



USAID
FROM THE AMERICAN PEOPLE

DIGITAL DEVELOPMENT IN SUB-SAHARAN AFRICA

MAPPING FINDINGS REPORT



Digital Development in Sub-Saharan Africa Mapping Findings Report

- I. Introduction _____ 1
- II. Methodology _____ 3
 - A. Data Sampling Strategy _____ 3
 - B. Data Normalization _____ 4
- III. Summary of Findings _____ 6
- IV. Conclusion _____ 15



I. Introduction

Sub-Saharan countries are undergoing an unprecedented digital transformation. Digital technology is revolutionizing industries, governments, economies, and societies. However, this transformation also brings risks of inequality, repression, and political and social instability. Importantly, there is growing recognition that digital technologies are being used by governments to repress, censor, surveil, and mislead their citizens. Digital tools can be used to accelerate and scale tactics that undermine the ability of citizens to exercise their basic rights and to hold their governments accountable. While citizens and civil society leverage digital tools such as social media and private messaging to communicate, organize, and advocate, repressive governments and non-state actors are innovating digital responses just as quickly. Thus, supporting robust digital ecosystems that are open, inclusive, secure, and beneficial to all is more important than ever.

In 2021, the Conflict, Peace-Building, and Governance Division in the Africa Bureau (AFR/SD/CPG) commissioned a [Landscape Assessment](#) to better understand the links between digital development and digital repression in sub-Saharan Africa and develop strategies to counter such repression. Primary findings of the assessment pointed to a lack of literature that addresses the benefits and the risks of digital development and a similar lack of solutions to this vexing issue. There is a need and an opportunity to proactively design USAID digital programming with an integrated awareness of digital repression and privacy risks. In order to develop potential solutions, it is necessary to analyze the range of digital interventions being deployed in sub-Saharan Africa.

The amount of evidence generated inside and outside of USAID programs continues to expand at a rapid rate, presenting another challenge and opportunity to utilize data in decision-making. As more evidence has been collected, it has been very difficult to sift through the ever-increasing amounts of information, make sense of it, and use that comprehension to improve the efficacy and efficiency of USAID programming. While the Landscape Assessment research project was intended to provide a retrospective look at USAID's past digital investments, it also uncovered a need to better leverage methods for evidence aggregation and apply them at greater scale and speed to foster a more complete understanding of USAID's digital development portfolio—including the digital repression risks to that portfolio—in sub-Saharan Africa.

To answer these challenges, CPG commissioned this mapping exercise through a competitive process, and selected DevelopMetrics based upon their unique methodology, which leverages emerging technologies and machine learning (ML) capabilities that enable evidence aggregation and syntheses of thousands of documents. As a result of DevelopMetrics' findings, CPG was able to provide insights into four broad research questions:

1. How has USAID allocated foreign assistance to digital development interventions over the past six decades, and to what extent has this allocation shifted over time?
2. What are the key trends in digital repression, and how do they map to trends in USAID's digital programming?
3. What are key lessons learned and recommendations from digital development interventions?
4. What project objectives have been associated with digital development interventions, and to what extent have these objectives been successful?

The following paper presents a comprehensive analysis of digital development interventions in sub-Saharan Africa, highlighting ten key findings that are summarized below:

1. Digital repression safeguards are underrepresented in USAID's Digital Development Portfolio.
2. Machine learning (ML) can support USAID's knowledge management process by automating data processing, identifying patterns and trends, making predictions, and enabling the discovery of new insights and the more efficient and effective use of data.
3. Sub-Saharan Africa shows significant differences in the adoption and effectiveness of interventions across nations.
4. Geospatial Data and Digital Government interventions, based on the weighted score, have been the most successful among all digital interventions.
5. E-commerce and Data Governance interventions, despite being used infrequently, have demonstrated positive results.
6. A lack of coordination, sustainability, local ownership, and connectivity are the most-common underlying challenges for digital development interventions.
7. Capacity-Building and providing access to information and communication technologies (ICT) are the most widely used digital development interventions in sub-Saharan Africa.
8. The Health sector employs the most digital development interventions, followed by the Agriculture sector.
9. The research shows that historically, digital development interventions have primarily been implemented to achieve objectives such as improved decision-making, increased productivity, expanded access to information, and enhanced human capacity.
10. The findings from this mapping exercise demonstrate the efficiency gains to USAID's overall knowledge management could be greatly enhanced by ML technologies. The trends and insights gained from this exercise could be applied, improved, and expanded and improved through a range of future research options.

II. Methodology

A. DATA SAMPLING STRATEGY

As the largest resource for USAID-funded technical and project materials, the Development Experience Clearinghouse (DEC) is an online database mandated to store all data collected by USAID and USAID’s contractors (USAID 2020). The sample size for this exercise included 11,276 final evaluations and final contractor/grantee documents extracted from the DEC database and restricted to countries in sub-Saharan Africa. These two categories of documents contain rich descriptive detail of interventions and outcomes implemented by projects going back as far as the 1960s. To ensure accuracy and comprehensiveness, a comprehensive review of academic literature and referenced data from reputable sources such as the Digital Ecosystem Evidence Map, Afrobarometer, and Freedom House was conducted. A vast array of documents was meticulously examined and cross-referenced, ultimately resulting in a sample size of 808 relevant academic articles on digital development being used to support the findings. A summary of the data sources used can be found in Table 1.

TABLE 1: DATA SOURCES

Source	Type	Selection Criteria	Sample Size
Development Clearing House	Final Evaluation & Final Grantee Report	Geography: Sub-Saharan Africa	11,276 documents
Digital Ecosystem Evidence Map	Academic Articles	Geography: Sub-Saharan Africa	808 digital development, 238 Sub-Saharan Africa
Afrobarometer	Survey	a) Year: 2019/2021 b) Geography: Sub-Saharan Africa c) Digital Development-specific data	1,200-2,400 cases per country, 49 countries
Freedom House	Numerical Ratings	Global Freedom, Internet Freedom, Democracy Status	49 countries

As the research was primarily based on USAID final evaluations, the analysis may be subject to a range of limitations. For example, the analysis did not include incomplete or inadequate documentation of ongoing projects, meaning that the impacts of these projects are not included in this report. Additionally, it is possible that several of the final evaluations analyzed may have contained insufficient or ambiguous information, which could have led to some inaccurate or incomplete results being reflected in this study. Despite these limitations, the research was found to provide valuable insights into the current state of digital development interventions in sub-Saharan Africa and highlight potential improvements for project design, implementation, and evaluation.

