools proliferate, few are interoperable with either DHIS-2, Mali's national healthcare information system, or with each other. In addition, funding incentivizes partners to develop and deploy rather than collaborate. On July 7th and 8th, 2022, ANTIM held the first workshop to create a national digital health coordination platform. Workshop participants agreed to establish two governing bodies to manage the platform, which will meet two to four times a year, and to hold a more inclusive digital health forum annually. However, the project is still in its infancy and has yet to be politically validated by the MSDS.

137 ANTIM, Interview by DECA Team, July 2022, online.

138 Fondation Pierre Fabre, "EHealth degree with three African universities," *Fondation Pierre Fabre,* March 30, 2019, https://www.fondationpierrefabre.org/en/suivre-notre-action/the-foundation-creates-an-ehealth-degree-with-three-african-universities/.

139 Regional expert, Interview by DECA Team, August 2022, online.

140 Ibid.

In addition, DHIS-2's success, while lauded by stakeholders across the digital health spectrum, remains dependent on the quality of data that goes into it. Many community health centers remain unconnected, and data collection is still done on paper and transcribed into DHIS-2. In these settings, data is entered on a tablet using an android application and brought to an area with an internet connection in order to be synced with the server. As one regional expert put it, "DHIS-2 has…allowed a speed in terms of access to the information sent but also in terms of accessibility…but is the quality of the information improved? Is the reliability of the information improved?"[141]

Interviewees also pointed out that some data is incomplete in the DHIS-2 system. One interviewee from a USAID implementing partner highlighted that, while 1,237 private health structures like private clinics have been integrated in DHIS-2, as of the first half of 2022 only 12.9 percent of reports from these structures are complete.[142] A regional expert highlighted that while community health centers do report their data, important gaps still exist at the village level, where community health workers collect data on nutrition and family planning.[143]

Mali also lacks a formal policy for governing the regulatory and legal frameworks for digital health. Interviewees from the academic sector indicated that this leaves some big questions unanswered. For example, while Mali has a general law on the protection of data, it remains insufficient for digital health. Big topics such as the responsibility of doctors when handling or sharing patient data, the types of data that should be shared, who can share that data, and who can access that data remain unclear in existing policy.[144]

In addition to responsible data concerns, Mali's lack of a digitalization roadmap holds back the integration of existing tools. Interviewees from the public and academic sectors agree that encouraging interoperability is imperative. As one interviewee notes, "For me, the biggest difficulty today is that we do not have a compass, and the compass must be a strategic plan politically validated by the Ministry of Health…whether we are an NGO, whether we are an international organization, let us tell them: these are the guidelines of the strategic plan; if you want to make plans, this is what we plan to do in the next five years."[145]

To close these gaps, interviewees from the public sector indicated that they face significant resource constraints and resistance from some within the sector itself. According to ANTIM, it will take between five and ten billion CFA (approximately $15.3 million USD) to digitalize the entire healthcare network, which comprises 1,609 community health centers, 65 operational reference health centers, and 13 hospitals.[146] In addition, some health center managers are reluctant to digitalize their organization. For example, it took ANTIM one year to operationalize just the pharmacy module in one of the university hospitals in Bamako. While they aspired to digitalize the entire system, three years later nothing has changed.[147]

141 Ibid.

142 JSI, Interview by DECA Team, June 2022, online.

143 Regional expert, Interview by DECA Team, August 2022, online.

144 Ibid.

145 Ibid.

146 ANTIM, Interview by DECA Team, July 2022, online.

147 Ibid.

PILLAR 2: DIGITAL SOCIETY, RIGHTS, AND GOVERNANCE

Digital Society, Rights, and Governance focuses on how digital technology intersects with government, civil society, and the media. This pillar is divided into three sub-pillars: Internet Freedom; Civil Society and Media; and Digital Government. Internet Freedom explores factors that enable or constrain the exercise of human rights and fundamental freedoms online. This includes individual rights to freedom of speech, privacy, and free assembly and the abuse of these rights through digital repression. Civil Society and Media identifies key institutions and how they report on, advocate around, and influence online freedoms. Digital Government looks at the government's efforts to manage internal information technology (IT) processes and systems, deliver citizen- and business-facing e-services, and engage with the public through digital channels.

KEY TAKEAWAYS: DIGITAL SOCIETY, RIGHTS, AND GOVERNANCE

FINDINGS

- Numerous Malian civil society organizations (CSOs) and online media play a central role in fighting the proliferation of disinformation, which is spread by an uninformed and polarized audience and exploited by insurgent groups.
- Digital platforms have grown in importance as channels for free expression and political opinion, despite the potential risk of repression by public authorities.
- Mali's cybersecurity capacity remains at an early stage. Cyber threats are on the rise and threaten public institutions. CSOs and the general population are in urgent need of basic digital hygiene awareness and practices.
- Digital government development is still suffering from deficits in its institutional governance and an absence of technical foundational blocks, as well as important gaps in the legal digital framework.

RELEVANT RECOMMENDATIONS

1. Empower CSOs, media, and citizens to counter disinformation
2. Reinforce freedom of expression online and open government principles through capacity building and developing transparency promotion platforms
3. Strengthen cyber hygiene awareness and capacity among Malian CSOs
4. Strengthen the government's understanding and application of cybersecurity processes
5. Shape the building blocks of government digitization in Mali

INTRODUCTION

Mali has a fragile online information landscape, mainly shaped by the deteriorating security situation and the proliferation of internal conflicts (see Box 1). Violent extremist groups are spreading hateful content and disinformation. CSOs and online media are countering these efforts through digital fact-checking units. Activists are advocating for free expression despite a lack of financial, human, and technical resources and the risk of reprisal. Public authorities are leveraging restrictive, albeit legal, tools to suppress free expression on online platforms.

All levels of government in Mali have recognized that cybersecurity is crucial for digital development. However, the capacity of this country to counter cyber threats remains at an early stage. Stakeholders face institutional, organizational, legal, and technical roadblocks holding back the national cybersecurity ecosystem. As a result, CSOs and the larger population remain unprepared to face cybersecurity risks.

Mali has also made noticeable efforts to leverage ICT to improve public services. However, significant hurdles remain. These include little synergistic governance for digital government development, the absence of technical foundational blocks, and gaps and inconsistencies in the legal framework.

2.1. MALI'S FRAGILE ONLINE INFORMATION LANDSCAPE

In Mali, populations polarized by recent events (see Box 1) and ill-equipped to process malinformation, misinformation, and disinformation (MDM) have become targets and unintentional channels for spreading falsehoods online. Violent and armed extremist groups also spread radicalization and recruitment propaganda through digital platforms. Despite various structural weaknesses and a shrinking civic space, CSOs and online media play a central role in countering MDM through social media-based fact-checking units and awareness and popularization campaigns, including some in local languages.

The growing importance of digital platforms as channels for free expression and political opposition has led to push back from local authorities. Citizens face internet shutdowns and social media disruptions, and online activists are prosecuted under the Penal Code and the Cybercrime Law. These measures, while repressive and restrictive, remain legal.

SOCIAL MEDIA AS A CHANNEL FOR MDM AND VIOLENCE

While only one third of the population has access to the internet, social media remains a popular communication tool. In 2020, the Internet Society of Mali (ISOC-M) asked 6,551 respondents across 13 localities about their social media use; WhatsApp (29.69 percent), Facebook (26.01 percent), and YouTube (16.74 percent) were the most popular.[148] Other statistics estimate only 15.3 percent of the population 13 years or older in Mali used Facebook in 2022,[149]which is typical of other Sahelian countries.[150]

According to a 2022 ISOC-M study on social network use in Mali, Malians use social networks to strengthen social ties (45.12 percent), search for jobs and build professional networks (21.15 percent), and facilitate e-commerce and promote entertainment (33.73 percent).[151] WhatsApp's success, even in the most remote villages, is due to its streamlined inclusion of the country's marginalized populations. These users—often illiterate or from a strong oral culture—depend on WhatsApp to access voice messages and videos in Mali's many vernacular languages.[152]

KEY TERMS | BOX 4: Malinformation, misinformation, and disinformation (MDM)

Malinformation is the deliberate publication of private information for personal or private interest, as well as the deliberate manipulation of genuine content. Note that this type of information is based in reality but is used and disseminated to cause harm.

Misinformation is information that is false but not intended to cause harm. For example, individuals who do not know a piece of information is false may spread it on social media in an attempt to be helpful.

Disinformation is false information that is deliberately created or disseminated with the express purpose of causing harm. Producers of disinformation typically have political, financial, psychological, or social motivations.

Source: USAID Disinformation Primer

148 Internet Society Mali Chapter, *Etat des lieux des Réseaux Sociaux au Mali* (Bamako, Mali: Internet Society Mali Chapter, 2021), 10, https://isoc.ml/wp-content/uploads/2021/03/Rapport-Etude-Reseaux-Sociaux.pdf.

149 Simon Kemp, "Digital 2022: Mali" *DataReportal,* February 16, 2022, https://datareportal.com/reports/digital-2022-mali?rq=Mali.

150 Ibid.

151 Internet Society Mali Chapter, *Etat des lieux des Réseaux Sociaux au Mali,* 21,

152 Ousmane Makaveli, "WhatsApp: comme un grand marche pour les Maliens," *Benbere.org,* February 10, 2020, https://benbere.org/terre-dopportunites/whatsapp-comme-grand-marche-maliens-mali/#:~:text=Au%20Mali%2C%20le%20succ%C3%A8s%20de,car%20simple%2C%20ergonomique%20et%20pratique.

Social media has also played a role in the country's conflict. In 2021, Mali recorded its highest number of terrorist attacks and deaths in the last decade (see Box 1).[153] Malian insurgent groups leverage social media to collect information; publicize their actions; discredit their opponents; and attract attention, support, and fundraising. These groups also exploit social media to exacerbate community, ideological, and regional divisions and stoke the country's historical conflicts and political instability.[154]

CIVIL SOCIETY AND THE MEDIA'S ROLE IN COUNTERING DISINFORMATION

Ahead of the 2020 legislative election, Mali's *Haute Autorité de la Communication* (HAC)[155] launched two main initiatives to prevent and fight disinformation.[156] First, HAC worked with radio stations to monitor and flag false information. Second, they drafted a code of conduct for the media during the election period to strengthen the quality of the media coverage of electoral operations.

CSOs are well positioned to play a central role in fighting disinformation in Mali. Much of their work is anchored in reinforcing social cohesion, advocacy, and peacebuilding.[157,158] The West Africa Network for Peacebuilding (WANEP), Think Peace, and the *Association des Jeunes pour la Citoyenneté Active et la Démocratie* (AJCAD) are actively disseminating their ideas through dedicated accounts on Facebook, Twitter, LinkedIn, and YouTube. CSOs also teach their constituents about the potential damages of disinformation and help them avoid government crackdowns. In addition, CSOs train bloggers, media personalities, and influencers to fact check what they read on the internet to help mitigate the spread of fake news,[159] especially during the election period.[160]

Few Malian CSOs are specialized in fact checking, but many have started working in this space. On January 19, 2022, the *Association des Professionnels de la Presse en Ligne* (APPEL) launched a fact-checking center to counter disinformation and false information.[161] In addition, Benbere, a digital media CSO, fact checks and analyzes problematic information and rumors in circulation on social media through its information verification unit "BenbereVerif." It also sifts through information by leveraging the dedicated hashtag #BenbereVerif and publishes short pieces of analysis in local news outlets. Benbere has partnerships with about 15 radio stations, allowing it to work across Mali's multilingual landscape. Finally, the Tuwindi Foundation has launched a mobile application and worked with APPEL to improve the information landscape (see Box 5).

153 Ibid.

154 Jiaxuan Yue, Habibou Bako, Kelsey Hampton, and Katie Smith, "Conflit et espace en ligne au Sahel : défis et recommandations," *Search for Common Ground,* July 2022, https://www.sfcg.org/wp-content/uploads/2022/07/Note-D-Analyse-Conflit-et-espace-en-ligne-au-Sahel-Juillet-2022.pdf.

155 Created by Ordinance No. 2014-006/P-RM of January 21, 2014, HAC regulates audiovisual, radio, print, and online press in Mali. http://hac.ml/.

156 ODIL, "Mali," *ODIL,* accessed September 9, 2022, https://odil.org/politique-publique/mali/.

157 CONASCIPAL and SIPRI, *Livre Blanc de la société civile pour la paix et la sécurité au Mali* (Stockholm, SW: Stockholm International Peace Research Institute, 2019), xi, https://www.sipri.org/publications/2019/other-publications/white-book-civil-society-peace-and-security-mali https://www.understandingwar.org/sites/default/files/ISW%20The%20Virtual%20Caliphate%20Gambhir%202016.pdf.

158 United Nations, "Régions du Centre : La société civile prête à jouer sa partition dans la stabilisation du Mali," *United Nations,* April 21, 2021, https://peacekeeping.un.org/fr/regions-du-centre-la-societe-civile-prete-jouer-sa-partition-dans-la-stabilisation-du-mali.

159 Lassane Ouedraogo, *Mali's Fake News Ecosystem: An Overview* (London, UK: Centre for Democracy & Development, 2022), 12, https://www.africaportal.org/publications/malis-fake-news-ecosystem-overview/.

160 Lassina Niangaly, "La Désinformation, Une Menace Pour La Democratie," *Le Jalon,* May 19, 2022, https://lejalon.com/2022/05/19/la-desinformation-une-menace-pour-la-democratie/.

161 Siaka Diamoutene, "Lutte contre les fake news : APPEL-Mali annonce la création d'un centre fact checking," *Maliweb,* January 20, 2022, https://www.maliweb.net/technologie/lutte-contre-les-fake-news-appel-mali-annonce-la-creation-dun-centre-fact-checking-2961238.html.

BOX 5: Malian NGOs fighting disinformation

The Tuwindi Foundation, an active Malian non-governmental organization (NGO), implements various initiatives to fight disinformation. In March 2020, Tuwindi launched "WUYA," a mobile application for fact checking and combating fake news. "WUYA" makes available multitudes of questions already checked by Tuwindi specialists. It also permits users to request checks concerning news (publications or announcements).

Tuwindi also supported APPEL Mali, in collaboration with Amnesty International, to launch "APPEL-VERIF," a fact-checking unit. In April 2022, Tuwindi trained 30 Malian journalists on the functionalities of the "WUYA" application. Tuwindi included modules on legal frameworks for the press, ethics, human rights, and freedom of expression in Mali.

Le Jalon, a multimedia news website operated by local journalists, launched one of the first fact-checking sites in Mali. "Mali Check" seeks to verify all fake news in circulation, even when the content is not about Mali, and to minimize the impact of the fake news.[162] Mali Check processes and verifies videos, photos, texts, voice messages, and speeches that are faked or taken out of context to deceive public opinion. In 2022, Mali Check trained more than 700 young people on how to check fake news and verify information.[163]

Professional associations, like the *Association des Sociétés Informatiques du Mali* (ASIM), are often solicited by the state to counter cyber attacks on institutional sites. In parallel, ASIM also conducts training on the verification of the information and makes targeted sites aware of fact-checking tools and protection solutions.[164]

However, CSOs' capacity to mobilize against MDM is threatened by external factors often outside of their control. For instance, like most global CSOs, those in Mali rely mainly on foreign investment, which can affect their financial sustainability in the long term.[165] In addition, censorship coming from both inside[166] and outside of the media[167] has become more frequent. This is exemplified by an increase in intimidation tactics, judicial harassment, arbitrary arrests, and other threatening behavior exerted on those who criticize the authorities of the transitional government.[168] In this environment, CSOs may begin to be more careful when analyzing information and countering MDM. Finally, CSOs continue to present ideal targets for cyber attacks due to their weak security infrastructures, lack of awareness, and little to no technical skills, particularly in terms of cyber hygiene practices.

DIGITAL PLATFORMS AS PUBLIC FORUMS AMID RESTRICTIONS TO ONLINE FREEDOM

Social media platforms play an increasingly important role as the space for free expression becomes severely curtailed by Mali's transitional military authorities.[169,170] APPEL estimates that Mali's online media landscape

162 ODIL, "Mali Check," *ODIL,* accessed September 9, 2022, https://odil.org/initiative/malicheck/.

163 Media interviewee, Interview by DECA Team, June 2022, online.

164 Professional association interviewee, Interview by DECA Team, July 2022, online.

165 Bertelsmann Stiftung, *BTI 2018 Country Report — Mali* (Gütersloh, DE: Bertelsmann Stiftung, 2018), 37, https://bti-project.org/fileadmin/api/content/en/downloads/reports/country_report_2018_MLI.pdf.

166 UNHCR, "Mali : L'expert de l'ONU gravement préoccupé par la détérioration de la situation sécuritaire et des droits humains," *UNHCR,* August 15, 2022, https://www.ohchr.org/fr/press-releases/2022/08/mali-un-expert-gravely-concerned-deterioration-security-and-human-rights.

167 Hugo Flotat-Talon, "Au Mali, critiques contre la junte non désirées," *DW,* March 22, 2022, https://www.dw.com/fr/mali-pressions-droits-humains/a-61215857.

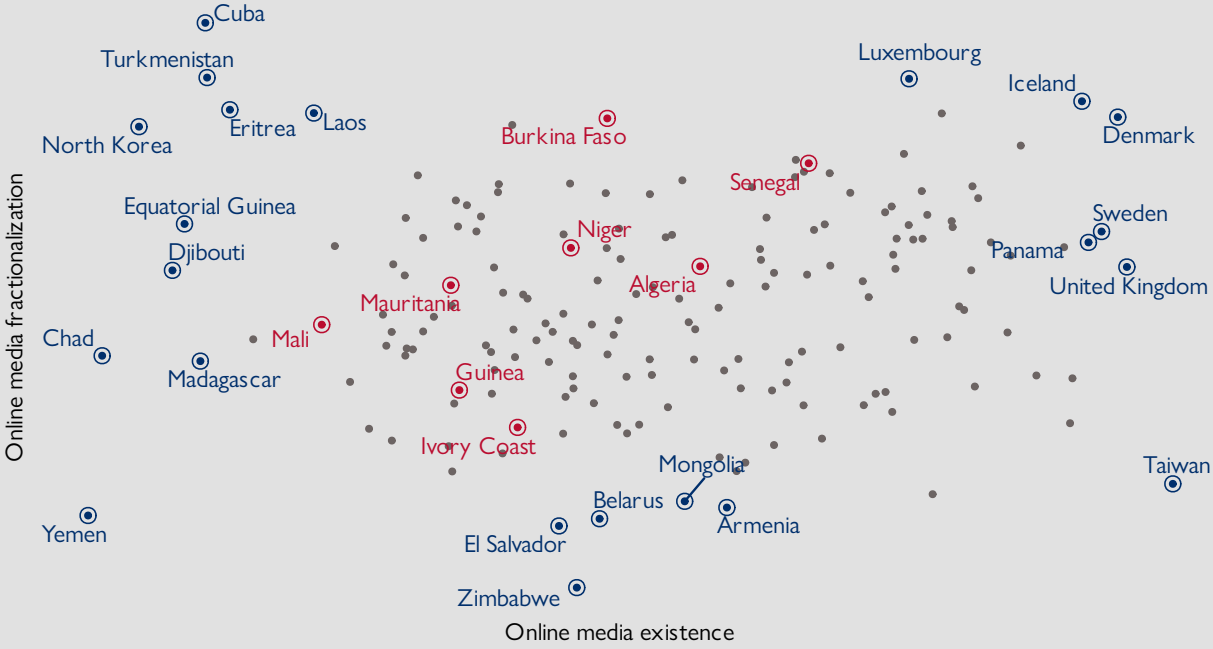
168 Avocats sans frontières Canada, "Le rétrécissement de l'espace civique et démocratique au Mali est très inquiétant," *Avocats sans frontières Canada,* August 11, 2022, https://www.asfcanada.ca/medias/nouvelles/le-retrecissement-de-lespace-civique-et-democratique-au-mali-est-tres-inquietant/.

169 Kristin Skare Orgeret and Bruce Mutsvairo, "Media polarisation risks press freedom and peace in conflict-hit Mali and Ethiopia," *The Guardian,* May 10, 2022, https://www.theguardian.com/global-development/2022/may/10/media-polarisation-risks-press-freedom-and-peace-in-conflict-hit-mali-and-ethiopia.

170 AFP, "UN 'deeply dismayed' at Mali media bans," *Expatica,* April 29, 2022, https://www.expatica.com/fr/general/un-deeply-dismayed-at-mali-media-bans-485454/.

contains about 200 different outlets.[171] Figure 9 compares Mali's media landscape with its neighbors along two different indicators, using data from the Digital Society Project. "Online media existence" (horizontal) measures the extent to which people consume domestic online media; here Mali lags clearly behind its neighbors in the Sahel. "Online media fractionalization" (vertical) is more subtle; it assesses the consistency of major domestic media outlets. In some countries (e.g., Zimbabwe or Taiwan), online media are highly politicized and offer opposing presentations of major events. At the other end, domestic media outlets in Cuba or Luxembourg tend to offer more consistent depictions (likely for very different reasons). Mali lies roughly in the middle, with media outlets that are less polarized than those in Côte d'Ivoire and more divergent than those in Senegal.

