Increasing the Use of Data for Global Development Decision-Making: A Systems Mapping Evaluation of the Data Collaborative for Local Impact Program in Tanzania

STRATEGIC PROGRAM FOR ANALYZING COMPLEXITY AND EVALUATING SYSTEMS

December 2020

This publication was produced for review by Millennium Challenge Corporation and United States Agency for International Development. It was prepared independently by the SPACES consortium.

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Strategic Program for Analyzing Complexity and Evaluating Systems (SPACES)

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Evaluation Mechanism Number: AID-OAA-A-15-00064

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Executive Summary

Introduction and Purpose: In 2015, MCC (Millennium Challenge Corporation) and PEPFAR (President's Emergency Plan for AIDS Relief) created the Data Collaboratives for Local Impact (DCLI)– a 5-year US$21.87 million partnership to enable individuals and communities to use data to improve decision-making. Through DCLI, MCC implemented three interconnected activities in Tanzania aimed at strengthening the data ecosystem: Data Lab, the Data for Local Impact Innovation Challenge (DLIIC) program, and Data Zetu. All three of these projects sought to improve the use of data for decision-making, with a particular focus on the cross-cutting themes of reducing HIV/AIDS prevalence, improving gender equity, and economic growth.

- Data Lab is a physical hub for computing resources, data science training and skill-building on the analysis and use of data.
- Data for Local Impact Innovation Challenge (DLIIC) was a set of grant challenges for promoting data use across a variety of themes.
- Data Zetu was an activity to improve the capacity of subnational (district and ward) institutions to provide and make use of actionable data.

MCC designed DCLI with a focus on systems thinking and systems change. To evaluate the effects of this program in Tanzania and to inform similar efforts in other countries, MCC established an agreement with the Strategic Program for Analyzing Complexity and Evaluating Systems (SPACES) to conduct an independent systems mapping effort. A systems map is a visual depiction of the various components, processes, and effects of a defined system, in this case, the DCLI program and the broader Tanzanian context in which data is created, captured, and exchanged (also referred to as the data ecosystem). By acknowledging and understanding the complexity and interconnectedness of the system involved in a multi-part initiative like DCLI, evaluators can better estimate the resulting effects and reach of programs focused on increasing the use of data for decision-making. A systems map moves closer to fully capturing how a program interacts with and affects the surrounding systems and contexts in which it operates (in this case, the Tanzanian data ecosystem). This systems mapping effort differs from traditional evaluations, which are not designed to show all of the effects of a program and are limited to specific indicators and goals as identified during the program design. Thus, the SPACES team developed a systems map of the DCLI program, to provide a more comprehensive picture of the DCLI program processes and the potential effects on the community and broader Tanzanian data ecosystem.

Methods: The goal of this project was to develop a systems map to evaluate the effects of the DCLI program in Tanzania and guide similar future efforts and investments. The development of a systems map follows the steps below:

1. Review of the Literature and Available Documents
2. Identify and Map Program Components, Processes and Effects
3. Conduct Key Informant Interviews (KIIs)
4. Refine and Validate Map
5. Identify Leverage Points

Findings: The resulting systems map demonstrates how the DCLI program has affected the ways by which program participants, community members, and decision makers identify, capture, organize and use data for decision-making at both the local level as well as across the broader data ecosystem. For example, evidence shows that adopting a community-led planning process fostered an increase in data used for decision-making and more effectively addressed community problems (e.g., a local medical officer's decided to allocate resources to a new medicine supply fund and supply center). Additionally, providing high-quality training coupled with support led to greater appreciation of utilizing data as well as more valuable products (e.g., one innovator conducted market research and found that many community

members relied on free data provided by telecommunications companies available during evening hours and therefore prioritized offline features in his mobile application.). Partnering with local actors to increase demand for data generated more tailored solutions (e.g., partnering with the National Bureau of Statistics led to a more informed and helpful data planning tool). The map also shows how DCLI program components targeted and leveraged the factors specific to the Tanzanian data ecosystem, which affect the use of data for decision- making. For example, DCLI programs harnessed local leadership, knowledge and expertise to facilitate training and problem solving which leads to communities changing resource investment and allocation decisions. Additionally, certain components of the DCLI program increased the number of connections between data users, which may in turn strengthen the overall data ecosystem through the exchange of knowledge, skills, and professional relationships. Furthermore, the DCLI program made efforts to understand and measure changes to how data is being used across the system. We also identify pathways where the additional collection of evidence to measure the entire impact of the program on the data ecosystem could demonstrate the broader reach of the program. In order to connect the findings from this effort to the overall DCLI program logic, we have mapped the findings to the table of DCLI outcome areas included in their program logic on pages 23 and 24.