B. DATA NORMALIZATION

To normalize thousands of data sources into a common data architecture, the project built a taxonomy of the Digital Development sector in a multi-phase process. First, ML was employed to extract mentions of each intervention, which all had some form of digital component, from 808 digital development academic articles. For the purposes of this exercise, an intervention is defined as a deliberate action taken within a population to produce a certain development outcome, and the outcome is defined as the positive or negative effect produced by an intervention (Belcher and Palenberg 2018; Organization for Economic Co-operation and Development 2002). Next, the taxonomy categories underwent technical review by digital development technical experts and were further refined. Finally, semi-supervised ML technology was leveraged to map the interventions to the taxonomy described in USAID evaluations using a proprietary set of algorithms peer reviewed by the United Nations (United Nations University, Maastricht).

Machine learning technology was used in this search in order to capture a broader range of results than a normal keyword search by connecting words with related meanings, resulting in a much broader range of results. Algorithms utilize advanced mathematical and computational techniques to contextualize words within the framework of their usage within a sentence. For example, the algorithm will flag words that do not have the same root but are related, such as democracy, independence, and freedom, as similar. As a result, the algorithm is able to categorize similar interventions that are described differently from the taxonomical term.

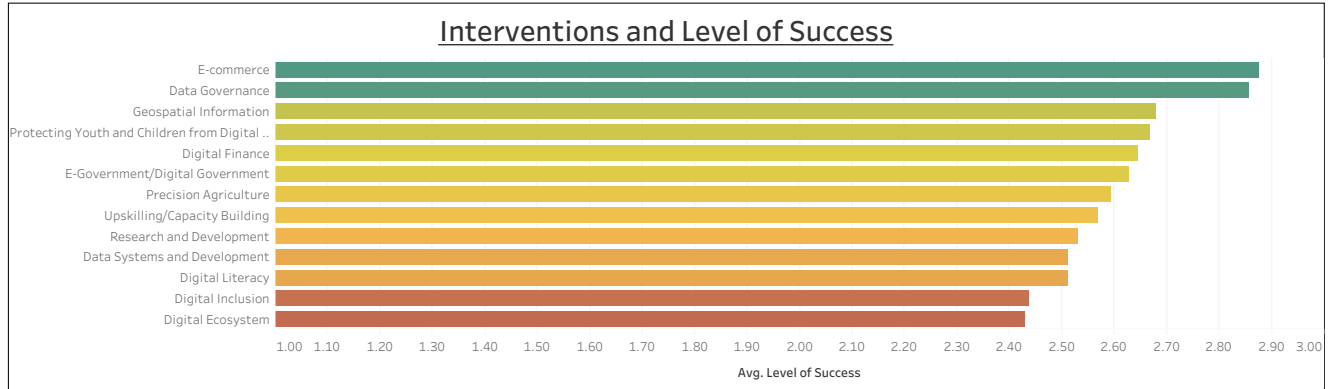
This methodology resulted in a final taxonomic catalog of all USAID digital interventions and outcomes, including clear definitions for each variable and older terms for digital development to capture data from other decades (see the taxonomy in [Appendix A](#)). The taxonomy includes three orders of codes, from the most general to the most specific. For example, “technology” is a first-order code that is very general. Under this first-order code, there are many second-order codes such as “financial technology,” “digitalization,” and “management information systems.” Second-order codes are more specific about what type of first-order code—in this case, “technology”—is being implemented. The most detailed level of code is the third-order code. For example, under the second-order code “financial technology,” “mobile money” is a third-order code which specifies which type of financial technology is being implemented.

Once completed, the taxonomy enabled the research team to normalize data from thousands of qualitative reports in the DEC, as well as data from Freedom House and Afrobarometer, into a quantitative dataset. The algorithm identified and extracted the text relevant to each mention of a digital development intervention and outcome which resulted in over 4,000 data points. A rating of the degree to which each intervention contributed to achieving the desired outcomes was also assigned based on the sentiment of the text as either positive or negative and categorized in a Likert scale of 1-3, as defined by experts (see definition in the Appendix A: Digital Development Taxonomy). The algorithm output was continuously verified and refined by a Technical Review Committee of digital development experts. All data was aggregated into the [Digital Development Dashboard](#), as seen in Figure 1 below, which displays key analytics at the intervention level.

FIGURE 1: DIGITAL DEVELOPMENT DASHBOARD

Digital Development in Sub-Saharan Africa

Distribution of Projects per Country	Analysis by Country	Interventions and Level of Success	Lessons Learned and Recommendations	Analysis by Sector	Popularity Over Time	Popularity vs Digital Trends	Intervention Frequency
--------------------------------------	---------------------	---	-------------------------------------	--------------------	----------------------	------------------------------	------------------------



Project Name	Intervention	Cleaned Excerpt
Liberia Teacher Training Program	Connectivity	Accordingly, as designed, the MOE now has one of the most resilient and “ecologically green” technical infrastructures in Africa. It includes, as planned, the HQ building for 140 workstations, each of which requires only 13 watts of power to operate (via power over ethernet Thin Clients operating under CIT all MS Office products and protocols), a highly trained IT Support staff, and modern presentation equipment. The LTTP supported HQ office redesign helps solar capacity that allows the MOE ICT infrastructure to operate without mains power. The MOE has already been cited by USAID engineers, soon to be mentioned in all of Africa.
	Data Systems and Development	Education Management Information System (EMIS) From 2012-2015, LTTP successfully built the capacity of the EMIS team to conduct the Annual School Census collection and analysis activity, informing all planning and budgetary decisions. LTTP designed the census questionnaire and “trained the trainers” in each county to correctly complete the census form. Numbers of schools captured in the census grew over time (virtually increased by 250% from 2012 to 2015) across religious/mission, community, and technical and vocational education and training (TVET) schools across the country. LTTP’s annual EMIS deliverable, the Annual School Census and survey results from year to year. Yearbooks were printed each year from 2012-2014 and are used by senior MOE officials and international partners to track outcomes for Liberian school children. PDF versions of the handbooks can also be downloaded from the MOE website.



III. Summary of Findings



FINDING ONE

Digital repression safeguards are underrepresented in USAID's Digital Development Portfolio.

Despite the growing use of digital technologies and the increasing threat of their misuse by malicious actors, project evaluations in the sub-Saharan Africa region have not adequately addressed digital repression risk factors. The research found that less than one percent of projects in the region considered the five tactics of digital repression: surveillance, Internet shutdowns and disruptions, disinformation and social manipulation, censorship, and targeted persecution. Of the limited mentions of digital repression risk factors that were found, misinformation was the most frequently referenced, appearing in six projects. Disinformation was the second most-common, mentioned in three projects. Other digital repression tactics, such as limiting Internet freedom, Internet blackouts, and intentionally widening the digital divide were each mentioned in a single project. This suggests that projects may not be taking these risks into account during the design, implementation, or evaluation stages.