FIGURE 9: Online media existence and fractionalization[172]



Source: Digital Society Project (2021)

Many online outlets in Mali, such as Ouverte Média, Kati 24, and Maliactu.net, even rival the national channel with their audience base. One organization, AJCAD, created a forum on its media platform "AJCAD TV" for the 2020 legislative elections so that young candidates could share their vision with the rest of the electorate.[173]

Digital communities also campaign for freedom of expression in Mali. For example, DONIBLOG, the Mali blogger community, launched the Blog Camp initiative to advocate for and train young people on how to use networks and social media responsibly. This community also disseminated information related to the Algiers peace agreement and the 2018 presidential campaign and led campaigns on Facebook to denounce breaches of good governance and freedom of expression.

Political parties, especially those with limited access to traditional media, are increasingly using social media and digital channels to reach voters. However, this use for political campaigns is lower than it is in neighboring

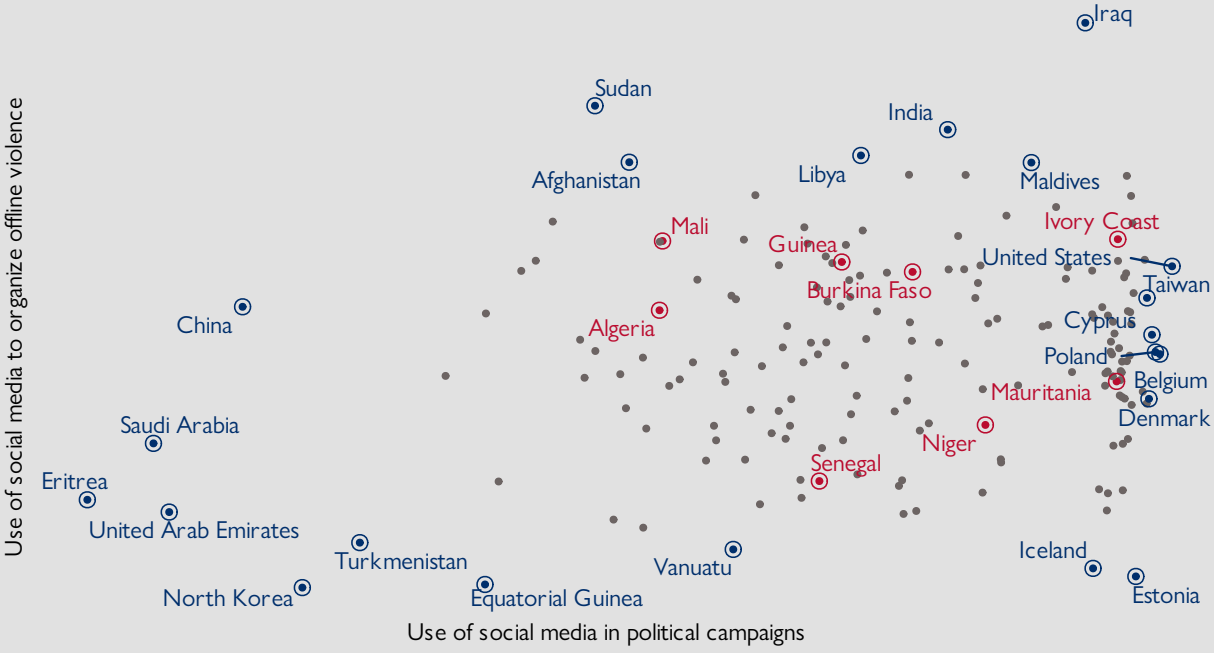
171 Cheick M. Traore, "Médias en ligne au Mali : les défis de la crédibilité et de la viabilité financière," *International Union of the French-speaking Press,* May 27, 2019, https://www.presse-francophone.org/fr/generalites/article/medias-en-ligne-au-mali-les-defis-de-la-credibilite-et-de-la-viabilite-financiere.

172 Varieties of Democracy (V-Dem) Datasets, Varieties of Democracy, accessed October 2022, https://www.v-dem.net/data_analysis/MapGraph/.

173 Adam Dicko, "In Mali, young people no longer want to play supporting roles," *Ideas 4 Development,* October 14, 2021, https://ideas4development.org/en/sahel-youth-citizen-mali/.

countries (see Figure 10). In some cases, opposition parties use anonymous Facebook accounts to post messages hostile to government policies.[174] In 2017, the Tuwindi Foundation leveraged the mobile application MonElu[175] to strengthen citizen participation in governance.[176] MonElu facilitates dialogue with elected officials and, in the process, increases accountability to citizens.

FIGURE 10: Uses of social media for political campaigning and for violence[177]



Source: Digital Society Project (2021)

Interviewees across civil society agree that the capacity of social networks to reach Malians who are illiterate and speak a variety of local languages has had broad implications for political mobilization. According to one interviewee from the peacebuilding space, social networks' ability to tap into these populations has catalyzed community organizing. He added that "this can explain the [rise]... of the June 5, 2020 Movement (M5), a very popular movement, and also the great mobilization which resulted in the fall of Mali's former President Ibrahim Boubacar Keita from power."[178]

Figure 10 also compares Mali to its neighbors in terms of the use of social media to organize offline violence. Mali stands out among its Sahelian neighbors as a country with both limited use of social media in electoral politics and relatively high use of social media to incite violence.

174 Jiaxuan Yue, Habibou Bako, Kelsey Hampton, and Katie Smith, "Conflit et espace en ligne au Sahel : défis et recommandations."

175 RFI, "Mali: MonElu, l'application pour une meilleure participation citoyenne," *RFI,* September 13, 2017, https://www.rfi.fr/fr/afrique/20170913-mali-monelu-application-politique-participation-citoyenne.

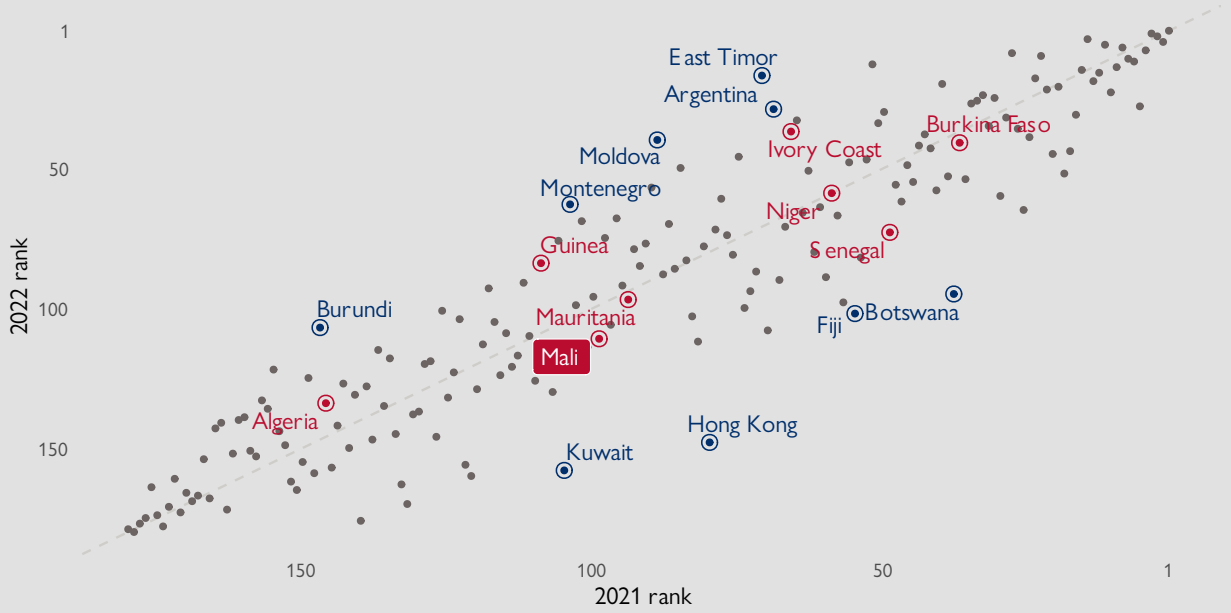
176 Andrew Songa and Aisha Dabo, "The Role Of Civic Tech In Consolidating Democracy In Africa," *CivicTech Fund Africa,* December 9, 2021, https://civictechfund.africa/pt/2021/12/09/the-role-of-civic-tech-in-consolidating-democracy-in-africa/.

177 Varieties of Democracy (V-Dem) Datasets, Varieties of Democracy, accessed October 2022, https://v-dem.net/data_analysis/Radar2Graph/.

178 Peacebuilding interviewee, Interview by DECA Team, June 2022, online.

In Mali, the growth of digital platforms as channels of expression and political opposition has met backlash. The 2020 coup, the July and November 2020 protests,[179] and the 2018 presidential elections[180] involved the resurgence of repressive measures such as internet shutdowns and social media disruptions. In April 2022, the United Nations High Commissioner for Human Rights denounced the restrictions imposed on the media in Mali.[181] Currently, Mali ranks 111th out of the 180 countries on the latest World Press Freedom (WPF) Index (May 10, 2022). As shown by Figure 11, Mali dropped 12 places since 2021[182](lying under the midline) and is far behind its neighboring countries, especially Guinea and Ivory Coast, which both realized noticeable progress in 2022, and Niger, whose position on the index remained unchanged.

FIGURE 11: Progress on the World Press Freedom Index



Source: Reporters Without Borders

Yet, these disruptive measures are not illegal in Mali. Article 4 of the Law on Telecommunications adopted in 1999 stipulates that in the objective of public security or territory defense, the government may, for a limited period, prohibit the provision of telecommunications services.[183] Other laws have also been involved in the crackdown on free speech.

179 U.S. Department of State, Bureau of Democracy, Human Rights, and Labor, *2020 Country Reports on Human Rights Practices: Mali* (Washington, D.C.: U.S. Department of State, 2020), https://www.state.gov/reports/2020-country-reports-on-human-rights-practices/mali/.

180 Pool d'Observation Citoyenne du Mali, *Déclaration Préliminaire du POCIL. Élection Présidentielle 2018 AU MALI 2ème tour de l'élection Présidentielle* (Bamako, ML: Pool d'Observation Citoyenne du Mali, 2018), https://docplayer.fr/137195084-Pool-d-observation-citoyenne-du-mali-pocim.html.

181 OHCHR, "Mali - note d'information pour la presse," *OHCHR,* April 29, 2022, https://www.ohchr.org/fr/press-briefing-notes/2022/04/concerns-independent-media-mali-after-shutdowns.

182 Kristin Skare Orgeret and Bruce Mutsvairo, "Media polarisation risks press freedom and peace in conflict-hit Mali and Ethiopia," *The Guardian,* May 10, 2022, https://www.theguardian.com/global-development/2022/may/10/media-polarisation-risks-press-freedom-and-peace-in-conflict-hit-mali-and-ethiopia.

183 Hamadou Tidiane Sy, et al., *Etude Lois sur la cybercriminalité & négation de la liberté de presse en Afrique de l'Ouest Burkina Faso, Mali & Niger (Sahel)* (Dakar, Senegal: L'École Supérieure de Journalisme, des Métiers de l'Internet et de la Communication, 2022), https://www.mediasupport.org/wp-content/uploads/2022/04/Lois-Cyber-Etude-Rapport-mars-2022.pdf.

BOX 6: New cybercrime law poses new risks for freedom of expression

Over the past decade, several West African countries have passed cybercrime laws ostensibly to protect national security. However, these laws have increasingly been used to crack down on press freedom. Like its counterparts in Niger and Burkina Faso, the previous GOM passed the 2019 law on the Repression of Cybercrime in Mali (Law No. 2019-056 of December 05, 2019) in response to a fragile ecosystem beset with conflict and instability. Also like its counterparts, the cybercrime law poses tangible threats to privacy and freedom of expression.[184]

Mali's cybercrime law includes several provisions that directly contradict Malians' constitutional right to privacy. For example, the law authorizes search and seizure of online media data during an investigation that can be carried out or allowed by the public prosecutor or the investigating judge. It does not require warrants or judicial review. Such interventions pose significant risks to personal data integrity, security, and privacy.

Furthermore, the law holds telecommunications intermediaries liable to track and monitor network activity and for the actions of their clients. Telecommunications providers are criminally responsible for illegal activity that occurs over their systems and are required by law to set up monitoring systems to inform authorities. If they fail to do so, public authorities could levy a fine up to $3,318 USD, a sentence of two years in prison, or both.[185] Telecommunications are therefore under the obligation to monitor all traffic that occurs over their network, malfeasant or not, threatening any notion of online privacy.

Online journalists' status is also not clearly distinguished from other online media users. The Cybercrime Law's provisions related to online press offenses are inconsistent with legislating the media in the age of digitalization and need revision in order to safeguard and uphold constitutional guarantees of freedom of expression and privacy.[186] Such situations become even more confusing as media platforms converge, quickly transforming all content, even those not intended to be online, into "online" content. This online content is, in turn, widely shared on social networks. One interviewee indicated that their organization has helped "the cleaning up of social networks" by limiting and punishing online offenses and insults, apologia for terrorism, and hate speech.[187] However, it does not "spare journalists either" nor specify that "journalists should not be victims of repression."[188]

2.2. CYBERSECURITY CAPACITY REMAINS AT AN EARLY STAGE

The Malian state is aware that cybersecurity is at the heart of digital development, but its capacities for ensuring cybersecurity remain at an early stage. Public bodies and institutions are increasingly exposed to large-scale cyber threats. Mali lacks a dedicated, national cybersecurity strategy. In addition, the country's steering bodies are ill-equipped with the expertise and organizational structures to support the implementation of cybersecurity programs. Few capacity development programs and training exist to address these issues. CSOs and the Malian population are increasingly exposed to various cyber risks, while remaining under-prepared, poorly equipped, and in urgent need of basic digital hygiene awareness and practices.

184 Astou Diouf, "La régulation des plateformes numériques et la liberté d'expression en Afrique de l'Ouest," *Heinorich Böll Stiftung,* May 2021, https://sn.boell.org/fr/2021/06/17/la-regulation-des-plateformes-numeriques-et-la-liberte-dexpression-en-afrique-de-0.

185 Simone Toussi, "New Mali Cybercrime Law Potentially Problematic to Digital Rights," *CIPESA,* February 21, 2020, https://cipesa.org/2020/02/new-mali-cybercrime-law-potentially-problematic-to-digital-rights/.

186 Ibid.

187 APPEL, Interview by DECA team, June 2022, online.

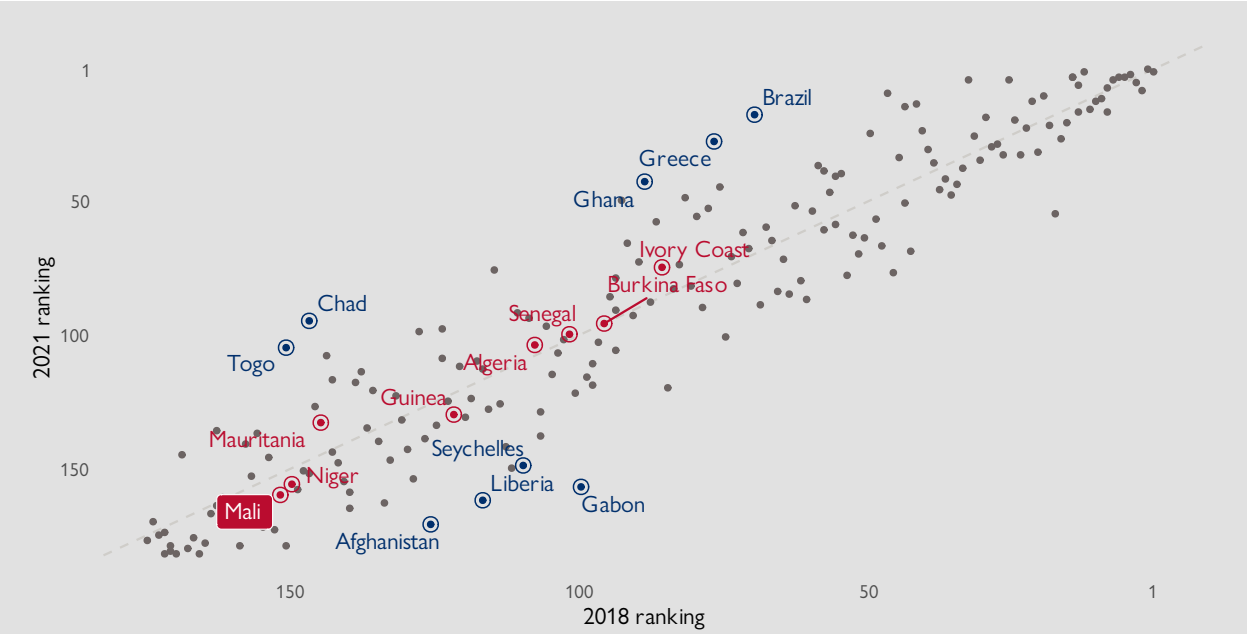
188 Ibid.

DEFICIENCIES AND GAPS IN THE NATIONAL CYBERSECURITY ECOSYSTEM

Mali has taken several actions to support the development of cybersecurity. The President of the Republic of Mali put into effect, on December 5, 2019, the Cybercrime Law No. 2019-056, and on May 21, 2013, the Protection of Personal Data law No. 2013-015, which created the *Autorité de Protection des Données à Caractère Personnel* (APDP). On November 25, 2020, the AMRTP started to set up a Mali Computer Emergency Response Team (ML-CERT).[189]

Mali is currently ranked 160th, with a score of 10.14, on the 2020 ITU Global Cybersecurity Index. This ranking (Figure 12) has barely changed since 2014 and is still well below that of neighbors such as Burkina Faso and Mauritania. Little has changed in terms of cybersecurity policy and its implementation over the past seven years. Persistent deficiencies remain in institutional and technical policies and procedures. For example, Mali lacks a national cybersecurity strategy[190] and also a dedicated body or structure to support its implementation.

FIGURE 12: Stagnant cybersecurity development



Source: ITU Global Cybersecurity Index

Mali obtained a score of zero in both organizational[191] and capacity development[192] measures. In practice, the government has not identified which public authorities are responsible and accountable for cybersecurity policy. Public bodies also lack technically specialized human resources and targeted awareness campaigns to keep officials and partners alert. In general, there is not a culture of cybersecurity in which officials believe that the risk is real and that their daily actions matter. These gaps highlight that public sector officials—especially

189 AMRTP, "Recrutement d'un cabinet conseil pour la mise en place du ML CERT," *Malipages,* November 11, 2020, https://www.malipages.com/appel-offre/recrutement-dun-cabinet-conseil-pour-la-mise-en-place-du-ml-cert/.

190 AfricaCyberMag, "Indice Développement Cybersécurité par Pays [Cas du Mali]," *AfricaCyberMag,* March 30, 2022, https://cybersecuritymag.africa/indice-developpement-cybersecurite-par-pays-cas-du-mali.

191 Organizational measures include whether or not a country has a national cybersecurity strategy, whether or not physical oversight authorities exist and how developed they may be, and who is responsible and accountable for cybersecurity policy.

192 Capacity development includes how well cybersecurity and cyber hygiene practices are communicated to the public and to what extent cybersecurity training programs exist and who (e.g., legal, private sector, and law enforcement stakeholders) can access them.

government officials, law enforcement agents, and judicial actors—need strong cybersecurity capacity development programs and training.

Hackers have already started to exploit these weaknesses. On June 17, 2022, hackers associated with the extortion organization Lockbit breached Mali's national tax authority, the *Direction Générale des Impôts* (DGI), and exposed documents linked to more than 312,000 taxpayers.[193] Lockbit 2.0 has been associated with other high-profile cyber attacks, including on France's *Ministère de la Justice,* the management consulting company Accenture, and the French electronics company Thales.[194] The attack in Mali was successful despite the fact that the *Ministère de l'Économie et des Finances* (MOEF), DGI's supervisory department, is relatively advanced in cybersecurity.[195,196]

POORLY ENABLED AND POORLY EQUIPPED CSOS FACE CYBERSECURITY RISKS

Malian CSOs increasingly rely on digital technologies and social media to reach rural, vulnerable, and illiterate communities and to collaborate in emergency relief. CSO staff also meet virtually due to pandemic restrictions, despite a disabling environment due to poor internet connectivity and uneven access to electricity. Both local and international organizations have spearheaded using social media in their programming. For example, the Tuwindi Foundation and the Democracy Tech Squad offered CSOs training in using social media and developing a stronger online presence. Internews and the National Democratic Institute (NDI) have also launched initiatives in this space. For example, with funding from USAID's Empowering Malians through Elections, Reforms, and Governance Efforts (EMERGE) project, both organizations teamed up to deliver web content and community management training.[197] All of these initiatives and efforts lack training and awareness components focusing on cybersecurity and cyber hygiene.

Most CSOs remain under-prepared, especially in terms of organizational capacity and financial viability (see Figure 13), to efficiently mitigate cyber threats. The 2020 Civil Society Sustainability Index scored Mali 4.2 out of 7, with 1 indicating the most enhanced level of sustainability and 7 the most impeded.[198] Mali's score is in line with other Sahel neighbors, including Burkina Faso at 4.3, Niger at 4.8, and Cote d'Ivoire at 4.9. These weaknesses are increasingly exploited to commit crimes such as harassment, ransomware deployment, phishing, vishing, and social hacking. More importantly, many organizations remain unaware of how to protect personal data in compliance with the country's laws.