We also identify 10 leverage points (e.g., program processes) in the system that can lead to transformative change:

1. Community forums to identify and select the issues that are important to the community
2. Local teams implement solutions
3. Data Zetu team disseminates results to community (e.g., research products, Shareback Sessions)
4. Grantees attend two-week workshops, learn project management, budgeting, data-driven product development skills
5. Grantees collect data to inform design of product or service
6. Grantees incorporate feedback into final product/service
7. Data Lab is built to house lab space and computational resources for the data community
8. Training on data visualization and calculating basic statistics
9. Data Lab establishes relationship with University
10. Training to use data in order to create an opportunity for profit

Conclusions: The systems map of DCLI demonstrates how all three projects within DCLI – Data Lab, Data Zetu, and DLIIC – are influencing and spurring wider changes in the use of data for decision-making at both the community and broad sector levels. This reflects the overall success of the DCLI program and the applicability of its lessons learned to the wider data and development community. We recommend that donors, governments, and civil society partners reflect on the leverage points and lessons learned from the DCLI program and seek to incorporate the highest yield pathways to change in their work, as appropriate.

Introduction and Objective

Data Collaborative for Local Impact aims to improve data use for decision-making

In 2015, MCC (Millennium Challenge Corporation) and PEPFAR (President's Emergency Plan for AIDS Relief) created the Data Collaboratives for Local Impact (DCLI)– a 5-year US$21.87 million partnership to enable individuals and communities to use data to improve decision-making. DCLI began in Tanzania in 2016 and expanded to Côte d'Ivoire in 2018. The design of the program was informed by in-country consultations conducted by MCC and PEPFAR, which found that there was an insufficient demand for data and a limited capacity to use data to inform decisions at the individual, local, and national level in Tanzania.

These findings resulted in three interconnected investments (that ran for 18 months) aimed at strengthening the data ecosystem: The Tanzania Data Lab (Data Lab), the Data for Local Impact Innovation Challenge (DLIIC) program, and Data Zetu. While these programs engaged with a variety of sectors (e.g., technology, education, health), all of them sought to improve the use of data for decision-making with a particular focus on the cross-cutting themes of reducing HIV/AIDS prevalence, improving gender equity, and economic growth. The Data Lab, based in the University of Dar es Salaam, served as the physical hub for DCLI's data science training, computational resources, and community engagement activities. The Data Lab has since re-launched in a new sustained form as a non-government organization (NGO), integrating certain activities from the other two DCLI programs into its ongoing programming. DLIIC, which is now one of the Data Lab subprograms, consisted of five full Innovation Challenge grant windows, in which selected applicants were awarded funding and intensive capacity building services to build and launch a proposed product or service to support better development outcomes. DLIIC is distinguished from other grant programs by its emphasis on sustainable capacity building and promoting network of innovators and data enthusiasts. Finally, Data Zetu (Swahili for "Our Data") was a subnational-level program in PEPFAR priority districts – and also where PEPFAR is implementing the DREAMS (Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe) partnership – targeted at preventing HIV infections in adolescent girls and young women. Data Zetu prioritized sustainable, locally-led change, by conducting community forums to identify and prioritize local problems and further empowering custodian organizations to plan and implement data-driven solutions.

MCC designed DCLI with a focus on systems thinking and systems change. To evaluate the effects of this program in Tanzania and to inform similar efforts in other countries, MCC established an agreement with SPACES to conduct an independent systems mapping effort. A systems map is a visual depiction of the various components, processes, and effects of a defined system, in this case, the DCLI program and the broader Tanzanian context in which data is created, captured, and exchanged (also referred to as the data ecosystem). This systems mapping effort differs from traditional evaluations, which are not designed to show all of the evidenced and potential effects of a program and are limited to specific indicators and goals as identified during the program design. Without acknowledging and understanding the complexity and interconnectedness of the system involved in a multi-part initiative like DCLI, evaluators can underestimate the resulting effects and reach of these types of programs. A systems map, on the other hand, moves closer to fully capturing how a program interacts with and affects the surrounding systems and contexts in which it operates (in this case, the Tanzanian data ecosystem). Thus, the SPACES team developed a systems map of the DCLI program, to provide a more comprehensive picture of DCLI program processes and the potential effects on the community and broader Tanzanian data ecosystem.

Thus, the goal of this effort was to develop a systems map to evaluate the effects of the DCLI program in Tanzania and guide similar future efforts and investments. Specifically this evaluation aims to address the following high-level questions:

1) What evidence exists that data is better incorporated into relevant decision-making processes since DCLI was implemented?