Additionally, interventions aimed at protecting against digital threats—such as cybersecurity, data governance, and digital harm interventions—also occurred less than expected, or not at all, within projects. This finding highlights key gaps related to the potential for negative externalities related to USAID's digital programming. For example, given the increase in digital interventions within the education sector, protecting youth and children from digital harm should be prioritized. While it is possible that ongoing projects that were not included in the sample size due to lack of sufficient documentation are currently focusing more on these interventions, an interview with an expert in protecting youth and children from digital harm noted a lack of safeguards in donor funded digital programs. See Figure 2 for a graphic summary of which expected interventions did not occur (represented in blue) or occurred less than ten times (represented in teal).



FINDING TWO

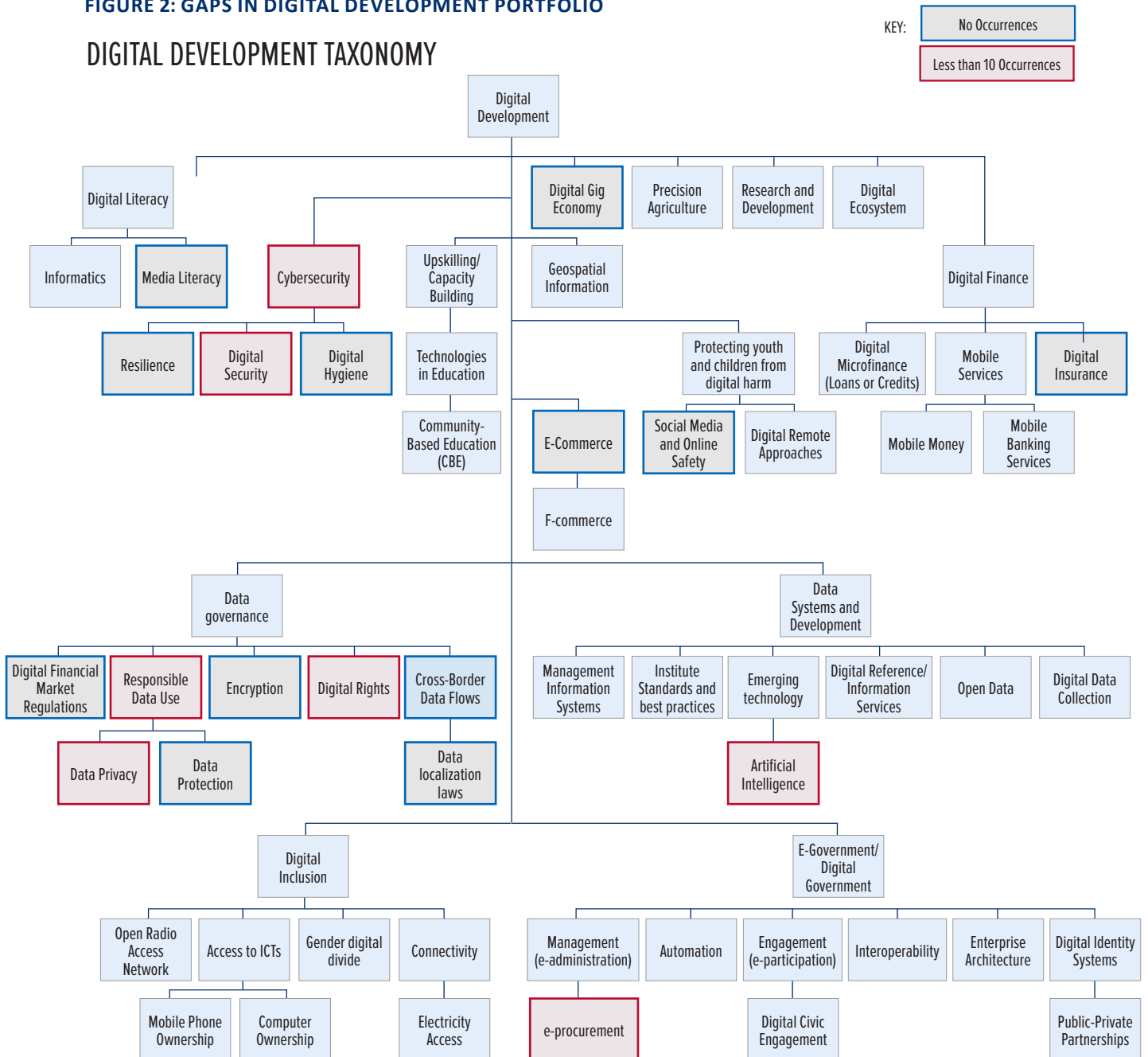
Machine learning (ML) can support USAID's knowledge management process by automating data processing, identifying patterns and trends, making predictions, and enabling the discovery of new insights and the more efficient and effective use of data.

USAID's ability to drive development results—from reducing global hunger and poverty to improving access to education and healthcare—hinges on the extent to which investments are appropriately targeted and rooted in evidence. However, the body of development evidence is immense. The

Development Clearing House alone holds over 300,000 documents and is complemented by other databases with over six decades of resources including academic articles, country-level datasets, beneficiary interviews, and gray literature. As a result, there is a tendency to “reinvent the wheel” each time a new strategy or project is designed, rather than attempting to decode relevant, valuable information from the evidence base.

While the use of evidence was constrained in the past by the sheer amount of information available, the project found that it is possible to solve the problem of an overwhelming amount of information by leveraging ML technologies. For example, during this project, a keyword search of the DEC returned fewer than ten results, while an ML-enhanced search for the same query returned thousands. As a

FIGURE 2: GAPS IN DIGITAL DEVELOPMENT PORTFOLIO



result of this efficiency, the project was able to simplify knowledge discovery by improving methods for evidence aggregation and applying them at greater scale and speed. This makes it simpler for USAID staff to find the knowledge they are looking for expeditiously.

Further, evidence aggregation and synthesis strengthens confidence for USAID project staff—particularly when compared to the inefficient process of reviewing individual studies—and serves as an important contribution to the knowledge base. By curating all documented uses of digital development interventions into an easy-to-use dashboard, the project was able to reveal important trends and insights into the digital development portfolio and demonstrate the applications of ML for improved knowledge management, learning, and decision-making.