Finally, while online harassment is a crime in Mali, victims must manage to collect material evidence to file a complaint with the police. However, there is a lack of an established and well-known mechanism to trigger the information- and evidence-gathering process following a cybercrime complaint. The absence of this protection prevents the victims, especially the uninformed ones, from going to courts, seeing a judge, and often even filing a complaint.[199]

193 Matteo Maillard, "Mali mélo. Hackers russes: au Mali, les impôts se font taxer les dossiers de milliers de contribuables," *Libération,* August 6, 2022, https://www.liberation.fr/international/afrique/hackers-russes-au-mali-les-impots-se-font-taxer-les-dossiers-de-milliers-de-contribuables-20220806_VSRJNUMAD5EULJZCTYE5QRNLXA/.

194 Damien Licata Caruso, "Le ministère de la Justice reçoit une demande de rançon des hackers hyperactifs de Lockbit 2.0," *Le Parisien,* January 27, 2022, https://www.leparisien.fr/high-tech/le-ministere-de-la-justice-recoit-une-demande-de-rancon-des-hackers-hyperactifs-de-lockbit-20-27-01-2022-XURNYOUY3FBIJLMCFQWW3CHOK4.php.

195 CAISFF has drawn up a security policy, set up an ISMS (Information Security Management System), and been ISO 27001 in 2021.

196 CAISFF, Interview by DECA Team, July 2022, online.

197 Amadou Kodio, "Gestion des plateformes digitales : Internews et NDI outillent des acteurs de la société civile," *Afrikinfos-mali.com,* June 29, 2022, https://afrikinfos-mali.com/2022/06/29/gestion-des-plateformes-digitales-internews-et-ndi-outillent-des-acteurs-de-la-societe-civile/.

198 "2020 Civil Society Organization Sustainability Index for Sub-Saharan Africa," USAID, ICNIL, and FHI360, 12th Edition, November 2021. https://www.fhi360.org/sites/default/files/media/documents/csosi-africa-2020-report.pdf.

199 Benbere, Interview by DECA team, August 2022, online.

2.3. INSTITUTIONAL AND STRUCTURAL DEFICIENCIES IN GOVERNMENT DIGITIZATION

The United Nations E-Government Development Index recognized Mali for its incremental progress in improving the country's digital government readiness.[200] Over the past few decades, the country has launched certain departmental information systems and maintains some institutional websites. Nevertheless, the absence of a dedicated national strategy, and its necessary steering and evaluation structures and tools, prevents the government from moving beyond a basic online presence. As a result, the country only ranks 171th out of 193 countries in e-government development.[201] Mali still lacks the foundational blocks necessary to digital government development. These include interoperability, cybersecurity, and data management. Interactive administrative e-services and citizen participation platforms are also absent. Finally, important gaps and inconsistencies in the country's digital legal framework make further developments even more challenging.

CURRENT STATUS OF DIGITAL GOVERNMENT DEVELOPMENT: ACHIEVEMENTS, GAPS, AND NEEDS

Weak interoperability, cybersecurity, and data management systems color an embryonic digital government landscape in Mali. Few public information systems are interoperable. The MOEF is one small exception. There, the *Système Intégré de Gestion des Impôts et Taxes Assimilés* (SIGTAS), an integrated system for the management of taxes, has allowed (although still partially) the exchange of information between sectoral information systems.[202]

Very few data registers are digitized at the government level,[203] and Mali lacks a consistent policy for government data management and hosting. Large differences in both quantity and quality exist across public authorities. For example, many of the MOEF's information systems and e-services, such as the SYDONIA automated customs clearance system and the online declaration and consultation of taxes and duties, have reached a high level of maturity. However, others, including those housed within Mali's education and health authorities, remain at an early stage of development.

Public services' online presence remains largely informational. This includes institutional websites and web and mobile applications. Very few public services permit citizens to transact and interact directly. The *Institut National de la Statistique* (INSTAT) does maintain basic statistics on its website, but many indicators remain out of date. AMRTP does publish quarterly and yearly reports including operator data but is subject to publishing constraints. However, some exceptions exist. For example, in 2018 the government launched an SMS-based voter registration information system.[204] Citizens can submit their old voter registration numbers via a shortcode (for a small fee) to receive their new information and find their voting center. Also, Mali's MSDS, in partnership with USAID, maintains the full open-source DHIS-2.[205] In 2015, the MSDS also piloted a teledermatology

200 United Nations, Department of Economic and Social Affairs, *E-Government Survey 2020: Digital Government in the Decade of Action for Sustainable Development with addendum on COVID-19 Response* (New York, NY: United Nations, 2020), https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2020-Survey/2020%20UN%20E-Government%20Survey%20(Full%20Report).pdf.

201 Ibid.

202 Namely: The General Directorate of Customs, the National Directorate of the Treasury and Public Accounts, the General Directorate of the Budget, the National Directorate of Financial Control, the General Directorate of Public Procurement and Public Service Delegations, and the National Directorate domains and cadaster.

203 Civil status registers, tax registers, unified social register, individual registers of the CANAM and ANAM, patient registers in some hospitals in Mali, an electronic register on the monitoring of vaccinations, DHIS-2, and land register and domains (in the process of being digitized).

204 Benbere, "Comment retrouver votre carte d'électeur," *Benbere,* July 14, 2018 https://benbere.org/terre-dopportunites/comment-carte-electeur-retrouver/.

205 USAID, *L'expérience du Mali dans le déploiement du DHIS2 (District Health Information Software, version 2)* (Washington, D.C.: USAID, 2019), https://www.measureevaluation.org/resources/publications/tr-20-407-fr.html.

system with 88 health centers to diagnose and oversee the treatment of skin diseases.[206] Finally, MESRS launched Mali Campus, an interactive e-service in partnership with the World Bank's PADES project, to help students register online.[207]

Very few official platforms aim to strengthen citizen participation in governance or facilitate the co-development of public services. Interviewees across civil society and digital media in Mali emphasized the importance of open data to improve transparency and accountability. But very little has been done. For example, Jokkolabs Bamako maintains Open Data Mali; however, as of September 2022, no dataset has been uploaded to the platform.[208] One interviewee from online media highlighted that "for the moment, the authorities have not adopted or taken any initiatives in relation to open data," and that taking such measures can "give the media, journalists in particular, access to certain information to do their work or their service properly."[209] Another interviewee from civil society highlighted that when the government published polling results for the first time in 2018, they did so over PDF rather than a machine-readable format, which made analysis by external observers difficult.[210] Some interviewees suggested that fixing this gap in access to governmental information—not only for polling data but also for citizen complaints, support on how to fill out forms, hours of operation, and other queries—may not be so difficult. For example, one interviewee from a professional organization emphasized that it could be as easy as setting up a call center to support data access.[211]

DEFICIENCIES IN THE GOVERNANCE OF DIGITAL GOVERNMENT DEVELOPMENT

Mali Numérique 2020, the national digital strategy for the period 2015-2019, was built around an ambition to position Mali as one of the technological hubs of West Africa. One key feature emphasized leveraging information technologies to enable a more productive public administration. More than seven years after the launch of this four-year strategy, no final official assessment of its achievements exists. This makes it difficult to evaluate whether any progress has been made toward the initial objectives.

Institutional overlap, coupled with the absence of a dedicated national strategy, hinders digital government development in Mali. Numerous institutional structures have been set up in Mali in order to supervise and coordinate various aspects of digital development, including strategy implementation, regulation, personal data protection, digital infrastructure, and services development and management. In the absence of a strong oversight governance structure, however, stakeholders have made little effort to coordinate with each other. For example, SMTD set up a mutualized national data center according to international safety standards. However, it remains very underused by the other departments. Instead, weak coordination has led these ministries to launch their own scattered data center initiatives.

206 Fondation Pierre Fabre, "Creation of a national teledermatology service," *Fondation Pierre Fabre*, accessed September 2022, https://www.fondationpierrefabre.org/en/our-programmes/tropical-dermatology/creation-of-a-teledermatology-service/.

207 MESRS, Interview by DECA team, July 2022, online.

208 "Open Data Mali," openAFRICA, accessed September 2022, https://africaopendata.org/fr/organization/open-data-mali.

209 Sahelien.com, Interview by DECA team, July 2022, online.

210 Tuwindi Foundation, Interview by DECA team, June 2022, online.

211 Professional organization interviewee, Interview by DECA team, July 2022, online.

BOX 7: Diagnostic of a multi-stakeholder governance initiative - IGF Mali

In 2019, the ISOC chapter in Mali led the launch of a local Internet Governance Forum (IGF), IGF Mali. Led by an executive board of seven members from various stakeholder groups, including public administration, the private sector, and civil society, this forum was lauded for its multi-stakeholder approach. Three years later, the picture is very mixed.

Few authorities have incorporated IGF into their decision-making processes. AGEFAU associated this forum with the validation of its universal access strategy. APDP invited it to a workshop on the protection of personal data. However, IGF Mali has no decision-making authority in the implementation of public policies, and all recommendations are not effectively applied.[212]

Interviewees highlighted many potential reasons for IGF's ineffectiveness. According to one professional association interviewee, the organization suffers from poor vision and leadership.[213] According to another interviewee, IGF Mali failed to understand its real mission as a multi-stakeholder initiative.[214] One interviewee from the peacebuilding community highlighted IGF Mali's poor inclusion of localities in the northern and central regions that have less access to the internet.[215] Finally, the organization lacks sufficient financial resources,[216] and the COVID-19 pandemic hamstrung its convening ability.[217]

One initiative to note is the National Digital Council, which the former MCEN minister announced at the beginning of 2020.[218] It is a forum with multisector representation to encourage public-private dialogue on ICT development in Mali. One public sector interviewee indicated that a new manager had just been confirmed and that he would be introduced through a round of validation meetings with different stakeholders.[219] The same informant also shared that a new $100 million USD project called the Mali Digital Transformation project had recently been announced and would be financed by the World Bank.[220] Finally, the *Ministère de l'Administration Territoriale et de la Décentralisation* is overseeing a digital identity project which could help make it easier for more of the population to have the necessary documents required to engage in the financial mainstream.

LEGAL FRAMEWORK FOR DIGITAL GOVERNMENT DEVELOPMENT

Significant gaps and inconsistencies in Mali's legal framework continue to stifle the country's digital development. Better legislation is needed to clarify the rights of access to information, privacy, and confidentiality. In December 2003, the GOM passed the Decree No. 03-580/P-RM,[221] which sets the terms of application of the Law No. 98-012[222] that governs relations between the administration and users of public services, including provisions

212 Internet Society Mali Chapter, "Gouvernance de l'Internet pour le développement au Mali," *Internet Society Mali Chapter,* accessed September 2022, https://isoc.ml/gouvernance-de-linternet-pour-le-developpement-au-mali/.

213 Professional association interviewee, Interview by DECA team, July 2022, online.

214 Ibid.

215 Peacebuilding interviewee, Interview by DECA team, June 2022, online.

216 Public sector interviewee, Interview by DECA team, July 2022, online.

217 Dr. Ousmane Ly, Interview by DECA team, July 2022, online.

218 Ecofin Agency, "Mali: Hamadoun Touré announces the creation of the National Digital Council," *Ecofin Agency,* November 9, 2020, https://www.ecofinagency.com/telecom/0911-42034-mali-hamadoun-toure-announces-the-creation-of-the-national-digital-council.

219 Public sector interviewee, Interview by DECA team, July 2022, online.

220 World Bank, "Mali Digital Transformation Project," *World Bank,* accessed September 2022, https://projects.worldbank.org/en/projects-operations/project-detail/P176174.

221 Decree No. 03-580/P-RM of December 30, 2003 sets the terms of application of the law governing relations between the administration and users of public services, http://www.ilo.org/dyn/natlex/natlex4.detail?p_lang=en&p_isn=96984.

222 Law No.98-012 of January 19, 1998, "Governing the relations between the administration and the users of the public services" and Decree of Application 03-580, http://www.ilo.org/dyn/natlex/docs/ELECTRONIC/96984/114898/F-576778572/MLI-96984.pdf.

centered on the right of access to information. However, both texts include broad and ill-defined exceptions.[223] In addition, there continue to be no plans to legislate open data, data exchange, integration standards, or the interoperability between public authorities.

Other inconsistencies exist between two major cyber laws: the Protection of Personal Data Law (No. 2013-015) and the Fight Against Cybercrime Law (No. 2019-056). The former permits data subjects to obtain, from the data controller, access to information. However, it neither provides for the appointment of a data protection officer, nor prepares for a data breach.[224] Such lack of data oversight and clarity can be crippling, especially when it comes to managing contradictions. For example, article 7 of the Protection of Personal Data Law specifies that personal data should only be kept for a specific period and purpose. At the same time, the Cybercrime Law authorizes the search and seizure of data in criminal investigation procedures, without explaining how the copied data must be stored, processed, or deleted after investigations.[225]

Finally, the *Service de Certification et de Signature Électronique* (SCSE) was created by Law No. 2016-012 of May 6, 2016, which relates to electronic transactions, exchanges, and services, with the mission of promoting and managing electronic certification and signature. The legal framework for public key infrastructures, which is mandatory for the issuance of digital certificates and the development of the digital signature, is under development.[226]

223 Ministere de la Fonction Publique, de la Reforme de L'Etat et des Relation Avec les Institutions, *La Stratégie d'Accès à l'Information au sein de l'Administration (SAISA)* (Bamako, ML: Ministere de la Fonction Publique, de la Reforme de L'Etat et des Relation Avec les Institutions, 2006), https://www.cartercenter.org/resources/pdfs/peace/americas/mali_saisa_french.pdf.

224 Boubacar Diakite, et al., "Mali - Data Protection Overview," *OneTrust DataGuidance,* April 2022, https://www.dataguidance.com/notes/mali-data-protection-overview.

225 Abdoulaye Yattara Sadou, *Étude Analytique des Politiques Nationales sur l'Usage de l'Internet et des Réseaux Sociaux au Mali* (Kampala, UG: CIPESA, 2021), https://www.mfwa.org/wp-content/uploads/2021/04/CIPESA-Report-MALI_Internet-Rights.pdf.

226 Africa Cybersecurity Magazine, "La transformation de la signature électronique au Mali avec Mme Fanta Coumba Karembe," *Africa Cybersecurity Magazine*, July 13, 2022, https://cybersecuritymag.africa/index.php/la-transformation-de-la-signature-electronique-au-mali-avec-mme-fanta-coumba-karembe.

PILLAR 3: DIGITAL ECONOMY

Digital Economy explores the role digital technology plays in increasing economic opportunity and efficiency, trade and competitiveness, and global economic integration. Areas of inquiry include digital financial services (credit or debit cards, payment apps, mobile money, and digital savings and loan products), financial inclusion, regulation of digital finance, digital trade, e-commerce, and the financial technology (FinTech) enabling environment. This pillar also assesses strengths and weaknesses in the local digital talent pool and the tech startup environment; a healthy digital economy requires a supply of ICT skills that matches the demand and an ecosystem that promotes technological innovation.

KEY TAKEAWAYS: DIGITAL ECONOMY

FINDINGS

- *Mali Numérique 2020* was the strategic action plan for the digital economy from 2015 to 2020. The government commissioned an evaluation study and acknowledged that the implementation of *Mali Numérique 2020* was not successful. A new strategy for 2023 to 2027 is under development. Overall, the policy framework for the sector is fragmented, with several bills and initiatives (such as the Startup Act) that have been pending for years.
- Digital financial services are expanding in Mali, but uptake is relatively low compared to its neighbors in the region. Cash is the biggest competitor, with low digital financial literacy and a lack of consumer trust as significant barriers to digital finance. MNOs have been accused of anti-competitive practices by new e-money competitors.
- E-commerce is underdeveloped and informal. Most activity occurs on social media, where merchants advertise and connect with customers, and then the transactions are completed offline. Formal platforms report "cash on delivery" as the norm for both suppliers and customers.
- The tech startup scene is small and lacks competition. Most startups operate informally, and interviewees attributed this to unfavorable tax conditions, high operational costs, and the lack of a cohesive policy framework for startups. Passing the Startup Act that has been pending since 2019 will be key.
- There is an inadequate talent pool and a lack of practical expertise. Locally-trained ICT professionals from vocational training institutes and universities are generally not industry-ready, leaving some companies to outsource talent from the Malian diaspora to work in Mali.

RELEVANT RECOMMENDATIONS

1. Support the adoption of a new comprehensive framework for the digital economy
2. Lower barriers to entry and increase usage of digital finance
3. Promote innovation and the digital transformation of startups and MSMEs

INTRODUCTION

The government seems keen to advance Mali's digital economy, as evidenced by a dedicated ministry, MCEN, which oversaw the drafting of the *Mali Numérique 2020* strategy.[227] The GOM also established a National Digital Council and embarked on drafting sector-focused bills with varied success. However, progress with these initiatives and Mali's digital economy have been negatively impacted by the COVID-19 pandemic, low agricultural production, political instability, and security challenges. In particular, Mali has struggled to create policies for an enabling environment to support the development of e-commerce infrastructure and the tech startup community.[228]

227 *Ministère de l'Economie Numérique de l'Information et de la Communication, "Mali Numerique 2020: Stratégie Nationale de Développement de l'Economie Numérique."*

228 Ena Dion and Joseph Sany, "After Two Coups, Mali Needs Regional Support to Bolster Democracy," *United States Institute of Peace,* December 9, 2021, https://www.usip.org/publications/2021/12/after-two-coups-mali-needs-regional-support-bolster-democracy.

3.1. CRAFTING A NEW COMPREHENSIVE FRAMEWORK FOR THE DIGITAL ECONOMY

Mali's digital economy is regulated by MCEN.[229] Over the next few years, MCEN envisions strengthening human capital, broadening the tax base, and enabling innovation.[230] While the government is optimistic about the future of Mali's digital economy and is currently drafting a new digital strategy, the country has been governed by an outdated one for the past few years.

Since 2014, MCEN has been guided by *Mali Numérique 2020,* the National Strategy for the Development of the Digital Economy.[231] While the national strategy set six ambitious targets, action items laid out under each of these areas were narrowly focused and did not address higher-level frameworks to bolster the digital economy. For example, action items relating to the production and supply of digital content only focused on the creation of an online portal, a one-stop national portal to raise Mali's profile internationally and allow access to public data. It would have benefitted from a higher-level framework to help motivate innovation and increase the capacity of local talent and companies to develop and maintain sites and online platforms across sectors. The strategy document also included action items to create two e-commerce platforms for tourism and the sale of cultural artifacts.

THE INADEQUACY OF MALI NUMÉRIQUE 2020

One of the most visible outcomes of adopting *Mali Numérique 2020* was the establishment of the *Direction Nationale de l'Economie Numérique* (DNEN), which was charged with implementing the strategy. The Ministry hosted a validation workshop and commissioned an evaluation study of the implementation of *Mali Numérique*. By the government's own admission, the implementation was not successful. One interviewee attributed this to a lack of funding and human resources.[232] A regional digital development expert also agreed that the strategy was not implemented as recommended.[233] While the World Bank had approached the Ministry with opportunities to actualize the strategy, the former Minister remained unreceptive to outside support.

Today, the GOM is working on a new strategy to guide the country through 2027. MCEN stressed that this new strategy will be informed by findings from the evaluation of its predecessor. As the government lays out its plan for the future, a regional digital development expert stressed the need for Mali to have a clear vision, highlighting the example of Niger's GoNiger strategy, which is currently being drafted with input from the World Bank.[234] In particular, Mali's new strategy will need to address the adoption of higher-level frameworks, create national sector strategies, and promote legislation, particularly for e-commerce and online consumer protection. Interviewees also mentioned the need for all member states to align their strategy efforts with guidelines from the forthcoming ECOWAS Regional E-Commerce Strategy, which calls for member states to develop national e-commerce strategies and legislation.[235]

229 *Ministère de la Communication de l'Economie Numérique,* accessed April 2022, https://communication.gouv.ml/le-ministere/.

230 Public sector interviewee, Interview by DECA team, July 2022, online.

231 *Ministère de l'Economie Numérique de l'Information et de la Communication, "Mali Numerique 2020: Stratégie Nationale de Développement de l'Economie Numérique."*

232 Public sector interviewee, Interview by DECA team, July 2022, online.

233 Regional digital development expert, Interview by DECA team, July 2022, online.

234 Ibid.

235 ECOWAS Commission, Interview by DECA team, August 2022, online.

REGIONAL INTEGRATION AND UNRATIFIED NATIONAL POLICIES

As a member, Mali is subject to *Union Économique et Monétaire Ouest-Africaine* (UEMOA) regulations for monetary and financial systems and to ECOWAS directives primarily for trade, data protection, and cybersecurity. The Central Bank of West African States, *Banque Centrale des Etats de l'Afrique de l'Ouest* (BCEAO), is headquartered in Dakar, Senegal. It is the issuing institute for the member states of the UEMOA. In 1987, ECOWAS launched a program to create one monetary union and single currency. To this end, in December 2020, the Bamako Accord established the West African Monetary Zone (WAMZ) for non-UEMOA countries.[236] The program's first phase aims to create a single currency for WAMZ countries. Following successful implementation, the program plans to integrate WAMZ into UEMOA to form the ECOWAS single currency, Eco, which is now projected for 2027.[237] As some countries pursue interests in launching their own digital currencies, it will be interesting to see how these activities play a role in advancing or hindering the single currency efforts.[238]

Mali's compliance with regional economic directives varies. In 2018, the government modified the 2001 Customs Code to simplify procedures and harmonize with ECOWAS Customs Code and other UEMOA requirements.[239] In June 2022, the National Transitional Council approved another revision, again in line with the ECOWAS Supplementary Act. However, this law has not been legally ratified (meaning a decree order has not been issued).[240]

Several interviewees identified the need for the government to act on outstanding laws and to improve its coordination. Several laws have been passed since 2015, but the previous government did not follow up to enact some bills (see Box 8). The Startup Act, which the GOM adopted in 2019, had not been enacted at the time of the DECA interviews in 2022.