2) Through what pathways has DCLI/Tanzania influenced use of data?
3) How did DCLI leverage or confront contextual factors facilitating or impeding change?
4) How were collective and network approaches to strengthening the data ecosystem applied?
5) What approaches were used to understand and measure systems change?

These high-level questions were the driven by the DCLI Outcome Areas of interest which include:

Transparency and accountability

Budgetary decision-making

Service delivery decision-making

Access to data and data sharing

Attitudes toward data

Data skills

Gender decision-making

Citizen decision-making

Evidence for each of these is noted in a table in the Findings.

Methods

The development of a systems map of the DCLI program included reviewing literature and program documents, identifying and mapping program components, processes, and effects, conducting key informant interviews (KIIs), refining the map, and validating the map. These steps are described in more detail below.

A. Review of the Literature and Available Documents

As a first step in developing a systems map, our team reviewed multiple DCLI program documents including project descriptions and scopes of work, semi-annual review reports, indicator tracking as part of DCLI monitoring and evaluation plans, and use stories (narrative descriptions of different stakeholders' experience of the program). We reviewed the documents to better understand the mechanics of the program.

B. Identify and Map Program Components, Processes, and Effects

Based on our review of available documentation, our team then identified the key program components (e.g., program implementers, resources, etc.), processes (i.e., the mechanisms by which programs were implemented), and effects (i.e., what resulted from the program's processes). From these elements, we developed an initial map structure representing each of the three arms of DCLI. Within this map we visually represented specific components and processes with circles and their connections to the other components and processes with arrows.

C. Conduct Key Informant Interviews (KIIs)

From September to November 2019, we conducted a total of 46 key KIIs, including interviews of MCC staff, project implementers, researchers and consultants involved in the projects. The KIIs occurred in two rounds, with the second set of interviews building on the first and incorporating 1) a diversity of institution types (e.g., government, NGO, private sector); 2) a diversity of geography; 3) expected ability to provide insights not already documented by the project; and 4) inclusion of women and youth participants. These KIIs gathered further evidence of program processes and the potential effects on the community and broader Tanzanian data ecosystem.

D. Refine and Validate Map

Building off of the KIIs, our team refined and expanded the systems map. This included fine-tuning the program components and processes, improving the structure of the map to better convey the connections within and between programs, and expanding to highlight the effects of the programs on the community and the broader sectors within Tanzania. In this refined map, we represented both evidenced and potential (non-evidenced) pathways to illustrate plausible downstream effects or consequences that will ultimately result from the program on the community and broader sectors. The first step in this process used knowledge gathered from the KIIs to identify potential downstream effects of these various program components and processes on the community and broader ecosystem. Once all possible effect pathways were identified from each of the program components, our team reviewed available data to determine if an effect pathway had evidence to support it, or if evidence did not yet exist for this pathway.

There are multiple benefits to incorporating both evidenced and potential effects:

- Rather than being limited to mapping what is described in interviews or use stories, this method captures the broadest range of potential program effects, many of which are unlikely to be measured without targeted efforts.
- This method allows users to identify where additional data is needed to validate the downstream effects of the program.

- By focusing on the mechanisms that might lead to downstream effects, rather than building from available data, the map becomes more useful to understand the potential effects of implementing similar programs in new locations.

Throughout the development of the map, we conducted ongoing validation to ensure the influences and connections represented in the map reflected reality. The validation process entailed validating each factor and connection individually, as well as the components in combination and how they reflect the DCLI program as a whole. In order to validate the refined DCLI systems map, our team used both internal and face validity approaches:

Internal validity

Internal validity, or *credibility* in qualitative research, refers to the ability to adequately demonstrate a causal relationship between two variables. Our approach was to investigate whether the effects reported met the criteria of causality: that the reported causes preceded effects in time, that they tended to happen together, and that there was not an alternative explanation for the effects as reported by program participants, acknowledging that there are additional elements in the broader system outside the program that produce changes in the affected elements. Though our study was limited in time and resources, preventing our ability to use prolonged contact or saturation techniques, we did apply triangulation, with multiple members of the project team participating in workshops and interview reviews, and member checking techniques, including checking face validity with program implementers, to maximize credibility. We also engaged in reflexivity in conducting the interviews and constructing the map, taking a critical perspective to the narrative presented by the DCLI team and probing for clarification and contradictory evidence during stakeholder interviews and validation. Outside of the stakeholder validation workshop and interviews with program implementers, we did not show interviewees the maps in order to avoid biasing their feedback about the program. Rather, we used the data gathered in these KIIs to inform the map development process, only afterward showing the proposed potential and evidenced effects to participants in the validation workshop.

Face validity of program processes

We first reviewed the initial DCLI maps with program implementers for face validity. This involved showing the map structure and program processes to program implementers to determine if the program components and processes reflected their understanding and experience of the program. We received feedback from program implementers on ways to adjust specific factors, missing connections, and suggestions for the map structure.