FINDING THREE

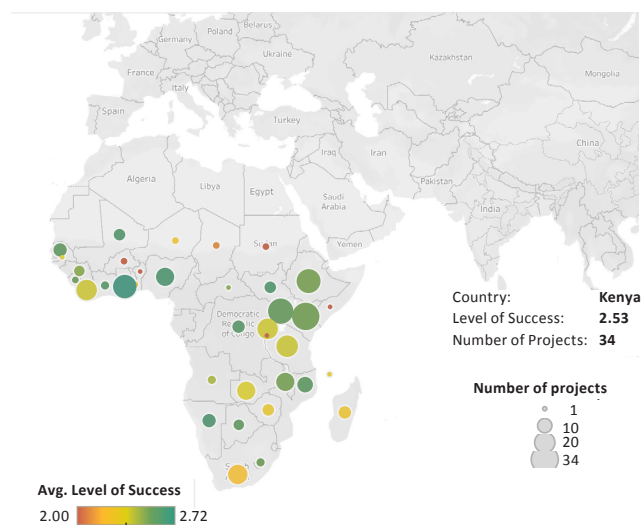
Sub-Saharan Africa shows significant differences in the adoption and effectiveness of interventions across nations.

The degree to which each intervention contributed to achieving the objectives outlined in the final evaluation reports—based on the sentiment of the text—was categorized as either positive or negative based on a Likert scale of 1-3, where 1 indicated unsuccessful, 2 indicated neutral or not enough information, and 3 indicated successful.

Kenya was found to have the largest digital development portfolio, with thirty-four projects identified as including at least one digital intervention. This was followed by Uganda (twenty-eight projects), Ethiopia (twenty-six projects), and Ghana (twenty-five projects). While Kenya's use of digital interventions was noted to contribute to successful achievement

of the project's objectives in 83 percent of project evaluations, Ghana, Namibia, South Sudan, Senegal, Mali, and Nigeria recorded a slightly higher degree of success with about 89 percent of the digital interventions described as contributing to successful achievement of the projects' objectives. While amongst countries with the lowest adoption rate of digital interventions, evaluations from Sudan (two projects), Burkina Faso (two projects), Chad (one project), Benin (one project), and Somalia (one project) recorded lower success of digital interventions. In these countries, only about 67 percent of the digital interventions were noted as contributing to successful achievement of project objectives, with the remaining use cases having zero effect, a negative effect, or lacking sufficient information to determine the achievement of project objectives.

FIGURE 3: GEOGRAPHIC DISTRIBUTION OF THE DIGITAL DEVELOPMENT PORTFOLIO





FINDING FOUR

Geospatial Data and Digital Government interventions, based on the weighted score, have been the most successful among all digital interventions.

The utilization of geospatial data and analysis in projects has steadily increased in the past decade, and it has been shown to be a highly effective method for achieving a variety of objectives. On average, it has a success rate of 89 percent and a Likert scale score of 2.68. The use of geospatial interventions has many potential use cases within projects, ranging from providing loans based on productivity, mapping health and water centers to facilitate improved access to water and sanitation facilities, tracking land parcels to issue new agricultural permits, and facilitating climate adaptation measures. For example, the Feed the Future Senegal Naatal Mbay Project (2015-2019) tracked farmer performance and technology adoption at the production level using Global Positioning Systems (GPS), field surveying, and geo-referenced data—together with historic production data—to successfully generate loan applications and marketing forecasts for farmers.

Forty-one projects employed Digital Government as an intervention, and it was effective in achieving a majority of these projects' objectives. On average, 88 percent of these projects were successful, with an average score of 2.63. The use of Digital Government interventions within projects ranges from providing citizens online access to government information and services, allocating digital identity cards, opening avenues to share feedback and ideas with government officials, and using technology to streamline procurement processes, amongst many other use cases. For example, the Consolidating Parliamentary Democracy Project (1998-2000) worked with the Directorate of Elections in Namibia to develop a web-based central depository of election results from all regions in Namibia. As a result, the Directorate was able to access, verify, and tally results in a timely manner. The election result center website increased transparency for stakeholders, including the press, who were able to access results from a central location. Further, this website facilitated direct public access to information, broadening the foundation and structures for informed citizen participation in the legislative and decision-making process, which is one of the Namibia National Democratic Institute's objectives in its work inside and outside Parliament.



FINDING FIVE

E-commerce and Data Governance interventions, despite being used infrequently, have demonstrated positive results.

Engaging with e-commerce platforms has been a successful, albeit infrequent, digital intervention that occurred in six projects in sub-Saharan Africa, with an average success rate of 96 percent and an average score of 2.88. For example, the Rwanda Technical Assistance Program (2002-2005) created Rwanda's first e-commerce website, featuring product descriptions portraying the cultural and historical significance of local handicrafts, information on the handicraft associations and the artisans, a firewall, and a shopping cart for direct online sales of the products to international consumers. The e-commerce website resulted in orders from customers in the United States and other countries and demonstrated that e-commerce systems were accessible in Rwanda.

Data Governance, while also only used in six projects, was found to be successful at achieving projects objectives, with an average success rate of 95 percent and an average score of 2.86. For example, the Trade and Investment Program for a Competitive Export Economy (TIPCEE) in Ghana (2005-2009) helped the country's Ministry of Communications draft the Electronic Transactions Act, which created a secure environment for electronic transfers, as well as three other laws strengthening telecommunications, e-commerce, and Internet security.



FINDING SIX

A lack of coordination, sustainability, local ownership, and connectivity are the most common underlying challenges for digital development interventions.

Many projects reported coordination challenges, especially related to the use of online platforms to encourage engagement. For example, the Naatal Mbay Project in Senegal (2015-2019) noted that for such digital interventions to be successful, new data platforms must emerge from a plurality of successful local solutions, rather than as a product of single, top-down, institutional backbone design. The Information and Communication Technologies for Elections and Community Access Project in Rwanda (2002-2005) highlighted that a website intended to host dialogue within the target community disappeared less than a year after it was launched. This is a common theme for many projects that create websites, platforms, or forums to build a digital ecosystem; implementers find that once the project has ended, the ecosystems go dormant or disappear altogether. It is also worth noting that, given the ability of digital solutions to circumvent traditional structures, these types of digital interventions may be less effective as they are particularly prone to neglecting to incorporate local buy-in and ownership as key components.

Connectivity was noted as an important challenge in over thirty projects. Lack of steady Internet, phone service, and electricity are the most-reported barriers faced by digital interventions. These connectivity challenges result in a range of complications for project implementation, such as universities and households not having high-speed Internet access to host virtual trainings, banks lacking sufficient bandwidth to upload documents necessary for financial transactions, ministries being unable to share information due to lack of bandwidth to update databases, and the inability of field-based healthcare professionals to report on outbreaks as they lack sufficient electricity access to charge their phones. For example, the Liberia Teacher Training Program (2010-2016) noted that its biometric pilot program exposed the limits of high-tech solution implementation in Liberia. A common recommendation across all projects was that digital interventions should be paired with connectivity interventions to ensure that the project is equipped with sufficient electricity and Internet to succeed.