The 23 Amendment Act is another bill that seems unresolved.[241] The goal of the comprehensive bill was to reorganize and streamline decentralized financial systems in order to make it administratively, economically, and financially more conducive for entrepreneurs to operate. Law No. 2019-032 amends the Law on the Regulation of Decentralized Financial Systems, but it is unclear if this is the same bill.[242]

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236 Simon K. Harvey and Matthew J. Cushing, "Is West African Monetary Zone (WAMZ) a common currency area?," *Review of Development Finance* 5, no. 1 (June 2015): 53-63, https://doi.org/10.1016/j.rdf.2015.05.001.

237 The Guardian, "ECOWAS pushes launch of single currency to 2027," *The Guardian,* June 15, 2022, https://guardian.ng/news/ecowas-pushes-launch-of-single-currency-to-2027/.

238 The Exchange, "The State of Cryptocurrency Adoption in Africa per Country," *Further Africa,* July 14, 2022, https://furtherafrica.com/2022/07/14/the-state-of-cryptocurrency-adoption-in-africa-per-country/.

239 ECOWAS, "ECOWAS Customs Code," *ECOWAS Trade Liberalization Scheme (ETLS),* August 2017, https://etls.ecowas.int/wp-content/uploads/2020/10/ECOWAS-CUSTOMS-CODE-FINAL-27092017FELIX.pdf.

240 U.S. International Trade Administration, "Mali Country Commercial Guide - Trade Barriers," *International Trade Administration,* August 8, 2022, https://www.trade.gov/country-commercial-guides/mali-trade-barriers.

241 MicroSave, *Inclusive FinTechs in Francophone Africa: Mali country report* (Washington, D.C.: Microsave, 2020), https://www.microsave.net/wp-content/uploads/2020/07/Inclusive-FinTechs-in-Francophone-Africa-Mali-country-report.pdf.

242 ECOWAS and The Inter-Governmental Action Group against Money Laundering (GIABA), *Anti-money laundering and counter-terrorist financing measures: Mali Mutual Evaluation Report* (Dakar, Senegal: GIABA, 2019), https://www.fatf-gafi.org/media/fatf/documents/reports/mer-fsrb/GIABA-Mutual-Evaluation-Mali-2019.pdf.

BOX 8: Timeline of policies relevant to Mali's digital economy

2001: Customs codes - Law No. 01-075. An amendment was introduced in 2018 and approved by the National Transitional Council in June 2022. A decree has not yet been issued.

2015: Order No. 2015 -1535/MCI/MEF-SG established products prohibited for import and export.

2015: Law No. 2015-036 of July 16, 2015 on consumer protection and its Decree No. 2016-0482-P-RM of July 7, 2016

2016: Law No. 2016-006 on the organization of competition

2016: Law No. 2016-011 on the rules for the means, methods, services, and cryptology systems

2016: Law No. 2016-012 relating to electronic transactions, exchanges, and services

2016: Law No. 2016-061 relating to public-private partnerships

2016: National Microfinance Development Policy and Action Plan 2016-2020

2016: Law No. 2016-008 relating to the Uniform Law on Anti-Money Laundering and Countering the Terrorist Financing from No. 02/2015/CM/UEMOA

2017: Law No. 2017-015 relating to the regulation of the telecommunications, information and communication technologies, and posts sector

2017: Law No. 2017-070 Amending Law No. 2013-015 on the protection of personal data

2019: Law No. 2019-032 Amending Law on decentralized financial systems

2019: Law No. 2019-056 on the suppression of cybercrime; criminalizes online fraudulent transactions and obligates financial institutions to assess all risks

2019: Tax Appendix to Law No. 2018-072 of December 21, 2018 (Finance Law of 2019) introduced a new tax, the solidarity contribution that is levied at a rate of 0.5 percent on the business turnover

2019: Strategic Framework for Economic Recovery and Sustainable Development (CREDD 2019-2023) promotes innovative technology and entrepreneurship in the green economy

The draft Startup Act was initiated in 2018 and approved in October 2019. It was revitalized in February 2021 by MCEN.[243] To date, the Act has not been legally ratified.

The draft 23 Amendment Act was under development in 2019; it is a comprehensive framework streamlining alternative financial systems for ease of access to capital.

3.2. EXPANDING DIGITAL FINANCIAL SERVICES

Few Malians have a bank account at a formal financial institution, but mobile money account ownership has risen over the past few years. However, compared to regional peers, digital financial services (DFS) usage in Mali remains relatively low and is not widely understood. BCEAO's Regional Financial Inclusion Strategy, which was adopted in 2019, has been implemented to varying degrees across the member states. While the status of the strategy in Mali is unclear, the DNEN reported that the MOEF was working on a national financial inclusion strategy.

LOW BANKING RATE

There are 14 commercial banks and three non-banking financial institutions in Mali; all are regulated by BCEAO.[244] Online and mobile banking services are provided by Mali's leading commercial banks, such as the Development

243 Charles Rapulu Udoh and Afrikan Heroes, "Mali Startup Act Back On Track After Military Junta," *Afrikan Heroes,* February 21, 2021, https://afrikanheroes.com/2021/02/21/mali-startup-act-back-on-track-after-military-junta/.

244 BCEAO, "BCEAO Banking Landscape", *BCEAO,* last modified June 20, 2022, https://www-bceao-int.translate.goog/fr/content/paysage-bancaire?_x_tr_sl=fr&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=wapp.

Bank of Mali (BDM), Ecobank, and Banque Atlantique. Orange Mali launched West Africa's first digital bank, Orange Bank Africa in Côte d'Ivoire in 2020 and had plans to expand to Senegal, Burkina Faso, and Mali in 2021.[245] A telecom market expert confirmed that the digital bank was still only operating in Côte d'Ivoire with plans to operate in other countries.[246] The company attributed delays in the regional roll-out to BCEAO's country-by-country approval process.[247] The Orange Money Mali platform does not yet feature Orange Bank, but BCEAO lists the Mali branch for Orange Bank (Côte d'Ivoire) with all other banks licensed to operate in Mali.[248]

Almost a third (28.85 percent) of Mali's population aged 15 years and older held an account at a financial institution in 2021, an improvement from only 18 percent in 2017.[249] Women-owned accounts at financial institutions tripled from 9.83 percent in 2017 to 28.29 percent in 2021 (not including mobile money accounts).[250] In the same period, there was a smaller gain for men - from 26.77 percent in 2017 to 28.60 percent in 2021, suggesting that the gender gap for holding accounts at financial institutions almost closed.[251] In 2017, 11.60 percent of the population had a debit account and even fewer, 4.75 percent, used their debit cards for payment.[252] In 2021, those numbers increased slightly to 14.56 percent possessing a debit account and 6.91 percent using their debit cards.[253] This usage gap can be attributed to several interoperability linkages with mobile wallets that are available on the market, making mobile phones the default payment method instead of physical cards.

In an effort to address low banking rates, African governments are mainstreaming Islamic finance while also raising capital globally to fund infrastructure and development projects.[254] Islamic finance is a system of retail banking, corporate banking, and capital markets that comply with *Shariah* law. These include principles of fairness in bearing mutual risk, profit sharing, and prohibiting usury interest rates. Mali is doing much better in Islamic capital markets than in Islamic banking. Mali is currently the fourth largest issuer of Islamic bonds, *sukuk*, in Africa, surpassed only by Côte d'Ivoire in the BCEAO region. The Islamic Corporation for Private Sector Development (SID) issues *sukuk* and invested in building a new regional Islamic bank. Coris Bank International launched Islamic banking windows in Mali, Senegal, Benin, and Côte d'Ivoire as a way to offer alternative Islamic banking products and services to people excluded from the financial sector due to lack of Shariah-compliant products.[255] While it has a high potential base in Mali, Islamic banks experience legal and *Shariah* governance difficulties and suffer from a lack of liquidity and product innovation coupled with staffing issues. Islamic banking systems traditionally use manual processes to ensure compliance with *Shariah* practices.[256] This has made the digital transformation of Islamic finance difficult. However, solutions such as artificial

245 Reuters, "Orange launches digital banking in Ivory Coast, eyes further expansion," *Reuters,* July 23, 2020, https://www.reuters.com/article/uk-ivorycoast-orange-bank-idUKKCN24O1Z9.

246 Telecom market expert, Interview by DECA Team, June 2022, online.

247 Quentin Velluet, "Jean-Louis Menann-Kouamé: 'Our success is based on that of Orange Money,'" *The Africa Report,* May 12, 2022, https://www.theafricareport.com/202736/jean-louis-menann-kouame-our-success-is-based-on-that-of-orange-money/.

248 BCEAO, "Paysage bancaire," *BCEAO,* last modified June 30, 2022, https://www.bceao.int/fr/content/paysage-bancaire.

249 Asli Demirgüç-Kunt, et al., *The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19,* (Washington, D.C.: World Bank Group, 2022), https://www.worldbank.org/en/publication/globalfindex.

250 Ibid.

251 Ibid.

252 Ibid.

253 Ibid.

254 Abdi Latif Dahir, "Islamic finance is gaining a foothold across Africa," *Quartz,* September 19, 2018, https://qz.com/africa/1395596/islamic-finance-in-africa-grows-in-mali-ivory-coast-togo/.

255 Islamic Corporation for the Development of the Private Sector (ICD), "Islamic Windows of Coris Bank International pave the way to achieve SDG goal by ensuring financial inclusion and shared prosperity," *ICD,* June 20, 2018, https://icd.africa-newsroom.com/press/islamic-windows-of-coris-bank-international-pave-the-way-to-achieve-sdg-goal-by-ensuring-financial-inclusion-and-shared-prosperity?lang=en.

256 Moussa Traore and Nur Harena Redzuan, "An exploratory study on the opportunities and challenges towards the establishment of Islamic banking in Mali," in *Pembinaan Tamadun Melalui Industri Patuh Syariah,* ed. Mohamad Fitri Mohamad Yusoff, Siti Syaiwani Ghazali, Suria Rismawati Sanwari, and Badriah Nordin (Selangor, Malaysia: International Islamic University Malaysia, 2021), 164-193. http://irep.iium.edu.my/95135/1/Dr%20Harena%20%281%29.pdf.

intelligence are increasingly being applied to the Islamic finance framework, and this is an area of opportunity as Mali's financial ecosystem evolves.[257,258]

DIGITALIZED INTERCONNECTED NETWORKS OF DECENTRALIZED FINANCIAL SYSTEMS

Decentralized financial systems or *systèmes financiers décentralisés* (SFD) are networks of savings and credit unions and microfinance institutions (MFIs) that offer alternative financial accounts outside of the traditional banking system. SFDs first appeared in the BCEAO sub-region in the late 1960s.[259] While Mali's penetration rate of SFDs is relatively low compared to other UEMOA countries, it has the most financial access points (see Table 1). Since the early 2000s, the GOM's focus on digitalization of SFDs and interoperability across networks has increased.[260] The Kafo Jiginew network was established in 1987, while the Nyèsigiso network was established in 1993. Between 2008 and 2015, the Canadian International Development Agency and other development actors, such as the Bill and Melinda Gates Foundation, supported the GOM in developing technology to connect member institutions of the Nyèsigiso and Kafo Jiginew networks. The automated interinstitutional system and financial access points of service now allow members of these cooperative banks to access their money throughout the country wherever there is a savings and credit union nearby. Digitalization of the backbone of SFD financial systems is another opportunity to expand financial inclusion.

TABLE 1: Main indicators of West African Monetary Union (WAMU) decentralized financial systems as of 03/31/2022

	TOTAL NUMBER OF SFDS*	NUMBER OF SERVICE POINTS	NUMBER OF SFD MEMBERS/ CUSTOMERS	POPULATION[261] (IN MILLIONS)	SFD PENETRATION RATE**
BENIN	58	693	3,138,748	12.8	24.52%
BURKINA FASO	81	776	1,741,439	22.1	7.88%
CÔTE D'IVOIRE	46	321	2,862,782	27.7	10.33%
GUINEA-BISSAU	6	6	10,693	2.1	0.51%
MALI	83	998	1,515,651	21.5	7.05%
NIGER	37	125	334,620	26.1	1.28%
SENEGAL	122	784	3,827,626	17.7	21.63%
TOGO	75	668	3,852,551	8.7	44.28%

**SFD - systèmes financiers décentralisés (decentralized financial systems)*

*** Author computation - number of SFD members as % of population*

Source: BCEAO - Department of Banking Activities and Alternative Financing, July 27, 2022

257 Codebase Technologies, "World-class, Shariah-Compliant Digital Solutions for Islamic Banks," *Codebase Technologies,* accessed November 22, 2022, https://www.codebtech.com/islamic-banking/.

258 Dawood Ashraf, "Digital Finance and Artificial Intelligence: Islamic Finance Challenges and Prospects," Islamic Development Bank Institute, August 24, 2021, http://dx.doi.org/10.2139/ssrn.4199484.

259 BCEAO, "Decentralized Financial Systems," *BCEAO,* accessed November 2022, https://www.bceao.int/en/content/decentralized-financial-systems.

260 Government of Canada, "Inclusive finance reaching financially excluded persons in Mali," *Government of Canada,* accessed June 2022, https://www.international.gc.ca/world-monde/stories-histoires/2019/mali-finance.aspx?lang=eng.

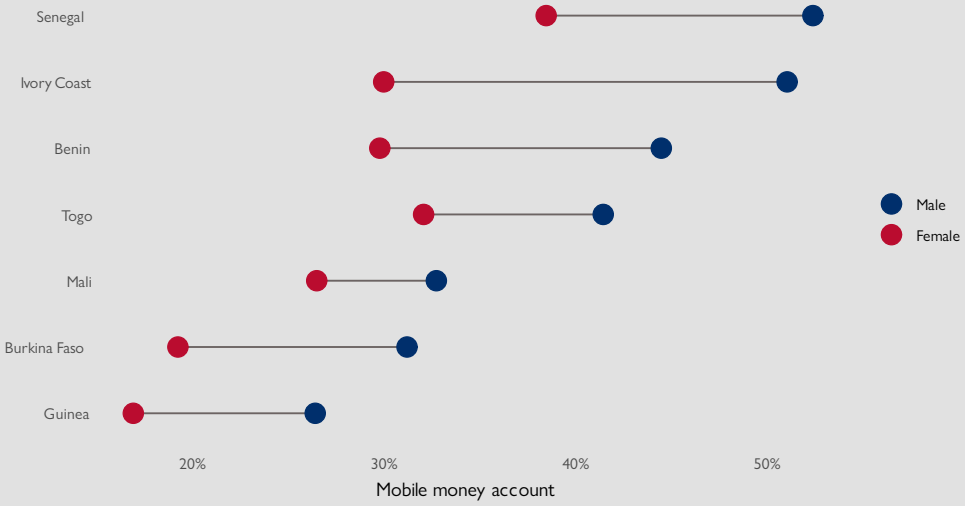
261 United Nations Population Fund (UNFPA), "World Population Dashboard Mali," *UNFPA,* 2022, https://www.unfpa.org/data/world-population-dashboard.

LOW PROFICIENCY IN USING MOBILE MONEY

Mobile money services are widely available in Mali, and the market is dominated by Orange Money Mali and Mali-Moov Africa Malitel.[262] GSMA gave Mali a high score of 94 out of 100 for agent networks on the 2021 Mobile Money Regulatory Index.[263] This score assesses agent eligibility, agent authorization, agent activities, and agent liability. Within the limits of regulation, mobile money providers control the quality of agents by setting criteria for them to register and to have limited authority to offer cash-in and out services while limiting their liability for losses. The high score means Mali has a favorable regulatory and service provider environment for agents.

Mobile money account ownership rose from 24.40 percent in 2017 to 29.38 percent in 2021. The ownership rate was 38.61 percent in urban areas as compared to 24.86 percent in rural areas in 2021. Account ownership for men increased from 29.12 percent in 2017 to 32.59 percent in 2021. Women account holders increased from 19.84 percent to 26.35 percent during the same period. This can be attributed to BCEAO relaxing registration requirements to permit opening a mobile money account during the COVID-19 pandemic in order to enable faster delivery of government-to-person cash transfers.[264] The gender gap in mobile money is widest before adoption or account registration. This is because women are less likely to own a mobile phone, and men tend to be financial decision-makers and heads of households. Once they are subscribers, women use mobile money less frequently and transact smaller amounts than men.[265]

FIGURE 13: Mobile money usage for men and women in West Africa



Source: Global Findex, 2021

Only 12.53 percent of Mali's population reported that they could use a mobile money account without the help of someone, including an agent. Regionally, this compares to a quarter of the population in Benin and in Togo and a third in Cote d'Ivoire and in Senegal independently using their mobile money accounts without assistance. So, while the account ownership gap is closing especially for women, the usage gap—where women

262 BCEAO, "Etablissement de Monnaie Electronique / SFD : Systèmes Financiers Décentralisés," *BCEAO,* last modified August 16, 2022, https://www.bceao.int/fr/content/etablissements-de-monnaie-electronique.

263 Sakshi Chadha, Kennedy Kipkemboi, and Brian Muthiora, *The Mobile Money Regulatory Index 2021 Regional & Country Profiles* (London, UK: GSMA, 2021), 50, https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/10/Mobile-Money-Regulatory-Index-2021.pdf.

264 Alan Gelb and Anit Mukherjee, "COVID-19: How Countries Can Use Digital Payments for Better, Quicker Cash Transfers," *Center for Global Development,* April 6, 2020, https://www.cgdev.org/blog/covid-19-how-countries-can-use-digital-payments-better-quicker-cash-transfers.

265 Elisa Minischetti, *Connected Women Mapping the mobile money gender gap: Insights from Côte d'Ivoire and Mali* (London, UK: GSMA, 2017), 5, https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/07/CW_Cote_Mali_gendergap_Phase2_V2_WEBOK.pdf.

transact lower amounts and less frequently compared to men—could be explained by low levels of proficiency in navigating mobile money platforms.

NEW E-MONEY LICENSE INCREASES COMPETITION

There are at least 18 FinTechs operating in Mali with 11 funding partners who include angel investors and venture capitalists.[266] Orange Mali, Wave Mobile Money, Move Money, and SAMA Money are major mobile money providers.[267] On April 14, 2022, BCEAO issued Wave the first e-money license to a FinTech company in West Africa, giving it direct access to the Central Bank. After Orange, Wave is only the second non-bank mobile money provider in Mali to issue e-money directly to customers.[268,269] Orange has enjoyed the competitive advantage of brand recognition and longevity in the market as well as a diversified platform due to partnerships and its upcoming digital bank.[270] However, its commercial disagreements on the sale of airtime and commission for calls and price adjustments[271] suggests that issuing the e-money license to Wave will be a game-changer for the mobile money market. Customers have protested that the MNO price adjustments in response to Wave entering the market meant they were overcharging customers all along (see Box 9). Enabling regulation around licensing, fair competition, and risk-based supervision are critical for FinTechs to grow and operate in the WAEMU region; Wave is no exception. The company plans to educate all stakeholders both at local and regional levels through ecosystem partners to build a more competitive financial sector that delivers universal financial inclusion.[272]

BOX 9: Wave Mobile Money

- Wave Mobile Money, a U.S.- and Senegalese-owned FinTech, has been offering mobile money in Mali through a bank-led partnership model since August 2021, after it first launched in Senegal in 2018 and then in Côte d'Ivoire in 2020.[273]
- Wave Mobile Money offers person-to-person money transfers, free bill payments, free cash-in, cash-out with a one percent transfer fee.
- The Wave platform is internet-based, thus requiring a smartphone or, for those without smartphones, the use of a physical card with a QR code for agents to scan and facilitate transactions. Unstructured Supplementary Service Data (USSD) is a backup service for agents to use when there is no connectivity available.
- There is no longer a need for customers to pull funds from their bank account to put into the Wave wallet; customers can directly channel funds to a Wave wallet.
- With increased competition, Orange reduced their transaction fees from three percent to one percent and eliminated withdrawal fees in 2021 to match Wave's pricing structure in anticipation of the e-money license.[274]
- Wave's business model relies on telecom infrastructure and is double-invoiced on telephony services by different MNOs for call forward servicing to operate their Customer Service Call Centers.

266 MicroSave Consulting, *Inclusive FinTechs in Francophone Africa: Mali country report* (Washington, D.C.: Microsave Consulting, 2020), https://www.microsave.net/wp-content/uploads/2020/07/Inclusive-FinTechs-in-Francophone-Africa-Mali-country-report.pdf.

267 Telecom market expert, Interview by DECA Team, June 2022, online.

268 Tawanda Karombo, "First E-Money License Issued To West African Fintech," *Global Finance,* May 9, 2022, https://www.gfmag.com/magazine/may-2022/first-e-money-license-issued-west-african-FinTech.

269 Kingsley Kobo, "How Wave rose to become Francophone Africa's first unicorn," *Quartz,* July 18, 2022, https://qz.com/africa/2189528/how-wave-rose-to-become-francophone-africas-first-unicorn/.

270 Telecom market expert, Interview by DECA Team, June 2022, online.

271 Quentin Velluet, "Sénégal/Côte d'Ivoire: Wave, the fintech that's shaking up the mobile money industry?" *The Africa Report,* June 20, 2021, https://www.theafricareport.com/97171/senegal-cote-divoire-wave-the-fintech-thats-shaking-up-the-mobile-money-industry/.

272 Wave Mali, Interview by DECA Team, July 2022, online.

273 Ibid.

274 Kobo, "How Wave rose to become Francophone Africa's first unicorn."

INTEROPERABILITY IS EXPANDING NATIONALLY AND REGIONALLY

BCEAO regulations govern bank-to-wallet interoperability within Mali and between UEMOA countries. In 2017, BCEAO embarked on the Digital Financial Services Interoperability Platform project in partnership with the African Development Bank and the Bill and Melinda Gates Foundation.[275] The five-year, $11.3 USD million project will create the largest regional interoperability platform in Africa. It is expected to be fully operational in 2023 and will link 130 banks, 33 e-money issuers (including six MNOs), more than 300 MFIs, and eight treasuries.[276] Money transfers via mobile banking will only be made between accounts held in UEMOA countries.

While Orange is reluctant to integrate with FinTechs in the region, it announced plans to offer *Mowali,* a cross-carrier payment service with South Africa's MTN Mobile Money. This product would allow more than 338 million existing mobile money subscribers across Africa to make customer and merchant payments across multiple MNO operators.[277] However, the initiative stalled due to resistance from central banks. Within Mali, Orange launched a bank-to-wallet interoperability model in 2015, interconnecting Orange to Ecobank.[278] In 2018, Orange Money Mali partnered with *Premiere Agence de Microfinance* to offer *Singa Ni Mara,* the first digital savings and microcredit product in the region. Customers can instantly receive anywhere from 1,000 to 50,000 CFA (about $1 USD to $79 USD) directly in their Orange mobile money accounts and will repay the loan within 30 days.[279]

A NATIONAL PAYMENT SWITCH MANAGED BY A REGIONAL CENTRAL BANK

A national payment clearing system or switch is a set of instruments, procedures, and rules that simplifies the processing of electronic financial transactions between buyers and sellers and enables funds to be transferred from one financial institution to another. The BCEAO is responsible for the management of the UEMOA Automated Interbank Clearing System (SICA-UEMOA) and the UEMOA Automated Transfer and Settlement System (STAR-UEMOA) payment systems.[280] SICA-UEMOA is made up of nine clearing systems, a national system for each of the UEMOA member states (including Mali) and one regional clearing system. The participants in SICA-UEMOA are the banks, the BCEAO, the post office, and the treasury. The Interbank Monetary Union of West Africa (GIM-UEMOA) is tasked with developing electronic payment systems across all its member states.[281] In 2020, the Central Bank deployed a mechanism to automate the participation of MFIs in the Union's payment systems, which was accompanied by training for MFI managers. The goal was to increase the speed and reduce the cost of customer transactions.[282]

DIGITAL PAYMENTS LAG BEHIND REGIONAL PEERS

Digital payments are less frequently used in Mali compared to its UEMOA counterparts (with the exception of Burkina Faso). In 2021, 34 percent of the Malian population made a digital payment compared to 42 percent

275 ADFI, "WAEMU digital financial services interoperability platform," *ADFI,* accessed October 2022, https://www.adfi.org/projects/waemu-digital-financial-services-interoperability-platform.

276 Ennatu Domingo and Chloe Teevan, "Africa's journey towards an integrated digital payments landscape and how the EU can support it," *ECDPM,* May 23, 2022, https://ecdpm.org/work/africas-journey-integrated-digital-payments-landscape-how-eu-can-support.

277 Marcus Lawrence, "Orange and MTN partner for Mowali payments joint venture," *Business Chief,* May 19, 2020. https://businesschief.eu/technology/orange-and-mtn-partner-mowali-payments-joint-venture.

278 Ron Paillon, "The interoperability of mobile money services: Inevitable evolution towards the hub model," *Sofrecom,* accessed October 2022, https://www.sofrecom.com/en/news-insights/the-interoperability-of-mobile-money-services-inevitable-evolution-towards-the-hub-model.html.

279 Orange Mali, "Singa Ni Mara" *Orange Mali,* accessed May 2022, https://www.orangemali.com/fr/services-financiers/singa-ni-mara.html.

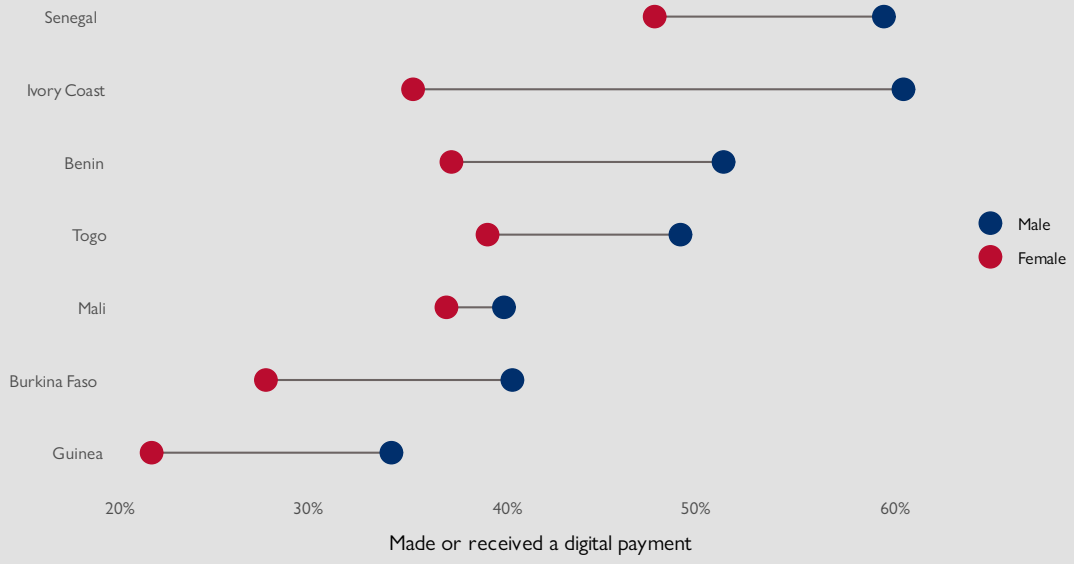
280 BCEAO, "Payment Systems Management," *BCEAO,* accessed May 2022, https://www.bceao.int/en/content/payment-systems-management.

281 BCEAO, "Monétique interbancaire régionale," *BCEAO,* accessed May 2022, https://www.bceao.int/fr/content/monetique-interbancaire-regionale.

282 BCEAO, *Annual Report 2020 (Summarized Version)* (Dakar, Senegal: BCEAO, 2020), 41, https://www.bceao.int/sites/default/files/2021-11/BCEAO_ANNUAL_REPORT_2020.pdf.

in Benin, 46 percent in Côte d'Ivoire, 51 percent in Senegal, and 41 percent in Togo.[283] When combining digital payments executed with payments received, Mali still lagged behind at 38 percent compared to 44 percent in Benin and in Togo, 48 percent in Côte d'Ivoire, and 53 percent in Senegal.[284]

FIGURE 14: Digital payments usage for men and women in West Africa



Source: Global Findex, 2021

In an effort to promote the usage of DFS during the COVID-19 pandemic, BCEAO slashed fees for e-money transfers not exceeding 5,000 CFA (approximately $8 USD) and also eliminated transaction fees for water and electricity bill payments initiated through mobile phones that were not greater than 50,000 CFA (approximately $79 USD). BCEAO also relaxed know-your-customer (KYC) requirements to enable existing SIM registrations to subscribe to mobile money wallets, and increase limits on mobile money account balances.[285]

INFORMAL HAWALA REMITTANCES

Personal remittances received in Mali were 5.7 percent of GDP in 2020.[286] The World Bank estimates that these rates could be doubled or tripled if informal remittances are considered.[287] *Halawa* systems are informal transfer systems that exist legally and sometimes illegally in different countries under different names. For example, these systems have existed in India since the 8th century, with the Arabic term *"hawala"* referring to trust. GSMA has found that about 60 percent of households in Burkina Faso and Senegal were using informal remittances through the *hawala* system or through transport companies which are also prevalent in Mali.[288] While *hawala* services are advertised openly, they are illegal. Not all hawala services are registered, and regulation

283 Demirgüç-Kunt, et al., *The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19.*

284 Ibid.

285 Erdoo Yongo, Christopher Lowe, and Yiannis Theodorou, *Access to Mobile Services and Proof of Identity 2021: Revisiting SIM Registration and Know Your Customer (KYC) Contexts during COVID-19* (London, UK: GSMA, 2021), 32, https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/04/Digital-Identity-Access-to-Mobile-Services-and-Proof-of-Identity-2021.pdf.

286 The World Bank, "Personal remittances, received (% of GDP) - Mali, 2020," *The World Bank,* accessed November 2022, https://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS?locations=ML.

287 Kingsley Kobo, "How economic sanctions drove money transfers in west Africa underground," *Quartz,* November 8, 2021, https://www.yahoo.com/video/economic-sanctions-drove-money-transfers-152052125.html.

288 Claire Scharwatt and Chris Williamson, *Mobile money crosses borders: New remittance models in West Africa* (London, UK: GSMA, 2015), 6, https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/04/2015_MMU_Mobile-money-crosses-borders_New-remittance-models-in-West-Africa.pdf.

and enforcement of the services are weak. BCEAO estimates that over $450 million USD across its eight member countries is moved back and forth each year through this method (Box 10). Trust has been the biggest driver generating repeat customers who operate primarily with cash, which also poses a risk for theft or loss.[289]

BOX 10: Example of how the hawala market works

1. A client goes to an unofficial office behind the ticket counter of Binke Transport bus company in Bamako. He wants to send money to his mother in Gao in northern Mali - 18 hours away by road.
2. The client hands cash to the *hawala* agent *(hawaladar)* and provides information on the recipient and destination. Both the client's and the recipient's information may be documented in an unofficial, handwritten ledger.
3. The *hawaladar* texts his contact in Gao and informs the client to notify the mother to pick up the money from that contact in one hour.
4. Another client cashes out money sent by his brother from Gao. He buys goods requested by his brother, which are delivered by the Binke Bus Company.
5. In both instances, cash is not directly exchanged between the *hawaladar* and his contact in Gao.
6. At the end of the week, the *hawaldars* in Bamako and Gao have facilitated a dozen transactions, but the Gao *hawaladar* has a positive balance. He uses a mobile money service to make one last payment to the Bamako *hawaladar,* and their accounts are settled.

Hawaladars use cheaper FinTech options like Orange or Wave rather than banking or formal money transfer services to virtually settle transactions with their contacts.[290] For cross-border transactions, the transaction cost for sending 230,000 CFA (approximately $395 USD) from Senegal to Mali through Orange Money is 1.5 percent compared to 4.13 percent on MoneyGram. *Hawala* clients do not have to have a mobile money account, as they can simply hand over cash to a *hawaladar.* While a relatively small number of people use mobile money directly from their own accounts, a larger group could be using it indirectly by working with *hawaladars*. This makes the traceability of funds and the enforcement of anti-money laundering and combating the financing of terrorism (AML/CFT) measures difficult. The *hawala* system's operating requirements also make the networks susceptible to illegal activity.

DIGITAL CURRENCY IN USE EVEN THOUGH BANNED

Mali is ranked 97th out of 146 countries on the 2022 Global Crypto Adoption Index for overall cryptocurrency adoption but ranks 25th for person-to-person exchange trade volume.[291] Mali is one of 23 African countries out of 51 countries worldwide that have either explicitly or implicitly banned cryptocurrency.[292] The latter prohibits cryptocurrency exchanges, banks, and other financial institutions from "dealing in cryptocurrencies or offering services to individuals/businesses dealing in cryptocurrencies," whereas under an explicit ban, it is criminal to transact or hold cryptocurrency. Mali has an implicit ban. It will be interesting to track digital currency developments in Mali, as the Central African Republic recently became the first African country to

289 Anne Look, "Malians Shelter to Black Market to Transfer Cash," *Voice of America,* August 29, 2012, https://web.archive.org/web/20120901215342/http://www.voanews.com/content/mail-western-union-black-market/1497859.html.

290 ECOWAS and The Inter-Governmental Action Group against Money Laundering (GIABA), *Anti-money laundering and counter-terrorist financing measures: Mali Mutual Evaluation Report* (Dakar, Senegal: GIABA, 2019), https://www.fatf-gafi.org/media/fatf/documents/reports/mer-fsrb/GIABA-Mutual-Evaluation-Mali-2019.pdf.

291 Kim Grauer, Will Kueshner, and Henry Updegrave, *The 2022 Geography of Cryptocurrency Report* (New York, NY: Chainalysis, 2022), 86, https://go.chainalysis.com/rs/503-FAP-074/images/2022-Geography-of-Cryptocurrency.pdf?mkt_tok=NTAzLUZBUC0wNzQAAAGHk-qeKqqsOjkl1QxIGar6YtIc98aJFHReZQhpbkMJhak4i3DKCYHKxNrwoHBxiG3ofSPxAnY4W3z6hVe0NvSc4mMd5_Sg_c8_3TLVwVwNRwlm.

292 Business Compiler, "List of 51 Countries that Have Banned Cryptocurrency," *Business Compiler,* January 4, 2022, https://www.businesscompilerng.com/2022/01/list-of-51-countries-that-have-banned.html.

adopt Bitcoin as legal tender in defiance of its monetary policy regulator, the Bank of Central African States.[293] *Centre d'Innovation de Recherche Technologique et d'Industrie Créative* (CIRTIC), whose predecessor was the startup Group Famib, introduced the Kalisi cryptocurrency in Mali. The interviewee acknowledged a legal vacuum despite the recent adoption of a law on cryptography systems which regulates data communication and storage in secure and usually encrypted forms.[294] The interviewee shared that Mali should not have banned cryptocurrencies but should, rather, have come up with a regulatory framework, seeing as people were already using the digital currencies and unwilling to risk their incomes. However, given other regulatory gaps, such as the lack of online consumer protections for digital markets, this is not a priority. There are ongoing initiatives to create government-controlled cryptocurrencies—otherwise known as central bank digital currencies (CBDC)— such as the development of "Eco," the ECOWAS regional single digital currency. In 2016, UAEMO embarked on testing a potential, union-wide digital currency called eCFA in Senegal, but they canceled the project after BCEAO withdrew support.

NO ONLINE CONSUMER PROTECTION

Mali does not have an online consumer protection policy for digital markets. This is problematic, as several interviewees mentioned the high prevalence of consumer distrust in digital finance and e-commerce in Mali. Trust is a major barrier to participation in digital markets throughout the region.[295] Through BCEAO oversight at the Central Bank, deposit insurance only covers credit institutions and decentralized financial systems in Mali and other member states in the BCEAO zone. Funds held in a float account in a financial institution by an e-money issuer would be covered, but there are no pass-through provisions for stored value on individual mobile money accounts.[296] Although there is a 2010 Supplementary Act for Personal Data Protection, ECOWAS does not have an online consumer protection policy for digital markets. ECOWAS is working with member states on a regional directive on consumer protection and is revising the current ECOWAS Supplementary Act on Electronic Transactions within ECOWAS to increase confidence in online transactions.[297]

3.3. INFORMAL AND UNDERDEVELOPED E-COMMERCE

Interviewees recognized that Mali's e-commerce is underdeveloped and is developing slowly. The DNEN acknowledged that e-commerce was on the rise but that most activity was occurring on social media networks, mainly Facebook. The challenge for the transitional government is how to incentivize merchants to formally register.[298] E-commerce skills are lacking on both the supply and demand sides. Some suppliers are not knowledgeable enough to draw up sound proposals to be formal vendors for e-commerce sales platforms. Interviewees expressed that certain segments of the Malian population, particularly those who are older and less educated, are not aware of the existence of online shopping. More Malians turned to online shopping during the COVID-19 pandemic, though, which has helped raise awareness and appreciation for the convenience of e-commerce sales platforms.

293 Ryan Browne, "Central African Republic becomes second country to adopt bitcoin as legal tender," *CNBC,* April 29, 2022, https://www.cnbc.com/2022/04/28/central-african-republic-adopts-bitcoin-as-legal-tender.html.

294 CIRTIC and Cluster Digital Africa, Interview by DECA team, June 2022.

295 ECOWAS Commission, Interview by DECA team, August 2022, online.

296 Chadha, Kipkemboi, and Muthiora, *The Mobile Money Regulatory Index 2021 Regional & Country Profiles.*

297 ECOWAS Commission, Interview by DECA team, August 2022, online.

298 Public sector interviewee, Interview by DECA team, July 2022, online.

RELATED POLICIES EXIST BUT THERE IS NO NATIONAL FRAMEWORK FOR THE E-COMMERCE SECTOR

When *Mali Numérique 2020* was adopted in 2014, MCEN, along with the departments in charge of justice, commerce, and the interior, drafted four bills relating to the information society, cryptography, cybercrime, and e-commerce. The first three are now law, but there was no comprehensive national strategy or legislation for e-commerce at the time of this assessment. There are several basic laws in Mali that pertain to electronic transactions, including cross-border transactions, data protection, cybercrime, the interoperability of services, cybercrime, art and copyright, and the issuance of electronic certificates. However, there is no coordination, and policy gaps continue to exist for the sector. The most consequential law for the sector is Law No. 2016-012, which governs the transfer and exchange of data electronically through transactions, exchanges, and electronic services.[299] While Mali's Electronic Transactions Act's provisions cover the basic foundations of consumer law for conditions of sale to be disclosed, some of Mali's e-commerce platforms do not provide information making consumers aware of their rights in online sales. The law also addresses cross-border electronic transactions. However, Malian operators have difficulty interpreting laws of other countries.

At the time of this assessment, the ECOWAS Commission was developing the upcoming Regional E-Commerce Strategy, which will serve as a regulatory framework for member states to develop national strategies and legislation to close gaps in existing regulation. Côte d'Ivoire was the only regional peer with a national e-commerce strategy. Interviewees shared findings from regional e-trade readiness assessments carried out in several countries, including Mali, that informed the drafting of the regional strategy. Trade ministries like Mali's *Ministère de l'industrie et du Commerce* focus on infrastructure and digital technologies but do not coordinate or link up with trade activities in different industries in the digital economy. They also do not have a dedicated office or department for e-commerce. Consumers and businesses mistrust electronic payments as well as services or actions along the entire supply chain. The sector also lacks data monitoring systems at the national level, and only private companies gather their own data. The data is not centralized or publicly shared, which makes it difficult to understand the sector as a whole. In terms of inclusive participation, Mali is predominantly informal trade, and female participation in e-trade is low. There are concerns about how to introduce more entrepreneurs to e-commerce. Finally, as with the adoption of digital tools as a whole, there are significant gaps in literacy and in understanding how to effectively run a business, including utilizing e-commerce platforms.

DEVELOPING SALES PLATFORMS AND NO DIGITAL PAYMENTS

Private sector interviewees all mentioned an increase in e-commerce uptake over the last five years. Sodishop, the first sales platform in Mali, is only five years old (see Box 11). The other top e-commerce companies are Ziqqi, Damoushop, Malisuguba, Bisugu, FaniMali, Banaba, and Zhooma.[300] There are also platforms like Jumia Mali, a free classifieds advertising platform.[301] Jumia Mali provides clear guidelines warning consumers not to send mobile money or other digital transfers for payment until they have seen the product. This warning serves consumers well for this type of site. Many sales platforms do not seem to prominently offer disclosed conditions of sale and consumer redress mechanisms; this can discourage consumers from completing their purchases online.

299 UNCTAD, *Mali Evaluation rapide de l'état de préparation au commerce électronique* (Geneva, SW: UNCTAD, 2020), 32, https://unctad.org/webflyer/mali-rapid-assessment-e-commerce-readiness.

300 Sodishop, Interview by DECA team, July 2022.

301 Jumia Mali, "Jumia Mali," *Jumia Mali,* accessed November 18, 2022, https://ml.jumia.com/.

BOX 11: Sodishop - The first e-commerce platform in Mali

Sodishop acts as an intermediary between sellers and buyers and delivers in almost all regions, including Gao, Kayes, and Kita.[302] It has a website and mobile application and also has a business-to-business e-commerce platform. Sodishop shared that they often must begin new business operations with coaching the suppliers on basic e-commerce set up and their responsibilities before entering contractual agreements. The interviewee cited low literacy and low digital literacy as challenges and said Sodishop is focused on human-centered development of the platform.[303] Cash-on-delivery is the preferred method for their clients, but payments from mobile wallets are also accepted. Sodishop is developing their own payment product, Sodipay, to integrate into their platforms. Sodishop use their own fleet of motorcycles and cars for deliveries in different regions beyond Bamako and only use transport companies for much larger orders. Sodishop has faced challenges of long delays at the border when shipping products across borders. The company tried to partner with a local Burkina Faso agency for customers to receive their orders from the agency, but it has been too difficult to finalize such an arrangement.

Digital payments are not common for both customers and suppliers; even paper checks are a challenge for suppliers. Interviewees mentioned that consumers do not trust online platforms. While they may visit the platforms and order products, they avoid digital payments to close out purchases. Despite some platforms having integrated payment systems, most orders are cash-on-delivery. Customers can use Orange Money, eTouch, and other mobile wallets as well. WhatsApp is also integrated into some sites to allow customers to complete orders on the messaging platform. For example, Smart Market is an online market for fresh produce delivered for a flat fee anywhere in the Bamako area.[304] Although the website mentions that payments can be made by Visa Cards or Orange mobile money, customers are directed to an integrated WhatsApp messaging platform when they first click to order an item.