FINDING SEVEN

Capacity-Building and providing access to information and communication technologies (ICT) are the most widely used digital development interventions in sub-Saharan Africa across all sectors.

Capacity-building efforts, particularly those designed to increase knowledge of how to use digital products, are the most frequently employed type of intervention in international development projects overall, with an average success rate of 86 percent and a score of 2.57. This trend holds true across all sectors; the findings indicate that over one hundred projects have utilized this approach. However, the usage of this type of intervention has been declining since 2014, and a key recommendation from post-2014 projects is to increase the use of Capacity-Building and pair it more frequently with digital interventions. Furthermore, these recommendations emphasize that Capacity-Building should not only focus on training individuals on how to use digital products but also aim to build trust in new technologies through demonstrations. This recommendation is particularly relevant when it comes to modern digital finance interventions.

Digital interventions designed to increase access to information and communication technologies (ICT) are the second most-common form of intervention, with an average success rate of 84 percent and a score of 2.53. ICT encompasses a wide range of technologies and devices, including computers, the Internet, mobile phones, software, and other digital tools. Although ICT-related interventions may not be the most frequently used intervention when data is analyzed in a given sector, they consistently rank within the top three most-utilized interventions across all sectors. Related interventions often entailed providing computers, software, and other equipment to institutions, including government ministries (most often ministries of justice and education) and schools. For example, the Anti-Corruption Country Threshold Program (2007-2009) in Uganda equipped the Anti-Corruption Division (ACD) of the country's High Court with computers, printers, and copy machines to improve the efficiency of case management. Computers installed with state-of-the-art systems allowed prosecutors to improve management of document-intensive investigations and prosecutions, resulting in reduced case backlogs and more cases being brought to closure. In another example, the Building Capacity for Disaster Preparedness project in Mozambique purchased radio equipment capable of receiving weather alerts or other urgent information by satellite to improve the disaster preparedness for a rural community in the country's Save River Basin.

Digital Information Systems, which involve using Internet or mobile-based services to provide information to users, was also a frequent intervention used in over seventy projects, with an average success rate of 81 percent and a score of 2.45. Examples of this intervention range from using mobile phone applications to support information exchange between healthcare professionals, creating a "one-stop shop" online information hub for young job-seekers, and enabling timely remote oversight of engineers to improve building quality, amongst many other potential use cases.

Management Information Systems that support the gathering, coordination, control, analysis, and visualization of data to make better decisions is also a frequent intervention—used in fifty-two projects—with an average success rate of 84 percent and a score of 2.53. For example, USAID worked with the Liberian government to test the impact of converting teacher and health worker salary

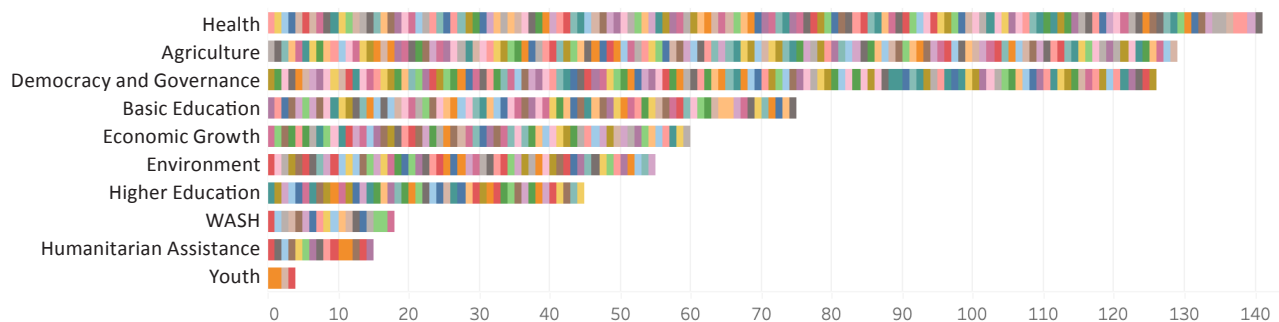
payments to digital payments. 20 percent of public school teachers enrolled in the new digital payout scheme within the first year, which translated to a 96.4 percent reduction in time and a 55.4 percent reduction in cost to distribute salary. Likewise, 1,180 Liberian Ministry of Health employees were enrolled, leading to a 79.2 percent reduction in time and a 62.9 percent reduction in cost to receive salary payments.



FINDING EIGHT

The Health sector employs the most digital development interventions, followed by the Agriculture sector.

FIGURE 4: FREQUENCY OF DIGITAL DEVELOPMENT INTERVENTIONS BY SECTOR (COLORS REPRESENT INDIVIDUAL PROJECTS IN THAT SECTOR)



The Health sector made the most use of digital interventions, followed by the Agriculture, Democracy and Governance, and Basic Education sectors. Capacity-Building, Management and Information systems, and Access to ICT were the most frequent and successful interventions in the Health sector. In the Agriculture sector, Digital Information Systems that use Internet or mobile-based services to provide information to users was the most frequent intervention, after Capacity-Building. Activities often involved sharing information related to agriculture production such as pricing and best practices.



FINDING NINE

The research shows that historically, digital development interventions have primarily been implemented to achieve objectives such as improved decision-making, increased productivity, expanded access to information, and enhanced human capacity.

The objectives of projects that used digital interventions varied widely, from improving supply chain management, strengthening transparency, and upgrading teaching methods. However, the most-common objectives fit into four main categories: improving decision-making, increasing productivity, expanding access to information, and increasing human capacity. Other common objectives included supporting the effectiveness of institutions, increasing transparency, improving learning outcomes, increasing income generation, facilitating social inclusion, and improving cost-effectiveness.

FIGURE 5: MOST FREQUENT OBJECTIVES



The analysis of international development projects revealed that digital interventions were not often paired with other digital interventions. Instead, they were more likely to be implemented alongside non-digital interventions. The most frequently paired intervention was Capacity-Building, which was implemented in conjunction with Data Systems interventions 43 times, Digital Inclusion interventions 75 times, and Access to ICT interventions 55 times. Interestingly, Connectivity interventions did not often occur alongside other digital interventions; the only significant co-occurrence for Connectivity was with Access to ICT interventions, which occurred 25 times.



FINDING TEN

The findings from this mapping exercise demonstrate the efficiency gains to USAID’s overall knowledge management could be greatly enhanced by ML technologies that extract and curate an incredible amount of information in a short amount of time.