Cash-on-delivery also exposes e-commerce operators to an increased risk of experiencing losses. Sometimes orders are refused by customers when delivered because a younger household member, usually an older child, placed an order without a parent's knowledge or permission. This would not occur with digital payments, as customers would have paid before delivery. As mentioned earlier, not all e-commerce operators provide conditions of sale, including recourse information for consumers. This could be the reason why customers insist on cash-on-delivery as a way of managing their own level of risk and ensuring quality of service (or retaining the ability to receive refunds or exchanges if dissatisfied with the product).

WEAK LOGISTICS AND CROSS-BORDER FACILITATION

Poor road systems, the lack of automated logistics management, and a shortage of warehousing characterize Mali's logistics support system.[305] Regional experts mentioned poor support logistics infrastructure, costly transportation services, poor integration of the entire e-commerce value chain, as well as a faulty physical addressing system and a lack of postal delivery services.[306,307]

Smaller formal and informal e-commerce operators like Hogan Express, which was launched in 2021, do not have their own transportation fleet and rely exclusively on transportation services. While Hogan Express is only based in Bamako, they send deliveries throughout Mali. When someone orders equipment, it is sent to

302 Sodishop, Interview by DECA team, July 2022.

303 Ibid.

304 Smart Market, "Smart Market," *Smart Market,* accessed November 21, 2022, https://www.smart-market.ml/boutique/.

305 UNCTAD, *Mali Evaluation rapide de l'état de préparation au commerce électronique.*

306 ECOWAS Commission, Interview by DECA team, August 2022, online.

307 UEMOA, Interview by DECA team, August 2022, online.

them via Teliman Mali, a motorcycle taxi-service launched in 2018 for passengers and courier delivery services. The customer then receives their order directly from Teliman.

The United Nations Conference on Trade and Development (UNCTAD) also found that private sector companies prefer DHL and other private shipping companies like K-Xpress and GlobalPax over the national post office.[308] Several e-commerce operators expressed their lack of confidence in the national postal delivery service. Some mentioned that it had been years since they used the postal service, because packages were previously not delivered. A regional expert acknowledged that private shipping companies like DHL and smaller local courier companies like Telliman are filling the postal service gap, but the government needs to invest in reinventing *La Poste du Mali*.[309] They gave the example of an agreement between DHL and Tunisia Post for domestic and international deliveries. The post office offers partnerships to actors interested in developing or working in e-commerce services given its existing infrastructure and 85 branches across the country.[310]

The e-post project is underway and aims to digitally interconnect post office branches, mailing services (especially express mail), and applications for payments. The project also plans to establish remote service sites; these sites would enable consumers and businesses to perform mailing services like printing stamps and labels from home. At the beginning of 2017, *La Poste du Mali* installed an application that meets the Universal Postal Union standard. It allows for the exchange of electronic data with all postal operators and transport companies, including Air France, and with customs offices in Europe, Cameroon, and the United States. There is also a pending protocol agreement with Mali's customs department, *Direction Générale des Douanes Maliennes* (DGDM), to speed up customs clearing for faster processing of packages.

The website for *La Poste du Mali* offers e-commerce solutions for third parties. However, the link for merchants to register to be hosted on the platform is inactive. An interviewee with the postal service mentioned this program was still under development.[311] A regional expert was not aware of *La Poste du Mali's* e-commerce platform but mentioned an initiative of the Universal Postal Union to establish e-commerce platforms in various countries regionally with the goal of enabling regional e-commerce integration.[312]

DIGITIZED CUSTOMS CORRIDORS AND AN ONLINE TRADE PORTAL

As a member of UEMOA and ECOWAS, Mali is party to regional, multilateral, and bilateral trade agreements and also part of a customs union with ECOWAS member states.[313] As a landlocked country, Malian e-commerce operators also experienced difficulty in receiving products from outside the country during the sanctions period. As of 2017, 34 of Mali's 44 customs offices were computerized, and 1,085 women and 538 male customs agents were trained as part of DGDM's migration project to UNCTAD's ASYCUDAWorld, which is a web based portal that supports paperless declaration processing through the use of electronic documents for a country's customs. It was designed by UNCTAD, and is operational in over 80 countries. In 2019, UNCTAD also partnered with ECOWAS to implement a regional transit module to exchange information among the customs clearance systems in Burkina Faso, Benin, Cote d'Ivoire, Niger, and Togo. This system was tested in Mali in 2020. The protocol agreement mentioned by *La Poste du Mali* seeks to streamline the logistics processing

308 UNCTAD, *Mali Evaluation rapide de l'état de préparation au commerce électronique.*

309 Regional expert, Interview with the DECA team, August 2022, online.

310 Public sector interviewee, Interview by DECA team, July 2022, online.

311 Ibid.

312 Regional expert, Interview by DECA team, August 2022, online.

313 ECOWAS Trade Information System, "Trade Agreements," *ECOWAS*, accessed May 31, 2022, https://ecotis.projects.ecowas.int/?page_id=21944.

and management between this system and a post office that is undergoing the digital transformation of its services.

The online Trade Portal of Mali is another coordinated initiative between the *Ministère du Commerce et de la Concurrence* (DGGC), the *Ministère de la Promotion de l'Investissement et du Secteur Privé* (CTRCA), and the *Ministère de l'Industrie et du Commerce*. It provides a step-by-step description of import and export procedures in Mali and complies with the World Trade Organization (WTO) Trade Facilitation Agreement. The *Agence pour la Promotion des Investissements au Mali* (API) serves both Malian and foreign enterprises of all sizes. The API website includes an e-business registration service which takes up to 72 hours to process.[314] It includes information on tax payment, access to social security, trade regulations, land ownership procedures, visa and residence permit regulations, as well as information on tax exemptions, special economic zones (free zone), recruitment of personnel, and connecting to water and electricity utilities. In addition to a national single window, API operates regional single windows in Mopti, Sikasso, Kayes, and Ségou.[315]

Mali has various trade agreements that can be immediately operationalized to help with regional integration and digital trade. It ratified its African Continental Free Trade Area agreement in January 2019 and is an elected member of the United Nations Commission on International Trade Law (UNCITRAL) for the 2019 to 2025 time period. The U.S. and UEMOA have a Trade & Investment Framework Agreement (TIFA). In 2021, Mali was eligible for financing programs under the African Growth and Opportunity Act (AGOA), with the U.S. International Development Finance Corporation (DFC), and with the Export-Import Bank of the U.S. As mentioned earlier, Mali's AGOA eligibility may likely be reinstated in the coming year due to the lifting of ECOWAS sanctions. The U.S. suspended Mali from the AGOA trade preference program when ECOWAS sanctions were imposed in January 2022.

3.4. UNFAVORABLE REGULATORY ENVIRONMENT FOR TECH STARTUPS

There have been several actions by the government and the startup community to advance Mali's digital economy and business infrastructure. For instance, MCEN held co-sponsored activities with Impact Hub Bamako and organized the National Digital Council to encourage idea exchange between the government and the business sector. However, interviewees stressed that the government needs to focus on being better organized in order to act on finalizing the outstanding legislation, which could contribute to solving most of the problems tech startups face in the current environment.

DELAYED STARTUP ACT AND LACK OF CONDUCIVE POLICIES

Interviewees highlighted poor government organization to act or follow up on policies that would create a more conducive environment for startups. While Mali has a law for Small- and Medium-Sized Enterprises (SMEs) under a 2015 UEMOA directive, Startup Acts are more suitable laws that are necessary to facilitate innovation and the scaling of tech startups. This is because tech startups tend to be unique and bear greater risk than other types of businesses making it difficult for them to access traditional financing.[316] In 2018, the government co-created the Startup Act with the Mali Startup Association and other actors in the startup ecosystem; the Council of Ministers adopted the Startup Act in 2019. Currently, as of 2022, the DNEN and the Mali Startup Association are collaborating to lobby the National Council of the Transition and the TGOM to adopt the bill

314 Créez Votre Entreprise En Ligne, accessed May 2022, https://mali.eregistrations.org/.

315 Agence pour la Promotion des Investissements au Mali, accessed May 2022, https://apimali.gov.ml/directory/.

316 Jordan Wolken, "Startup Acts are the next form of policy innovation in Africa," *Atlantic Council*, December 9, 2020, https://www.atlanticcouncil.org/blogs/africasource/startup-acts-are-the-next-form-of-policy-innovation-in-africa/.

and its implementing decree.[317] A regional expert attributed the delay in ratification to frequent changes in the ministry and a unilateral focus on technology startups at the expense of all other sectors.[318] While interviewees were encouraged by the resumption of discussions, most remained skeptical that the government would act quickly.

Existing policies are also obstacles for tech startups. There are no policy incentives for lower tax treatments, preferential public procurement from startups, and suitable capital financing structures. While business owners under 40 have discounted rates on taxation, startup companies complained that the tax burden is still too high. Law No. 2019-056 on the Suppression of Cybercrime (mentioned in the previous pillar) requires companies to cooperate with criminal investigations, allowing authorities to intercept, seize, or copy data.[319] Companies must therefore use technical capabilities that enable authorities to intercept communications. The Suppression of Cybercrime Law is problematic, because it does not specify how seized data is protected and does not provide criteria for surveillance or notice regarding when communications are intercepted. This ambiguity threatens the intellectual property of innovative startups, which can be at risk for theft.

LOW INNOVATION, NO COMPETITION, AND INFORMAL OPERATIONS

An interviewee described the typical Mali entrepreneur as a "dreamer" rather than as an innovator, expressing that there is not enough competition to motivate true innovation.[320] A telecom market expert stressed the need to increase the number of startups and companies that develop mobile and web-browser applications in order to meet user demand.[321] Interviewees reported low technical capacity and the general lack of an entrepreneurial culture in Mali, except among second-generation entrepreneurs or those who have had exposure abroad.

Most startups operate informally due to the cost barriers of formal business registration, the high tax burden, operational costs, as well as inadequate infrastructure, frequent power cuts, and low internet penetration, all of which hinder the smooth operation of ICT-related or ICT-enabled businesses.[322] Access to capital through traditional financing channels is particularly difficult for startups compared to SMEs. This could be addressed by a Startup Act designed to improve the terms for accessing local financing for tech startups. Given the high-risk nature of startups during the ideation development stage, venture capital funding is the most ideal source of funding before innovations progress to market.

WELL-ORGANIZED HUBS AND ACCELERATORS BUT LOW CAPACITY

Startup support in Mali, particularly to founders, is well-organized through hubs, accelerators, and even associations. Some key hubs and accelerators in Mali's tech-startup scene include Donilab, Impact Hub Bamako, Jokkolabs, Createam, and Teteliso. Impact Hub Bamako was formed in 2016 and provides support to entrepreneurs from ideation to growth through training, assisting with financing searches, and providing a shared workspace.[323] Donilab is a hub that was established in 2015 and focuses specifically on technology and agriculture. They have about 1,000 clients and primarily target women, offering co-working space, incubator and accelerations services,

317 Mali Startup Association, Interview by DECA team, July 2022.

318 Regional expert, Interview by DECA team, June 2022.

319 Simone Toussi, "New Mali Cybercrime Law Potentially Problematic to Digital Rights," *CIPESA*, February 21, 2020, https://cipesa.org/2020/02/new-mali-cybercrime-law-potentially-problematic-to-digital-rights/.

320 Donilab, Interview by DECA Team, June 2022, online.

321 Telecom market expert, Interview by DECA Team, June 2022, online.

322 Regional expert, Interview by DECA team, June 2022, online.

323 Impact Hub, Interview by DECA team, July 2022, online.

a fabrication lab, and research and development support. Donilab operates in Bamako, Ségou, Sikasso, Mopti, and Ménaka. They also have a presence in France to attract diaspora investors and mentors.[324]

Umbrella organizations include the Mali Startup Association and the organization of innovation incubators (CNIECIM/Mali Innov). WomenTech Mali is another association that was established in 2016 for young ladies who are passionate about science, technology, engineering arts, mathematics, and design. They are based in Bamako but have programs throughout Mali such as the "Mali Tech Tour," a series of workshops to train young women on topics like how to use social networks to build a brand and activism. WomenTech Mali's objective is to offer visibility to women leaders in the field such that they can serve as success stories for younger people. The association offers resources, capacity building, skills development, and a support community in which young women can inspire and encourage each other in their innovations.[325] Through Afrilabs, the Mali Business Innovation and Incubation Center (Nyetaa Mali) provides technical, business, and mentoring support to young innovators.

There has been a pattern of emphasizing ideation through competitions. This includes the MaliApp Challenge in 2016, which was organized by Orange Mali with the support of Impact Hub and Impact Creative.[326] MCEN used to host a startup pitch competition called Tech Friday every last Friday of the month, where three winners won prizes worth one to five million CFA ($1,500 USD to $7,500 USD). In 2019, MCEN also gathered 200 startups for a competition, where the three best startups were selected to travel to Silicon Valley. In the previous year, two startups, Lenali and Yelen Solar, represented Mali in Las Vegas at CES, a consumer electronics and tech trade show, in 2018.[327] Mali Digital Awards is an annual digital competition, rewarding innovation in digital devices and honoring men and women in the field. It is organized by the Dashili Business Solutions Agency in partnership with La Centrale and supported by Mali's *Ministère De L'Emploi Et De La Formation Professionnelle*.

While the innovative community is well-organized, the activities have focused primarily on competitions, training, and mentoring programs and there seems to be low capacity to support progression past ideation. The economic model for these actors is not self-sustainable and relies on donor funding. The lack of support or capacity beyond ideation may be a symptom of this model. Interviews with hubs and associations all emphasized the lack of business know-how, understanding of the entrepreneurial ecosystem, access to financing, and a conducive policy environment for innovative entrepreneurs to scale sustainably.

3.5. INCREASED SUPPLY OF DIGITAL TALENT BUT LOW JOB READINESS

In the past, few job training institutions existed in Mali, but there are now more public schools and universities. These include the University Institute of Management (IUG); the University Institute of Technology (IUT); and the Institute of Applied Sciences (ISA) at the University of Technical Sciences, Technology, and Management of Bamako (USTTB). Though companies have less difficulty finding students to recruit for employment from local training centers,[328] UEMOA mentioned that a fund to provide scholarships to citizens of member states,

324 Regional expert, Interview by DECA team, June 2022, online.

325 WomenTech Mali, Interview by DECA team, June 2022, online.

326 The World Bank, "The MaliAppChallenge Competition Encourages Young Malian Entrepreneurs to Innovate Using Digital Technologies," *World Bank*, May 16, 2016, https://www.worldbank.org/en/news/feature/2016/05/12/young-entrepreneurs-tackling-development-challenges-with-technology-win-the-maliappchallenge.

327 Consumer Technology Association, accessed November 17, 2022, https://www.ces.tech/.

328 WomenTech Mali, Interview by DECA team, June 2022, online.

including Mali, was under development in order to address the shortage of ICT professionals.[329] A public sector interviewee and a regional representative mentioned the need to incorporate more practical applications in training programs as well as short courses to meet real-time demand for expertise.[330,331] A multimillion dollar government initiative funded in 2011 was likely disrupted by the 2012 coup and would have contributed to non-traditional IT training needs (see Box 12).

BOX 12: The Bamako Digital Complex

In 2011, the government secured a $22.5 million USD loan from the African Development Bank to create *le Complexe Numérique de Bamako* (Bamako Digital Complex).[332] The goal was for the complex to be a research and innovation hub, as well as a training center for digital talent and innovative businesses.

Three pillars of the project were identified in an implementation plan carried out from 2011 to 2017.[333]

- A Techno Center to build human capital, increase competitiveness, and create jobs, especially for youth. It would train 30 ICT engineers, 120 technicians, 600 civil servants, and 150 job seekers per year and would increase women's participation in development.
- A Techno Park housing a data center, business incubators, and technology firms.
- A Techno Village - a convention center to showcase the latest innovations in various development sectors, hosting events gathering experts, researchers, and academics from Africa and globally.

At the time of this assessment, there were no known buildings associated with the initiative. While there does not seem to be recent implementation activities related to the initiative, one public sector interviewee indicated that a new director had been appointed, was assembling a team, and had resumed dialogue with the African Development Bank with the intent to finance the construction of the complex at an industrial site previously purchased for that purpose.[334]

DISPERSED TRAINING INITIATIVES AND LACK OF COORDINATION IN SPECIALTY TRAINING

There are several other ICT training initiatives across the ecosystem driven by partnerships between donors and NGOs rather than by a national-level strategy or a roadmap for building ICT expertise in diverse specialties. One example is the GENESIS Startups Mali program, which is a joint initiative between the NGO Eureka Group and the IAS at USTTB in partnership with national employers and vocational training institutes. Kabakoo Academies is a Malian education technology company building the first pan-African learning platform for digital and decentralized manufacturing skills. In partnership with the National Directorate of Vocational Training Centers, CIRTIC offers training programs in the programming of solutions, blueprint development, offshore engineering services, custom solution development and integration, and auditing and information systems. Their headquarters is in Bamako, but they work in several African countries, including Côte d'Ivoire, Niger, and Rwanda. In addition, CIRTIC has customers in France and the U.S. This exposes local students to practical and international expertise, higher standards for quality and service expectations, and global trends in emerging innovations.

329 UEMOA, Interview by DECA team, August 2022, online.

330 Public sector interviewee, Interview by DECA team, July 2022, online.

331 UEMOA, Interview by DECA team, August 2022, online.

332 ICA, "Mali to receive AfDB loan for IT complex," *Le Consortium pour les infrastructures Afrique*, September 12, 2011, https://www.icafrica.org/fr/news-events/infrastructure-news/article/mali-to-receive-afdb-loan-for-it-complex-2273/.

333 African Development Fund, *Bamako Digital Complex Support Project: Appraisal Report* (Tunis, TU: African Development Fund, 2011), https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Mali_-_AR_TechnoMali_Project_.pdf.

334 Public sector interviewee, Interview with DECA team, July 2022, online.

Specialized training occurs on an as-needed basis, which again highlights the lack of a cohesive strategy or national roadmap. For instance, a regional expert shared that ECOWAS provides customized training for each member country. Public sector workers receive training when ECOWAS provides new equipment and receive standard training from their implementing partners for different projects.[335] About two years ago, ECOWAS conducted a national cybersecurity assessment training in Mali. In August 2022, ECOWAS launched HackerLab 2022, a regional competition on cybersecurity. The goal of the competition was to spark interest in cybersecurity professions. Fifteen teams from the member states were expected to compete at the regional level after national-level competitions were coordinated by the ICT ministries of each member state.[336] Mali's team, secureit webreakit, won the national competition in August but were not invited to attend the regional competition in October along with teams from Burkina Faso and Guinea due to sanctions.[337]

INTERNATIONAL RECRUITING TO ALLEVIATE LOW QUALITY IN DIGITAL TALENT SUPPLY

Local ICT training programs may not be meeting industry needs; one interviewee shared that locally-trained developers often have difficulty being hired.[338] For years, the lack of development or tech expertise to support the digital economy has resulted in work being outsourced internationally or to local companies with the financial means or foreign partnerships.[339] Interviewees mentioned that Malian nationals in the diaspora are often recruited to work in the tech sector; this was noted by both a FinTech company and an innovation hub that work with several startups.[340],[341]

Before the 2020 coup, the *Cellule Technique de Co Développement du Mali* and AFD co-funded a project called *Construire le Mali* to improve the quality of the local workforce. The initiative was a two-year project and advocated for pairing up local talent with members of the Malian diaspora, hopefully mitigating the need for companies to recruit workers internationally.[342] The donors partnered with Malinovv, the innovation incubators organization, and its member organizations—Createam, Donilab, Impact Hub Bamako, Jokkolabs Bamako, and Tetelisoto.

335 Regional expert, Interview by DECA team, August 2022, online.

336 Ibid.

337 Africa Cybersecurity Magazine, "Burkina Faso, Guinea and Mali are excluded from HackerLab 2022!," *Africa Cybersecurity Magazine,* September 27, 2022, https://en.cybersecuritymag.africa/index.php/burkina-faso-guinee-et-mali-sont-exclus-du-hackerlab-2022.

338 WomenTech Mali, Interview by DECA team, June 2022, online.

339 MicroSave Consulting, *Inclusive FinTechs in Francophone Africa: Mali country report.*

340 Donilab, Interview by DECA team, June 2022, online.

341 Wave, Interview by DECA team, June 2022, online.

342 Le Projet Construire le Mali, accessed November 15, 2022, https://construirelemali.cynomedia.com/le-projet/.

SECTION 3:

Recommendations for USAID/Mali

The international development community can support and strengthen Mali's digital ecosystem in many ways. This section outlines recommendations for specific actions and partnerships as well as general guidance for digitally-enabled programming. The list is organized by DECA pillar and cross-cutting themes

Table 2 below summarizes each recommendation as follows:

- **What:** Links to the recommendation details
- **Why:** Provides the motivation or intended impact of the recommendation
- **How:** Summarizes the approach the international development community can take to implement the recommendation

The **detailed recommendations section that follows** provides further explanation of how the international development community can implement each recommendation

When acting on any of these recommendations, information on best practices in digital development program design can also be helpful; the Principles for Digital Development[343] and the USAID Digital Investment Tool are great resources. The section below provides background and guidance on how to best use these resources.

343 These principles are nine living guidelines that provide best practices for every phase of the project life cycle. They were created in consultation with various international development organizations, including USAID.