The trends and insights gained from this exercise could be applied, improved, and expanded through a range of future research options, such as:

1. **Regional Analysis:** Expand the analysis of digital development interventions to other regions such as Latin America, Europe, the Middle East, and Asia; this would benchmark the success of interventions in sub-Saharan Africa against other regions and to promote the spread of best practices and lessons globally.
2. **Country-Specific Analysis:** Conduct country-level analysis of the digital development portfolio for Missions within sub-Saharan Africa to inform country-level strategy. This analysis could also include additional data sources such as the DECA and the UNDP’s Digital Development Compass, as well as local data sources to improve the implementation of digital development interventions within Mission portfolios.
3. **Keep Content Up-to-Date:** Employ existing technology to automatically update the evidence base when a new article or evaluation is published, ensuring that the evidence created in USAID projects is contributing back into the evidence base. This also ensures that decision-makers have access to the most recent and accurate data to enable rapid response to congressional demands or to easily locate success stories or key lessons related to a particular intervention.
4. **Use of Data in Practice:** Incorporate using the Digital Development Dashboard into the initial design of a target strategy or project to study how practitioners engage with the evidence and data. Based on this study, update the design of the dashboard to increase the data usability at the strategy design and project implementation stages.
5. **Correlation of Findings with Other Key Variables:** Given that the mapping exercise tracked the popularity trends of individual digital development interventions over time, it is possible to compare these trends with other key factors—such as budget or the policy environment—to examine the causes behind these trends. For example, the use of capacity-building has been declining in projects since 2012. Further research could examine if this was due to declining budget, a policy shift, organizational learning based on the failure of past capacity-building interventions, or to some other cause not yet known.

IV. Conclusion

The mapping exercise, undertaken by CPG through DevelopMetrics, has provided valuable insights into the digital development landscape in sub-Saharan Africa. The use of machine learning (ML) technologies enabled the analysis of thousands of documents, resulting in a comprehensive understanding of USAID's digital development portfolio. The findings of the report indicate that there is a need for increased focus on digital repression safeguards across the portfolio. It also highlights that geospatial data and digital government interventions have been the most successful interventions, when considering the weighted score for each intervention.

Further, the report emphasizes the importance of proactively designing USAID digital programming with an integrated awareness of digital repression and privacy risks. It also highlights the need to better leverage methods for evidence aggregation, and to apply findings to digital development interventions at both the project design and implementation phase.

The recommendations of the report provide a valuable launching pad for future USAID digital development programming in sub-Saharan Africa and will help ensure that future programs capitalize on learnings from the past sixty years of digital development programming to reach priority goals across all sectors—from reducing poverty and the risks of digital harms to increasing access to health and education.

Appendix A

TAXONOMIC CATALOG OF ALL USAID DIGITAL INTERVENTIONS AND OUTCOMES

INTERVENTIONS				
First Order Code	Second Order Code	Third Order Code	Definition	Synonyms
Protecting Youth and Children from Digital Harm			Interventions that harness technology and digital innovations to safeguard children from digitally-enabled harm or harm in digital environments, whether physical, emotional, or sexual. It also includes targeting and stopping adults who use digital technology to exploit and abuse children.	
	Social Media and Online Safety		Interventions focused on offering safe social media and other online platforms for children. This includes identifying online threats to children and mitigating the risks.	
	Digital Remote Approaches		Using digital or remote communication tools such as help lines, youth-led radio broadcasts, U-Reports, SMS, WhatsApp groups, Instagram posts, Facebook and Facebook Live sessions, television, community volunteers, and chatbots to attend children in need of help.	
Cybersecurity			Interventions that facilitate ways in which individuals, systems, and technology protect information and communications systems and information kept in digital formats against damage, unauthorized use or modification, or exploitation.	cyber risk, cyber harm, cyber attack, cyber vulnerabilities, cyber threat
	Resilience		Cyber resilience interventions focus on preparing organizations, institutions, or individuals from cyber threats. These interventions include quick responses and recovery from these threats.	Licensing Services
	Digital Security		Interventions that assist in the practice of understanding one's digital footprint, identifying localized risks to information systems and taking reasonable steps to protect one's owned assets from loss or capture. (USAID, 2019) (Disinformation Primer)	
	Digital Hygiene		Routine-based digital practices for individuals and organizations to minimize cyber risks.	
Data Systems and Development			Interventions that use digital technology to improve data collection, management, and usage. An example is electronic health record systems.	
	Management Information Systems		Gathering, coordination, control, analysis, and visualization of data used to make better decisions and obtain maximum benefits from investments within firms.	
	Institute Standards and Best Practices		Set of guidelines on how to carry out certain actions and tasks to obtain the best results. Best practices or standard guidelines may be set by a governing body or may be internal to an organization or institution.	
	Emerging technology		Emerging technologies are technologies whose development, practical applications, or both are still largely unrealized. These technologies are generally new but also include older technologies finding new applications. Emerging technologies are often perceived as capable of changing the status quo.	
		Artificial Intelligence	Computer programs that are able to do tasks and solve problems that usually require human intelligence.	Machine Learning
	Digital Reference/Information Services		Internet or mobile-based services that provide information to users. This includes web forms, online chats, sectoral information services such as climate information services, and mobile-based information services. These interventions can support science-based and user-specific information	
	Open Data		Data or content is open if anyone is free to use, re-use or redistribute it, subject at most to measures that preserve provenance and openness.	Creative Commons
	Digital Data Collection		Ability to amass, analyze, and share data via electronic technologies such as tablet computers or smartphones. Before digital data collection, pen and paper to record information gathered in the field.	