TABLE 2: Summary of DECA recommendations

	WHAT?	WHY?	HOW?
PILLAR 1: DIGITAL INFRASTRUCTURE & ADOPTION			
1	Expand connectivity and increase affordability for the last mile through: (1) research and demonstration and (2) support for regulatory reform in conflict environment	Reduced digital divides and increased connectivity for all; strengthened telecom market regulation; and increased internet affordability	Connect stakeholders through demand aggregation. Evaluate the feasibility of alternative connectivity solutions. Facilitate technical support for AMRTP and TGOM through international expertise. Provide direct technical assistance to the TGOM.
2	Promote digital inclusion: invest in locally relevant and accessible content	Decreased digital divides; access to services; and increased economic opportunities for all	Broaden availability of voice-to-text and other audio-based services for low literacy populations. Foster partnerships with regional innovation labs.
3	Collaborate with public and private stakeholders to scale existing e-learning and e-health opportunities	Access to services and increased economic opportunities for all	Convene a coordination event for all digital health stakeholders. Build partnerships with the private sector to help digitize education, increase utilization of national digital health information systems, and improve community health surveillance and reporting. Collaborate with stakeholders working on Mali's Virtual University.
PILLAR 2: DIGITAL SOCIETY, RIGHTS, AND GOVERNANCE			
4	Empower CSOs, media, and citizens to counter disinformation	Increased community engagement and understanding and reduced polarization	Support resilience against disinformation through government advocacy. Design open-source, credible content for raising awareness. Engage with influential local media partners. Train community-based fact checkers.
5	Reinforce freedom of expression online and open government principles through capacity building and developing transparency promotion platforms	Strengthened media and CSOs as sustainable vanguards for digital rights and democracy; enhanced collaboration and transparency to ensure a safe, secure, and responsive digital ecosystem	Strengthen Mali's Internet Governance Forum through engagement and research. Facilitate the development of a transparent legal framework for open government. Evaluate and assess the feasibility of open government principles.
6	Strengthen cyber hygiene awareness and capacity among Malian CSOs	Increased safety and security for civil society and media; increased trust and the safe use and adoption of digital tools and services	Test, strengthen, and build the capacity of partner systems. Build cyber hygiene capacity through existing mechanisms. Advocate for online safety and conduct public awareness-raising campaigns.

	WHAT?	WHY?	HOW?
7	Shape the building blocks of government digitization in Mali	Improved enabling environment for digital government initiatives to flourish	Support the development of a digital government national strategy. Advocate for a sustainable and adequate governance structure. Reinforce an enabling legal framework for the development of digital government, including data governance regulation. Collaborate with international organizations to foster public-private partnerships for e-government. Advocate for the creation of a Mali Digital Services unit. Promote a national general interoperability framework and resource mutualization.
8	Strengthen government understanding and application of cybersecurity processes	Safer and more resilient digital systems and networks that ensure security, privacy, and long-term sustainability	Support the TGOM to design a robust national cybersecurity strategy. Develop cybersecurity awareness and workforce in public administration.
PILLAR 3: DIGITAL ECONOMY			
9	Support the adoption of a new comprehensive framework for the digital economy	Sustainable development of Mali's digital economy	Support the validation and adoption of the 2023-2027 digital strategy. Support the adoption of the national financial inclusion strategy. Advocate for the use of RegTech solutions for oversight in financial services. Support experimentation through regulatory sandboxes. Facilitate multi-stakeholder participation in drafting a national e-commerce strategy. Support the policy dialogue to enact an inclusive Startup Act for all startups. Facilitate coordination and regional dialogue.
10	Lower barriers to entry and increase usage of digital finance	Increased access, trust, adoption, and use of transactional digital platforms	Support providers to develop and operate consumer redress mechanisms. Increase the capacity of consumer advocacy groups to raise awareness about consumer rights and redress in digital financial markets.
11	Promote innovation and the digital transformation of startups and MSMEs	Increased innovation and pathways to formalize businesses and develop e-commerce systems	Support startups and local enterprises to develop innovations and scaling solutions to increase market integration. Support enterprises in existing programming to expand to transactional sales platforms. Support workforce development initiatives that focus on increasing ICT specialization.

DETAILED RECOMMENDATIONS

1. EXPAND CONNECTIVITY AND INCREASE AFFORDABILITY FOR THE LAST MILE THROUGH: (1) RESEARCH AND DEMONSTRATION AND (2) SUPPORT FOR REGULATORY REFORM IN CONFLICT ENVIRONMENT

In Mali, interviewees described a rapidly evolving but unstable connectivity environment. Despite advances in connectivity infrastructure, gaps in access and affordability persist, especially in rural areas.

A. Evaluate the feasibility of alternative connectivity solutions. USAID, GSMA, and others have identified alternative ways to expand rural connectivity in areas where commercial investments may not be feasible. One such example is community networks, where communities lead the implementation and maintenance of internet networks and use of specific portions of spectrum. The Internet Society of Mali (ISOC-M) has identified the deployment and development of community networks as a focus of its 2022 Action Plan. The international development community could partner with ISOC-M to evaluate how community networks can work best in a conflict environment such as Mali. Other solutions might include the use of TV White Space (TVWS), which utilizes unused frequencies between 470 and 790 MHz to expand connectivity, and Free Space Optical Communication (FSOC), which refers to the transmission of data via a modulated beam of light through the air, or free space, between two line-of-sight points.

B. Build on and facilitate technical support to the AMRTP and TGOM through international experts. The international development community could work with the TGOM to organize events exploring the country's telecom policy and regulation. The international development community could work with the U.S. Telecommunications Training Institute (USTTI), which has already conducted training in Mali and has a relationship with the country's regulator.

C. Provide direct technical assistance to the TGOM. After identifying specific policy areas in which to intervene, the international development community should coordinate with other potential reform actors, such as the World Bank and USTTI. Topics could include: developing recommendations for and providing trainings on optical fiber cable regulations, strengthening the country's Universal Access Fund, improving the sustainability of the country's Internet Exchange Point, TVWS regulations, strengthening the Network Type Approval Regime, and strengthening FM Radio compliance.

KEY RESOURCES

- Barriers to investing in last-mile connectivity (USAID, 2020)
- Infrastructure and Community Development (Internet Society, 2022)
- Closing the Coverage Gap: How innovation can drive rural connectivity (GSMA, 2019)
- Better Connectivity, Better Programs: How to Implement a Broadband Demand Aggregation Program (USAID, 2018)
- A4AI Policy and Regulatory Good Practices (A4AI, 2022)

2. PROMOTE DIGITAL INCLUSION: INVEST IN LOCALLY RELEVANT AND ACCESSIBLE CONTENT

Mali's low level of literacy and a lack of locally-tailored content make it challenging to roll out inclusive digital development programming.

A. Broaden voice-based options. The international development community can explore partnerships with other organizations working on natural language processing (NLP) to complement Mali's linguistic diversity. NLP is a subfield of artificial intelligence that uses computers to process human language. While machine

translation is available between English and other high-market-value languages, others languages are often left out in the cold. Speakers of these languages may find it difficult to not only participate in development programming but also to access life-saving information online. A few organizations are already working to close this gap, including Translators without Borders and Uliza, a South Africa-based startup.

The international development community may also consider partnerships with regional research institutions, like Google's AI lab in Accra, Ghana, to explore text-to-voice conversion for Sahelian languages.

Mozilla's Common Voice team has also been building a publicly available voice dataset with volunteers to help voice-enabled technology work for underrepresented groups.

KEY RESOURCES

- Promoting Local Content Hosting to Development the Internet Ecosystem (Internet Society, 2015)
- Teaching on WhatsApp: Leadership and Storytelling for Grassroots Community Organization (Grassroot, MIT GOV/LAB, 2022)
- Digital Inclusion for Low-Skilled and Low-Literate People (UNESCO, 2018)
- Digital Literacy Primer (USAID, 2022)

3. COLLABORATE WITH PUBLIC AND PRIVATE STAKEHOLDERS TO SCALE EXISTING E-LEARNING AND E-HEALTH OPPORTUNITIES

Health and education practitioners are working to expand the reach and effectiveness of digital tools and systems, but interoperability and policy challenges remain, hindering the advancement of both sectors.

A. Convene a coordination event for all digital health stakeholders. Improved coordination would enable practitioners and public authorities to create tools better aligned and integrated with Mali's national health information system, DHIS-2. The international development community can build on the work of ANTIM that held the first workshop to create a national digital health coordination platform in early 2022.

B. Build partnerships with the private sector to digitize education. The international development community can also partner with private and public stakeholders working to expand digital education tools and resources in Mali's low-resource environment. The international development community can build partnerships with private sector startups, such as DoniyaBlown, to explore how to scale these efforts in a more sustainable way.

C. Collaborate with stakeholders working on Mali's Virtual University. The international development community can work with Mali's tertiary education ministry, MESRS, to establish a virtual university in the country. The project's objective is twofold: to support existing virtual training and face-to-face training and to offer accredited degrees and courses in both.

KEY RESOURCES

- A Review of Digital Health Strategies in 10 Countries With Young Populations: Do They Serve the Health and Wellbeing of Children and Youth in a Digital Age? (Frontiers in Digital Health, 2022)
- A Successful Trial of Digitized Health Records in Mali (MEASURE Evaluation, 2020)
- Gender Digital Divide Primer (USAID, 2020)
- A Vision for Action in Digital Health 2020 - 2024 (USAID, 2020)

4. EMPOWER CSOS, MEDIA, AND CITIZENS TO COUNTER DISINFORMATION

As the fault lines of Mali's conflict move online, digital platforms may be used to stoke social tension through disinformation and hate speech. In this context, the international development community can support Malian CSOs and media to enable civil peace by strengthening their capacities to fight disinformation and counter cyber threats.

A. Support resilience against disinformation through government advocacy. The international development community can advocate for access to reliable information with the TGOM. The international development community can engage major digital rights and freedom CSOs that understand local conflict dynamics and learn from them regarding their experiences countering disinformation.

B. Analyze sources of MDM and design open-source, credible content for raising awareness. The international development community can also consider collaborating with government, academic institutions, and selected CSOs to identify a "watch list" of key issues in the country, map MDM sources, and co-sponsor local media research to understand the nature of MDM in Mali.

C. Engage with influential local media partners. The international development community can collaborate with Mali's vibrant digital media community to produce conflict-sensitive digital content, manage crisis moments, and develop software applications that help people access verified and truthful information.

D. Train community-based fact checkers. Capacity building programs can also include training on how to set up and reinforce existing units and teams for fact checking and unpacking disinformation. The international development community can engage with government, academic institutions, and CSOs to launch community-based networks and online group moderators who specialize in the identification and management of disinformation.

KEY RESOURCES

- Conflict and Online Space in the Sahel: Challenges and Recommendations. Issue Brief (Jiaxuan Yue, et al., Search for Common Ground, 2022)
- Global Terrorism Index 2022: Measuring the Impact of Terrorism (Institute for Economics & Peace, 2022)
- Livre Blanc de la société civile pour la paix et la sécurité au Mali (CONASCIPAL Mali, 2019)
- Mali's Fake News Ecosystem: An Overview (Lassane Ouedraogo, Centre for Democracy & Development, 2022)
- Le soutien de l'Union européenne à la société civile malienne : méthodes et résultats (Alix Vuitton, Département de Science Politique, Faculté des Arts et Sciences, Université de Montréal, 2021)

5. REINFORCE FREEDOM OF EXPRESSION ONLINE AND OPEN GOVERNMENT PRINCIPLES THROUGH CAPACITY BUILDING AND DEVELOPING TRANSPARENCY PROMOTION PLATFORMS

The international development community can work to strengthen Malian CSOs, help online media outlets withstand digital repression, and reinforce transparency in Mali.

A. Support all the actors working to protect digital rights and the freedom of online expression in Mali. The international development community could play a driving role in reinforcing the efforts of actors working to protect digital rights and online free expression in Mali, including CSOs, online platforms and media outlets, and traditional press.

To do this, the international development community can help the TGOM, as well as targeted CSOs and online media, benefit from technical support provided by regional partners

In addition, the international development community can explore partnering with regional organizations working on digital rights and freedoms in West Africa.

B. Strengthen Mali's Internet Governance Forum through engagement and research. The international development community can engage each part of the country's digital ecosystem to reactivate Mali's Internet Governance Forum (IGF). Interviewees emphasized that a reinvigorated IGF should be a truly multi-stakeholder structure, inclusive of different voices and involving participants from different geographies within the country and with an equitable gender representation.

C. Develop the use of transparency-promoting digital platforms within the Malian administration. The international development community can also support the development of the legal framework to enable the adoption of transparency-promoting digital platforms, such as open data sets, e-participation platforms, and open procurement platforms. Once a legal framework is in place, the international development community can support the use of these platforms, and help the GOM release and leverage public sector information and data and account for potential risks and necessary safeguards.

KEY RESOURCES

- Facilitating Access to Open Government Data: Frameworks and Practices (US-Support for Economic Growth in Asia, a joint project of USAID and the U.S. Department of State, Workshop on Facilitating Access to Open Government Data, July 27, 2022)
- 2020 Civil Society Organization Sustainability Index for Sub-Saharan Africa (USAID, International Center for Not-for-Profit Law, & FHI360, 12th Edition, November 2021)
- Is open data working for women in Africa? (Ana Brandusescu and Nnenna Nwakanma, World Wide Web Foundation 2018)
- Digital Rights at a Crossroads: Recommendations for Advancing Human Rights and Social Justice (Global Partners Digital, 2021)
- Civil society in the digital age in Africa: identifying threats and mounting pushbacks (Centre for Human Rights, University of Pretoria, and the Collaboration on International ICT Policy in East and Southern Africa2020)

6. STRENGTHEN CYBER HYGIENE AWARENESS AND CAPACITY AMONG MALIAN CSOS

While CSOs and independent media are underprepared to efficiently counter cyber risks, many Malian citizens are also lacking in basic digital hygiene awareness.

A. Test, strengthen, and build the capacity of partner systems. The international development community can work to improve cyber hygiene among civil society and disseminate these practices among targeted social groups. It can also train partners on best practices, such as deleting chat histories, using strong passwords, keeping documentation of data breaches, and procuring licensed software.

B. Advocate for online safety and conduct public awareness-raising campaigns. The international development community can consider online safety awareness campaigns that provide citizens with simple digital security tips via multiple online platforms.

KEY RESOURCES

- Civil Society Organizations' Cyber Resilience - Leaving No Civil Society Organization Behind in Cyber Resilience (United Nations University, 2021)
- Navigating Cybersecurity: Guidance for (I)CSO Professionals (Solidarity Action Network, International Civil Society Centre, & CyberPeace Institute, 2022)
- DigitHarium (a global forum to discuss and debate digital transformation within the humanitarian sector, with a focus on humanitarian protection, policy, ethics, and action)

7. SHAPE THE BUILDING BLOCKS OF GOVERNMENT DIGITIZATION IN MALI

The international development community can partner with the TGOM to create a well-designed and sustainable digital transformation. These efforts include setting up the necessary institutional and legal instruments, as well as the development of interactive public e-services.

A. Support the development of a National Digital Government Strategy (NDGS). The international development community should work with representatives from the public sector, private sector, civil society, and academia to co-create a clear, inclusive, and flexible three-year digital government roadmap. The international development community should also promote the establishment of a governance structure with strong leadership and increased effectiveness

B. Advocate for a sustainable and adequate governance structure. The international development community can advocate for a governance structure to steer the NDGS and oversee its action plan. NDGS projects are multi-departmental, requiring strong coordination between stakeholders and consistent effort to improve legal instruments, change or connect administration business processes, ensure information exchanges and services, and implement technical components.

C. Reinforce an enabling legal framework for the development of digital government, including data governance regulation. The international development community can help the government to update and improve the existing digital regulation framework by supporting its efforts to ensure that the right enabling laws are in place, by guaranteeing data privacy and security, and by accelerating digital government development. In addition, the international development community can explore the best way to approach persistent legal inconsistencies.

Moreover, the international development community can:

- Advocate and support updating and improving data governance regulation
- Provide specific technical expertise when it comes to completing a digital regulatory framework through adequate legal statutes and texts
- Facilitate the development of a transparent legal framework that anchors open government values, such as transparency and accountability, into the country's digital regulatory framework.

D. Collaborate with international organizations to foster public-private partnerships for e-government. The international development community can support and facilitate public-private partnerships to help identify and build out priority, interactive public e-services. Interactive e-services require making data available around the clock for simple tasks, like downloading forms and searching government databases. Also, these services can later be upgraded to become transactional and include more complex tasks, like business registration, birth registration, and land titling.

E. Advocate for the creation of a Mali Digital Services unit. The international development community could also advocate for the creation of a "Mali Digital Services" unit (similar to the U.S. Digital Service) at *Agence des Technologies de l'Information et de la Communication* (AGETIC). Such a unit would host engineers and software developers from Malian private-sector companies and/or very active CSOs who would apply their technical skills to build and improve citizen-centric services, including websites and mobile apps. Ideally, such a scheme would improve the quality of e-government while providing a professional development opportunity and capacity building for government officials and technologists.

F. Promote a national general interoperability framework and resource mutualization. The international development community can also support the government's digitalization by providing adequate support to lay the groundwork for incremental, sustainable, and integrated e-services development.

KEY RESOURCES

- Digital Government: Foundations for Global Development and Democracy (Center for Sustainable Development, Brookings Institution, 2021)
- Challenges and Opportunities of Digital Transformation in the Public Sector in Transition Economies: Examination of the Case of Uzbekistan (Gulnoza Kuldosheva, Asian Development Bank Institute, 2021)
- Interoperability Framework for e-Governance (IFEG) Version 1.0 (Government of India, Department of Electronics and Information Technology, Ministry of Communications and Information Technology, 2015)
- E-Government Development Index (Department of Economic and Social Affairs, Division for Public Institutions and Digital Government, United Nations)
- GovStack (Federal Ministry for Economic Cooperation and Development, Gesellschaft für Internationale Zusammenarbeit , Estonia, ITU, DIAL)
- The Digital Impact Alliance (DIAL; housed at the United Nations Foundation; originated to bring the public and private sectors together to realize an inclusive digital society that connects everyone to life-enhancing and life-enabling technology)
- African Data & Digital Dialogues Report: Cross-Border Digital Policies for Africa - Scoping, Framing, and Mapping Trends (Internet & Jurisdiction Policy Network, 2021 & 2022)
- Étude Analytique des Politiques Nationales sur l'Usage de l'Internet et des Réseaux Sociaux au Mali Fondation des Médias d'Afrique de l'Ouest (MFWA) (Sadou Abdoulaye Yattara, CIPESA, 2020)
- Scalable e-Government Solutions for Developing Countries via the GovStack initiative (ITU, Government of Estonia, Bundesministerium wirtschaftliche Zusammeenarbeit und Entwicklung, DIAL, 2021)
- E-Government Survey 2020: Digital Government in the Decade of Action for Sustainable Development (Department of Economic and Social Affairs, United Nations, 2020)

8. STRENGTHEN GOVERNMENT UNDERSTANDING AND APPLICATION OF CYBERSECURITY PROCESSES

Cybersecurity is essential to protecting information in contexts of security crises, but the TGOM's capacity is low.

A. Support the TGOM to design a robust national cybersecurity strategy. The international development community can work with the public sector, civil society, the private sector, and academia to elaborate and execute a national cybersecurity strategy that serves as an action plan to improve the security and resilience of national infrastructure and services. This should be done through a co-creation approach, as frequent government turnover is often a challenge to policy making and implementation.

The targeted national cybersecurity strategy should close gaps in cybersecurity law, specifically by completing the legal framework for key public infrastructure, which is necessary to set up digital certificates and digital signatures. The national cybersecurity strategy should outline plans to better secure government data, build stronger systems to detect cyber attacks, and protect critical internet infrastructure. It should also help to improve information sharing on detected attacks with all relevant stakeholders

B. Develop cybersecurity awareness and workforce in public administration. To anchor a better and more secure digital environment for government, as well as for businesses and citizens, the international development community can work with local universities, vocational institutes, and international partners

- » Develop the cybersecurity awareness campaigns necessary for keeping officials and administration partners alert.
- » Design cybersecurity curricula for the next generation of Malian cybersecurity professionals.

KEY RESOURCES

- 2020 ITU Global Cybersecurity Index (International Telecommunication Union, 2021)
- Global Cybersecurity Capacity Program (World Bank, 2019)

- Cyber Security Capacity Building in Developing Countries: Challenges and Opportunities (Lilly Pijnenburg Muller, Norwegian Institute of International Affairs, 2015)
- Cybil Portal (a knowledge database for cyber capacity building programs operated by the Global Forum on Cyber Expertise)
- Guide to Developing a National Cybersecurity Strategy – Strategic Engagement in Cybersecurity (ITU et al., 2018)

9. SUPPORT THE ADOPTION OF A NEW COMPREHENSIVE FRAMEWORK FOR THE DIGITAL ECONOMY

As Mali emerges from sanctions and plans for democratic elections, it is crucial that the TGOM coordinate policies to ensure a comprehensive framework for Mali's digital economy.

A. Convene a multi-stakeholder validation exercise of the 2023-2027 digital strategy. Government coordination is key to developing digital economies. The international development community can support the government's capacity to host a series of validation workshops for soliciting feedback across agencies, as well as from practitioners, to ensure a high quality, comprehensive strategy.

B. Support the adoption of a national financial inclusion and financial education strategy. In order to build trust in digital financial platforms as well as bridge the gender digital divide, it is important to also address demand-side barriers to financial inclusion. The international development community could mobilize a multi-stakeholder steering committee to solicit input on the pending national financial inclusion strategy to establish a coordination plan for the effective implementation of programs and ensure it aligns with WAEMU's regional financial inclusion strategy and incorporates a national strategy for financial education.

C. Support the use of RegTech solutions for market oversight. The international development community could promote the use of RegTech[344] solutions. This could help financial authorities and companies monitor regulatory compliance and identify gaps in market oversight that could help close loopholes exploited by informal transfer services such as *hawalas*.

D. Support a national regulatory sandbox. To enhance competition, the international development community could set up a sandbox[345] to encourage the testing of innovative FinTech products and integrated e-commerce solutions.

E. Support a steering task force to draft and adopt a national e-commerce strategy. The international development community could support the National Digital Council's capacity to convene private sector actors as well as CSOs to co-create a national e-commerce strategy. In addition, stakeholders could map and evaluate relevant existing policies and support the TGOM to participate in activities targeting ECOWAS member states.

F. Facilitate efforts to ratify the Startup Act. The international development community could work on a policy forum that includes non-tech startups to help revise provisions to ensure greater inclusivity. Mali's neighbor and key trade partner, Senegal, is the only country in the region with a Startup Act.

KEY RESOURCES:

- FinTech Partnerships Playbook (USAID, 2019)
- State of the Industry Report on Mobile Money 2021(GSMA, 2021)
- Consumer Protection in Mobile Financial Services (Alliance for Financial Inclusion, 2014)
- National Strategies For Financial Education OECD/INFE Policy Handbook (OECD, 2015)
- ECOWAS Regional E-Commerce Strategy (UNCTAD, 2021)

344 RegTech is the management of regulatory processes within the financial industry through technology. The main functions of RegTech include regulatory monitoring, reporting, and compliance.

345 A sandbox refers to an isolated—but fully functional—testing environment where software, applications (apps), and programs can be tested.

- Member States of the Economic Community of West African States eTrade Readiness Assessment (UNCTAD, 2022)
- E-Commerce and Digital Economy Program Year In Review 2020: Facilitating inclusive digital economies in challenging times (UNCTAD, 2021)
- Startup Acts: An emerging instrument to foster development to high growth (Investment Climate Reform Facility, 2021)

10. LOWER BARRIERS TO ENTRY AND INCREASE USAGE OF DIGITAL FINANCE

While mobile money and interoperability have contributed to expanding financial inclusion in Mali, data and interviewees confirm that the country's low levels of engagement with digital finance can be attributed to a lack of trust and a lack of understanding.

A. Support the private sector in developing and operating consumer redress mechanisms for digital payments. The forthcoming ECOWAS Regional E-Commerce Strategy contains guidelines for member states to develop and enforce online consumer protections that follow international best practices for consumer protections in digital markets. The international development community could engage with financial service providers and e-commerce to provide customers with clear and accessible information about redress mechanisms and to ensure the processes are enforced consistently.

B. Increase the capacity of consumer advocacy groups to raise awareness about consumer rights and redress in digital financial markets. The international development community could support CSOs to advocate for online consumer protections and the enforcement of consumer redress mechanisms. An example would be to support the activities of consumer rights groups that are involved in addressing consumer complaints and facilitating dispute resolution.

KEY RESOURCES:

- Consumer Protection in E-Commerce: OECD Recommendation (OECD, 2016)
- Human-Centered Design for Financial Products: Workshop Facilitator's Guide (USAID, 2019)
- Women & Money – Insights and a Path to Close the Gender Gap (IDEO.org, 2019)

11. PROMOTE INNOVATION AND THE DIGITAL TRANSFORMATION OF STARTUPS AND MSMES

By developing a business e-registration portal as well as the e-signature certification service, the TGOM is demonstrating a commitment to making it easier for businesses to operate in the digital economy. Interviewees confirmed, however, that e-commerce is still very informal and underdeveloped in Mali.

A. Support startups and local enterprises to develop innovations and access scaling solutions to increase market integration. The international development community can strengthen the capacity of incubators and accelerators to be more effective in providing support to more startups and successfully catalyzing their progression from ideation to market. This can be done by facilitating access to technical and business expertise, establishing public-private partnerships, increasing access to staged funding or venture capital, and enabling integration with international markets.

B. Support workforce development initiatives that focus on increasing ICT specialization. The international development community can partner with existing ICT training institutions to increase the specialization and job readiness of ICT professionals.

KEY RESOURCES:

- USAID Development Innovation Ventures
- Building Resilient and Inclusive Digital Ecosystems: A Toolkit for Using Digital Payments in Development Programs (USAID, 2020)

Appendices

A. DEFINITIONS

Definitions from USAID DECA Toolkit unless otherwise mentioned.

Affordability: Whether a person can afford the cost of data relative to their income, measured as gigabytes (GBs) of data per percentage of monthly income. The Alliance for Affordable Internet (A4AI) uses a *"1 for 2"* measure for affordable internet—affordable internet is where 1GB of mobile broadband data is priced at 2 percent or less of average monthly income.

Agent/Branchless banking: The delivery of banking services outside conventional bank branches, usually through a network of agents equipped with point-of-sale devices or mobile phones. Agents can take many forms, including as individuals conducting business at small shops, petrol stations, and supermarkets. Financial services provided by agents can include cash-in and cash-out points, credit, loans, insurance, bill payment, and person-to-person transfers.

Censorship: The suppression of free speech by governments or private institutions based on the assumption that said speech is objectionable or offensive. In addition to hard forms of censorship (handed down officially through laws and regulations), soft forms of censorship exist (applied through financial and/or reputational pressure).

Civil Society Organization (CSO): Organizations including formal non-government organizations (NGOs) as well as formal and informal membership associations (labor unions, business and professional associations, farmers' organizations and cooperatives, and women's groups). CSOs articulate and represent the interests of their members, engage in analysis and advocacy, and conduct oversight of government actions and policies.

Cyber Hygiene: The practices and steps that users of computers and other devices take to maintain system health and improve online security. These practices are often part of a routine to ensure the safety of identity and other sensitive details that could be stolen or corrupted.

Cybersecurity: The prevention of damage to, the protection of, and the restoration of computers, electronic communications systems, electronic communications services, and wire and electronic communications, including information contained therein, to ensure its availability, integrity, authentication, confidentiality, and non-repudiation.

Data Governance: Policies, strategies, frameworks, and practices that governments implement to regulate data collection, management, use, and sharing in the public and private sectors. This broad topic can include data privacy practices, data sovereignty, data stewardship roles and authorities, cross-border data flows, regulations on AI, and data infrastructure (e.g., open data portals and interoperability layers).

Data Privacy: The right of an individual or group to maintain control over and confidentiality of information about themselves. Data privacy can be at risk both from unintentional sharing and from undue or illegal gathering and use of data about that individual or group.

Data Protection: The practice of ensuring the protection of data from unauthorized access, use, disclosure, disruption, modification, or destruction, to provide confidentiality, integrity, and availability.

Digital Divide: The distinction between those who have access to the internet and can make use of digital communications services and those who find themselves excluded from these services. Often, one can point to multiple and overlapping digital divides, which stem from inequities in access, literacy, cost, or the relevance of services. Factors such as high cost and limited infrastructure often exacerbate digital divides.

Digital Economy: The use of digital and internet infrastructure by individuals, businesses, and governments to interact with each other, engage in economic activity, and access both digital and non-digital goods and services. As the ecosystem supporting it matures, the digital economy might grow to encompass all sectors of the economy—a transformation driven by the rise of new services and entrants, as well as backward linkages with the traditional, pre-digital economy. A diverse array of technologies and platforms facilitate activity in the digital economy; however, much activity relies in some measure on the internet, mobile phones, digital data, and digital payments.

Digital Ecosystem: The stakeholders, systems, and enabling environment that together empower people and communities to use digital technology in order to gain access to services, engage with each other, or pursue economic opportunities. Although certain aspects of the digital ecosystem have country-wide reach, other features differ across geographies or communities. USAID's framework for understanding the digital ecosystem is structured around three pillars: Digital Infrastructure and Adoption; Digital Society, Rights, and Governance; and Digital Economy.

Digital Financial Inclusion: The use of digital technology to reach financially excluded and underserved populations with a range of formal financial services that are suited to their needs and are responsibly delivered to customers and sustainable for providers.

Digital Financial Services (DFS)/FinTech: Financial services enabled by or delivered through digital technology (e.g., mobile phones, cards, the internet). DFS (e.g., payments, credit, insurance, savings, advisory) can be offered by a range of providers, from banks to a host of non-bank financial institutions, such as microfinance institutions, digital credit providers, payment providers, technology vendors, and electronic money issuers.

Digital Government: The use of digital technologies, as an integrated part of government modernization strategies, to create public value. This includes how the government manages internal information technology (IT) processes and systems, delivers citizen- and business-facing e-services, and engages with the public through digital channels. Digital government is often used interchangeably with terms like "e-governance" and "e-government."

Digital Literacy: The ability to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital devices and networked technologies for participation in economic, social, and political life. This may include competencies that are variously referred to as computer literacy, ICT literacy, information literacy, and media literacy.

Digital Payments: Payments initiated or received by electronic means. For an end-user, these payments might be made through a text message, mobile application, website, or merchant-level point-of-sale device, such as a dongle or QR code. A financial institution—e.g., bank, switch, MFI, or payment service provider—might facilitate these payments to or from a range of instruments. Instruments might include: prepaid wallets

(i.e., electronic money accounts), cards, transaction or bank accounts, and other instruments that serve as stores of value and permit payments.

Digital Repression: The use of digital tools and technology to suppress internet freedoms and includes five techniques—surveillance, censorship, social manipulation and harassment, internet shutdowns, and targeted persecution of online users. This term can include offline actions taken to penalize online speech (e.g., arrests, physical violence), as well as online actions that seek to suppress freedoms in online and offline spaces.

Digital Rights: The fundamental rights and freedoms that individuals can exercise online, as well as a respect for privacy and ownership of data.

Digital Trade: The delivery of products and services over the internet by firms in any industry sector and of associated products such as smartphones and internet-connected sensors.

Disinformation: False information that is deliberately created or disseminated with the express purpose to cause harm. Producers of disinformation typically have political, financial, psychological, or social motivations.

E-commerce: The sale or purchase of goods or services, conducted over computer networks by methods specifically designed for the purpose of receiving or placing orders.

Financial Access Point: Locations where individuals can carry out banking or transaction activities such as cash withdrawals, deposits, or balance checks. These include, for example, ATMs, bank branches, and banking agents.

Emerging Technologies: Technologies for which ethical, policy, and regulatory frameworks are struggling to keep pace with the rate of technological progress. They often lack rigorous testing in the real world, so their implications on people and societies remain less well-understood. These include artificial intelligence (AI), the internet of things (IoT), blockchain, drones, and 3D printing, among others. As these technologies become more affordable and widespread, they may have a significant impact on digital ecosystems and on development more broadly.

Information and Communications Technology (ICT): Diverse set of technological tools and resources used to transmit, store, create, share, or exchange information. These technological tools and resources include computers; the internet (websites, blogs; and emails); live broadcasting technologies (radio, television, and webcasting); recorded broadcasting technologies (podcasting, audio and video players, and storage devices); and telephony (fixed or mobile, satellite, video-conferencing, etc.).

Internet Freedom: The online exercise of human rights and fundamental freedoms regardless of frontiers or medium. Where internet freedom is respected, the same rights that people have offline are also protected online.

Internet Service Provider (ISP): An organization that delivers access to end-users using both fixed-line and wireless technologies. Wireless ISPs (especially those in rural areas) often seek to take advantage of low licensing and equipment costs by delivering service using unlicensed spectrum. ISPs range in size and scope from small, local providers to providers with international and even global reach.

Interoperability: The ability of computer systems or software to exchange and make use of information from other systems. For example, interoperable data systems allow for data sharing and reuse with common formats and definitions, and interoperable payment systems allow digital transfers of money between different financial service providers.

Internet Governance: The development and application by governments, the private sector, and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the internet.

Last-Mile Connectivity: Where the end-users access the internet using devices (mobile phones, laptops, tablets, computers) through local access networks.

Malinformation: The deliberate publication of private information for personal or private interest, as well as the deliberate manipulation of genuine content. Note that these pieces of information are based on reality but are used and disseminated to cause harm. An example is a report that reveals a person's sexual orientation without public interest justification.

Media Literacy: The ability to access, analyze, evaluate, create, and participate with messages in a variety of forms—from print to video to the internet. Media literacy builds an understanding of the role of media in society as well as essential skills of inquiry and self-expression needed for citizens of a democracy.

Misinformation: Information that is false but not intended to cause harm. For example, individuals who do not know a piece of information is false may spread it on social media in an attempt to be helpful. Note that disinformation is a type of misinformation—disinformation refers to misinformation that is spread with malicious intent.

Mobile Money: A technology that enables people to receive, store, and spend money using a mobile phone. Can also be referred to as a mobile wallet or e-money.

Mobile Network Operator (MNO): An entity that provides voice and data services primarily via wireless terrestrial networks. MNOs typically use licensed spectrum bands, which, due to the fact that they are not shared, tend to deliver a higher quality, more reliable (and more cost-intensive) service.

OpenGovernment Data: A philosophy—and increasingly a set of policies—that promotes transparency, accountability, and value creation by making government data available to all.

Radio Spectrum: Refers to the range of frequencies of electromagnetic radiation that are used to deliver radio transmissions. A critical function of telecommunications sector regulatory authorities is to designate specific frequency ranges (or bands) for different purposes, including telecommunications (but also for applications such as radio astronomy or other industrial uses). Some bands (e.g., WiFi) are *unlicensed*, meaning that anyone can use them without seeking explicit prior permission. *Licensed* spectrum requires users (e.g., commercial cellular networks or FM radio broadcasters) to secure a regulator's approval prior to use. Licenses are typically assigned through spectrum auctions, which seek to establish the economic value of spectrum, a finite natural resource.

Transparency: An environment where governments and public officials engage in the clear disclosure of rules, plans, processes, and actions in a form that is readily accessible to all. Transparency promotes accountability by providing the public with information about what the government is doing.

Universal Service Fund (USF): A mechanism designed to promote network infrastructure development in areas that commercial access providers deem uneconomical. Essentially established as subsidy programs, USFs are resourced through contributions drawn from the revenues of telecommunications operators. USF funds are often applied to help de-risk or otherwise complement network investments in underserved (or unserved) areas. In many cases, USFs target projects that serve schools, hospitals, and other anchor institutions where demand for services can be aggregated.

Virtual Currency: No globally accepted definition exists, but a virtual currency can be considered a digital representation of value intended to be used as a medium of exchange, unit of account, or store of value. It is not issued by a government and not treated as legal tender. As an umbrella term, virtual currency can include fully decentralized cryptocurrencies like Bitcoin as well as alternatives that are issued, stored, transacted, or redeemed in a centralized fashion. Virtual currencies are distinguished from proposed government-issued digital forms of cash, typically referred to as central bank-issued digital currencies (or CBDCs).

B. METHODOLOGY

The Mali DECA included three components:

A. **USAID/Mali engagement:** USAID/Mali designated a Mission DECA Team from the USAID/Mali program office. The Mission DECA team helped identify stakeholders; reviewed relevant documents during planning, interviews, and the analysis and report-writing stages; and attended select interviews during the interview phase.

The Mission DECA Team also helped organize the introduction presentation and the recommendations workshop with USAID/Mali on June 16, 2022 and August 11, 2022, respectively. These meetings were important for socializing the DECA's purpose and preliminary findings across various USAID/Mali technical offices.

This engagement was important not only for ensuring an appropriate mix of interviewees but also for building the research team's understanding of USAID/Mali's priorities.

A. **Desk research:** The desk research used a standardized template organized around the three pillars (digital infrastructure and adoptions; digital society, rights, and governance; digital economy). The desk research included three components: 1) review of USAID/Mali's CDCS, funding allocations, and digitally relevant programming; 2) quantitative analysis of open-source data and indices to produce regional comparisons (e.g., GSMA, World Economic Forum, International Telecommunication Union); and 3) internet research guided by high-level questions under each pillar about the state of Mali's digital ecosystem.

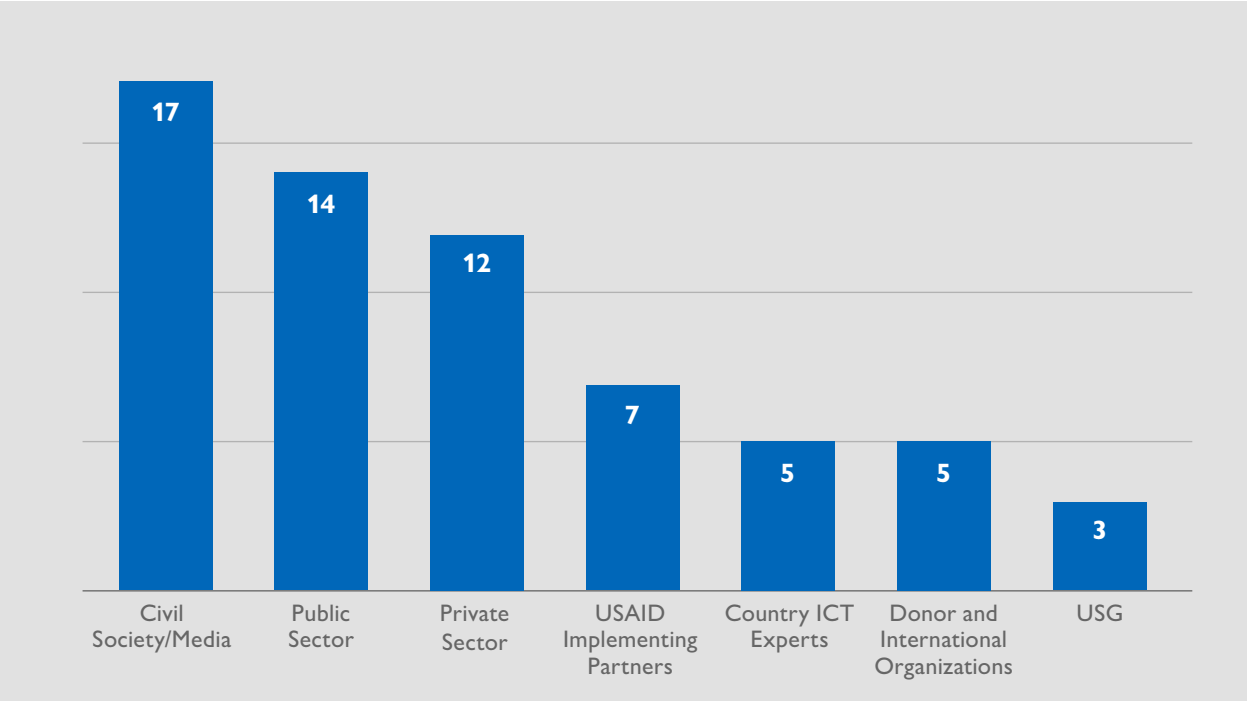
The research team shared the desk research with the Mission DECA Team prior to conducting interviews and used it to inform the interview guide questionnaires.

A. **Interviews:** The research team hired a local partner (the interview team) with experience in data systems and qualitative and quantitative research in Mali and West Africa. The interview team developed a risk analysis and specific protocols around identifying and conducting outreach to key stakeholders. Through the interview team's networks, and through USAID/Mali, the research team compiled a list of target stakeholders and secured interviews with informants from civil society, academia, international organizations, and the private and public sectors. Additional interviewees were added throughout the research process through referrals from completed interviews.

During the interview phase, the interview team conducted anywhere from two to ten interviews per week. Due to the security context and language, the research team prepared interview guides for the interview team who translated and facilitated each interview. Each interviewee was asked a general set of questions, which were developed before the interview phase, as well as questions tailored to be targeted to interviewees and based on learnings from previous interviews.

To ensure a diverse mix of interviewees, the research team evaluated the list of scheduled interviews and conducted additional outreach in an attempt to fill identified gaps. The graph below and Appendix C show the 63 interviews by sector (17 female interviewees and 77 male interviewees).

FIGURE 15: Mali DECA interviews, by sector



Analysis

The research team conducted the bulk of the preliminary analysis during the virtual interview phase. During the interview phase, the interview team delivered finished interview guides at the end of the week or the beginning of the following week. The research team reviewed the notes and added comments, noting additional questions we could ask and identifying gaps in our understanding. Once a week, during the nine weeks of interviews, the research team consulted with the interview team on progress, challenges, learnings, and new interviewees. Midway through the interviews, the research team identified primary themes based on these initial findings. Upon completing the interview phase, the research team convened to revisit these themes, confirmed their validity against some interview notes, and proceeded to organize the findings around the three pillars outlined in this report (digital infrastructure and adoption; digital society, rights, and governance; and digital economy).

Limitations

Research team members were limited, to an extent, by their technical expertise. Research team members were chosen to provide coverage of key technical areas identified in a preliminary review. This may introduce some bias—weighting the specializations of team members more heavily than other possible technical areas.

Many interviewees were selected through USAID/Mali's, the research team's, and the interview team's networks, which may have excluded stakeholders who are less comfortable engaging with U.S. government representatives. Most interviews took place virtually; as a result, information is limited to urban-based interviewees' knowledge and lessons learned from their work across the country.

Research team

The research team was composed of three digital development generalists and specialists; team members who are technical experts reviewed interview notes relevant to their expertise.

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