INTERVENTIONS				
First Order Code	Second Order Code	Third Order Code	Definition	Synonyms
Digital Ecosystem			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.	
Digital Finance			Interventions that promote the use of mobile technologies for finance (e.g. mobile money payment applications), increasing transparency, and opening new and inclusive markets.	
	Digital Microfinance (Loans or Credits)		Loans and credits offered by banks and digital lenders via a digital medium. The whole process is done online.	
	Mobile Services		Financial services accessed and delivered through mobile phones.	
		Mobile Money	Mobile money is a pay-as-you-go digital medium of exchange and store of value using mobile money accounts, facilitated by a network of mobile money agents. It is a financial service offered to its clients by a mobile network operator or another entity that partners with mobile network operators, independent of the traditional banking network. An example is Apple Pay.	
		Mobile Banking Services	Mobile banking is the use of an application on a mobile device to access and execute banking services, such as check deposits, balance inquiries, and payment transfers.	
	Digital Insurance		Digitalization of the insurance sector. This means the use of innovative technologies enters the insurance market.	
Digital Inclusion			Interventions that facilitate access to and adoption of digital and data technologies, particularly—though not exclusively—for historically marginalized groups. digital inclusion is more than just access to tech - it's also the ability to meaningfully use it.	Digital Divide
	Access to ICTs		Interventions that support access to information and communication technologies. This includes physical technologies such as computers and mobile phones, but also access to certain software and multimedia products.	internet-enabled devices or access to ICT-enabled devices
		Mobile Phone Ownership	Interventions that give direct access to mobile phones, specifically smartphones.	
		Computer Ownership	Interventions that give direct access to computers.	
	Connectivity		Interventions that facilitate access or improve digital infrastructure to provide access to affordable, reliable connectivity services such as installing new internet connections, installing electricity infrastructure, among others. This includes wifi and the later includes wireless internet access via mobile networks.	last mile connectivity, Digital Infrastructure Development
		Electricity Access	Installing new electricity infrastructure in the areas most needed.	
	Open Radio Access Network		A nonproprietary version of the Radio Access Network (RAN) system that allows interoperation between cellular network equipment provided by different vendors.	
	Gender digital divide		Interventions which aim to close the inequalities between men and women in terms of digital technology access and use. This can be through access or adoption of ICT and ICT-enabled technology	
E-Government/ Digital Government			Systems and processes related to managing the daily work of government. This includes interventions that facilitate the provision of government services and communication between the public and government agencies using digital technology.	e-governance, digital transformation, or digitalization of government, automation of government services, automated customs systems, health information systems, open data platforms

INTERVENTIONS				
First Order Code	Second Order Code	Third Order Code	Definition	Synonyms
	Management (e-administration)		Management, or e-administration, includes the digitalization of internal government processes and systems. Examples include: Digital databases, which store data in a digital format for easier reference and data analysis; Data storage solutions that allow for data to be securely stored and protected; Management information systems (MIS), are information systems used for decision-making, and for the coordination, control, analysis, and visualization of information; and E-procurement systems, which enable a more efficient and transparent exchange of information and transactions between government and suppliers of goods and services.	
		e-procurement		
	Automation		Also known as Delivery, or e-service delivery, includes the conversion of public services and records from paper to digital.. Examples include: Government portals, including mobile apps, which provide access to information and services and the ability for stakeholders to carry out administrative procedures online; Digital payments, which can help governments improve public financial management and increase the efficiency and transparency of payments to and from government bodies; and Digital identification (ID) systems, which have the potential to provide the means for individuals to securely prove their identity and provide a unique ID number that facilitates data exchange across government systems. However, Digital ID systems must be secured; designed to be broadly inclusive and with meaningful consent processes; and implemented in countries with robust data protection, privacy regulations and policies, consistent enforcement of these regulations and policies, and independent oversight and grievance redress mechanism.	e-services, Service Deliveryelivery
	Engagement (e-participation)		Engagement, or e-participation, includes digital channels and platforms through which stakeholders can collaborate with and influence government agencies and policies. Examples include: Citizen and voter education, which are provided through accessible channels; Government-supported incubation hubs, which engage the private sector in creating tools and systems to meet the specific needs of governments; Open data portals, which allow citizens and businesses to use government data for innovation, services, and accountability; Political participation mechanisms, which offer stakeholders access to direct lines of communication with local representatives to raise questions and concerns, and which provide an easy way for representatives to respond; and Citizen science initiatives, whereby the public voluntarily participates in the scientific process to help address real-world problems.	
		Digital Civic Engagement	Engagement in civic activities through online services. This includes online voting, reading online news, accessing government information through online platforms, directly contacting governmental institutions through email, among others.	
	Interoperability		The ability of computer systems or software to exchange and make use of information	
	Enterprise Architecture		Enterprise architecture enables digital government by allowing technical components to work together. It requires coordination between agencies and the standardization of processes, protocols, and policies. Comprehensive enterprise architecture enables the integration of systems and shared services across government agencies. This requires robust connectivity infrastructure and devices across government bodies operating at the national, regional, and local levels.	
	Digital Identity Systems		Digital identification (ID) systems register individuals into a computerized database, often with biometrics such as fingerprints, and in turn provide these individuals with certain credentials (e.g., identifying numbers, cards, digital certificates, etc.) that can be used as proof of identity. (Digital Strategy, modified).	
		Public-Private Partnerships	Collaborating with the private sector to achieve mutually-beneficial objectives. Activities could include building and strengthening private sector actors through grants, technical assistance, and network support or collaborating with the private sector in project implementation.	

INTERVENTIONS				
First Order Code	Second Order Code	Third Order Code	Definition	Synonyms
Geospatial Information			Geographic Information Systems (GIS), remote sensing, remote monitoring, satellite monitoring, satellite data	
Data governance			Data governance encompasses the policies, strategies, frameworks, and practices that actors implement to incentivize responsible data production, management, use, and sharing in the public and private sectors.	
	Responsible Data Use		Responsible Data (RD) is are interventions geared towards prioritizing and responding to the ethical, legal, social and privacy-related challenges that come from using data in new and different ways in advocacy and social change.	metadata
		Data Privacy	Interventions that aim to protect individuals' or groups' rights to their personal data. Data privacy is the right of an individual or group to maintain control over, and the confidentiality of, information about themselves, especially when that intrusion results from undue or illegal gathering and use of data about that individual or group.	
		Data Protection	Regulations related to the processing of personal online data. These kinds of interventions are necessary to avoid corruption, compromise, or loss of the data in those cases where individual self-regulation is not accessible.	
	Cross-Border Data Flows		Movement or transfer of information between servers across country borders.	
		Data localization Laws	Laws that require data to be stored, processed, or handled within the borders of the country where the data originated. Many countries are adopting data-localization laws to avoid surveillance or interference by foreign governments or corporations. At the same time, data-localization laws can leave citizens and businesses with no means to avoid surveillance by the intelligence agencies of their own governments and hinder cross-border flows of data, which can have a negative effect on e-commerce and the development of an open, secure, and inclusive digital ecosystem. (Digital Strategy)	
	Encryption		The method by which information is converted into secret code that hides the information's true meaning. The science of encrypting and decrypting information is called cryptography	
	Digital Rights		The promotion of human rights in online spaces. These rights include, but are not limited to, the right to privacy, freedom of opinion and speech, freedom of information and communication, gender rights, and the right to freedom from violence. (Roberts 2021)	
	Digital Financial Market Regulations		Regulations impacting the digital financial market promoting transparency, uniformity, and consistency. This includes user protection, prosecuting market misconduct, and maintain a trustworthy financial system.	
Research and Development			Research and development encompass an extremely broad range of new activities and potential digital innovations.	
E-commerce			Electronic commerce is buying and selling (commercial transaction) goods and services electronically through an online platform.	
	f-commerce		Ecommerce specifically on facebook	
Digital Gig Economy			Digital labour platforms that enable organizations to hire independent workers for short-term commitments	
Upskilling/Capacity Building			Interventions that leverage digital technologies to help develop or strengthen the skills, abilities, processes, and resources that individuals, businesses, or institutions need to effectively participate in economic and social life.	
	Technologies in Education			
		Community-Based Education (CBE)	Interventions that provide the means to reach children who are unable to attend formal schools due to insecurity, distance or other constraints	

INTERVENTIONS				
First Order Code	Second Order Code	Third Order Code	Definition	Synonyms
Digital Literacy			Interventions that develop or improve digital literacy, particularly—though not exclusively—for historically marginalized groups. Digital literacy is 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 and social life. It may also be known as computer literacy, information and communication technology (ICT) literacy, information literacy, or media 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 and social life. This may include competencies that are variously referred to as computer literacy, information and communication technology (ICT) literacy, information literacy, and media literacy.” Digital literacy includes both hard skills related to the use of hardware or software and digital soft skills related to the use of digital media and information. (Digital Strategy) (Disinformation Primer)	social training, life training, social learning,
	Informatics		The use of data to inform decisions.	
	Media Literacy		The ability to methodically consider and reflect on the meaning and source of a post or news article. (Disinformation Primer)	Media and information literacy, fake news
Precision Agriculture			An approach to farm management that uses information technology (IT) to ensure that crops and soil receive exactly what they need for optimum health and productivity. This includes remote sensing which is the process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance (typically from satellite or aircraft) as well as ICT-enabled extension services.	remote sensing,
Unknown Code				
OUTCOMES				
Level of Success	1		The intervention had no impact, or a negative impact, on the ability to achieve one or more of the project’s objectives.	
	2		It is not possible to determine whether the intervention contributed to the achievement of any of project’s objectives.	
	3		The intervention had some positive impact on the achievement one or more of the project’s objectives.	
	4		The evaluators attribute the achievement of one or more of the project’s objectives to the intervention.	
Types of Digital Repression				
Digital Repression (General)				
	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). (Digital Strategy)	
	cyber threat, cyber attack, cybercrime, malware, ransomware, phishing, hack			
	Restriction of Civil Liberties		Individual rights protected from unjust interference by governmental or other actors. In the United States, the first ten Amendments to the U.S. Constitution, known collectively as the Bill of Rights, enshrine these rights. Civil liberties include the right to the freedoms of expression and association and peaceful assembly, also recognized as universal human rights under the Universal Declaration of Human Rights. (Digital Strategy)	

INTERVENTIONS				
First Order Code	Second Order Code	Third Order Code	Definition	Synonyms
	Restriction of Civic Space		Safe public spaces, offline or online, in which democratic debate can take place and citizens can freely exercise their human rights, including the freedom of opinion and expression. (Roberts 2021)	
	Dangerous Speech		Any form of expression (speech, text or images) that can increase the risk that its audience will condone or participate in violence against members of another group. (Disinformation Primer)	
	Lack of Data Privacy		The right of an individual or group to maintain control over, and the confidentiality of, information about themselves, especially when that intrusion results from undue or illegal gathering and use of data about that individual or group. (Digital Strategy)	
	Lack of 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 Strategy)	
	Democratic Backsliding		State-led debilitation or elimination of the political institutions sustaining an existing democracy. (Bermeo 2016)	
	Digital Authoritarianism		The use of digital information technology by authoritarian regimes to surveil, repress, and manipulate domestic and foreign populations. (Digital Strategy)	
	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 Strategy)	
	Digital Repression		Digital repression refers to the use of digital tools and technology to violate human rights and includes five techniques -- surveillance, censorship, social manipulation and disinformation, internet shutdowns, and targeted persecution of online users. While digital repression is common under authoritarian regimes, democracies have also used these techniques. Digital repression is not limited to government actors; non-state and foreign actors (including private sector and religious groups) can also deploy these techniques for political, social, and economic reasons. Digital repression can be deployed using various technological tools including surveillance cameras, commercial malware, social media “botnets”, and access-blocking firewalls. Censorship and surveillance circumvention technologies (e.g., VPN, encrypted messaging applications) are used by people in many countries to mitigate some elements of digital repression. (DECA Toolkit, forthcoming)	
	Disinformation		Disinformation is 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. (Shorenstein Center, 2018) (Disinformation Primer)	
	Gaslighting		A technique of deception and psychological manipulation practiced by a deceiver, or “gaslighter,” on victims over an extended period. Its effect is to gradually undermine the victims’ confidence in their own ability to distinguish truth from falsehood, right from wrong, or reality from appearance, thereby rendering them pathologically dependent on the gaslighter. (Disinformation Primer)	
	Lack of Internet Freedom		The U.S. Government conceptualizes internet freedom as the online exercise of human rights and fundamental freedoms regardless of frontiers or medium. The same rights that people have offline must also be protected online—in particular, freedom of expression, which is applicable regardless of frontiers and through any media of one’s choice. (Digital Strategy/ Disinformation Primer)	
	Malinformation		Deliberate publication of private information for personal or private interest, as well as the deliberate manipulation of genuine content. Note that these information are based on reality but are used and disseminated to cause harm. (Wardle & Derakhshan, 2017) (Disinformation Primer)	

INTERVENTIONS				
First Order Code	Second Order Code	Third Order Code	Definition	Synonyms
	Misinformation		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. (Shorenstein Center, 2018) (Disinformation Primer)	
	Pink Slime Journalism		A low-cost way of distributing thousands of algorithmically generated news stories, often with political bias. (Disinformation Primer)	
	Propaganda		True or false information spread to persuade an audience but often has a political connotation and is often connected to information produced by governments. (Disinformation Primer)	
	State Surveillance		Observing, listening, monitoring or recording by a state or its agents to track citizen's movements, activities, conversations, communications or correspondence, including the recording of metadata (Roberts October 2021)	
	Internet Black-out		The complete or partial failure of the internet services. It can occur due to censorship, cyber attack, disasters, police or security services actions or errors.	
	Digitally enabled targeted Persecution			
	Technology-facilitated gender-based violence		Any action carried out using the internet and/or mobile technology that harms others based on their sexual or gender identity or by enforcing harmful gender norms.	
	Social media attacks/monitoring		An attack executed through platforms like Instagram, LinkedIn, Facebook, or Twitter with the purpose of stealing personal data or gaining control over a social media account.	
	Disinformation		disinformation/misinformation (Trolling, bots, deep fake, fake news)	



USAID
FROM THE AMERICAN PEOPLE