Next, during KIIs with program implementers, we further reviewed specific connections or components in the program (without showing the map) to further establish the internal validity of our representation of the program operations. Many of the interviewees affirmed the parts of the map illustrating map structure, components, and connections.

Face validity of effects of the program on the community and Tanzanian data ecosystem

Initial representations of the effects of the program were established during the KIIs which drew out the resulting effects of the program on the community and broader sectors from the perspective of various stakeholders. Note that we did not review iterations of the map with each interviewee to avoid biasing the conversations and the effects of program that they might share. We further investigated these program effects during our validation workshop held in November 2019, at DataRev, an event hosted by MCC and PEPFAR which convened various stakeholders to share results and learnings from programs promoting data use in decision-making in a variety of contexts. During the workshop, the SPACES team met with a group of DataRev participants including DCLI program implementers, DLIIC program participants, and other related actors in the data ecosystem, some of whom had participated in initial implementer interviews or later KIIs. During the workshop we broke into three groups based

on which activity under the wider DCLI program the participants had engaged with: the Data Zetu subnational program, Data Lab, or the DLIIC grant program. During the breakout session, participants received physical copies of the systems map for review that included both the program mechanisms as well as the mechanisms and pathways by which the program affected the wider ecosystem, based on the KIIs. They then provided specific feedback on these map where program processes may have been inaccurately interpreted and captured, where effects were missing, and confirming where effects extended beyond the implementation window and scope of the program itself. The feedback was captured through annotation of the map and written notes. The feedback from this workshop was then integrated into the map to produce a final version.

This ultimately resulted in a map with two layers :

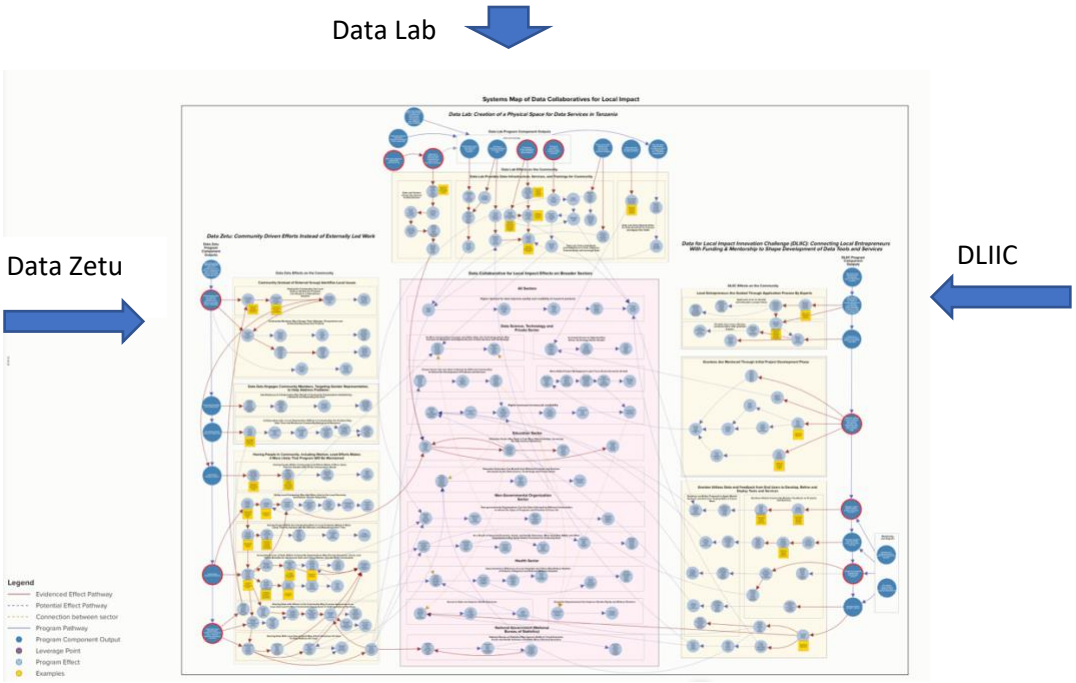
1. **Comprehensive Systems Map of the Effects of DCLI Program (Figure 1)**, which includes all of the evidenced and non-evidenced effects of the DCLI program.
2. **Systems Map of Evidenced Pathways of Effects of DCLI Program (Figure 2)**, which includes the evidenced pathways. Evidence is based on program documentation, reports, KIIs, and stakeholder validation workshop.

Limitations

A systems map is, by necessity, a simplification of reality and cannot represent every component or connection that a system entails. The goal in creating such a map is to visualize the most relevant components and connections to the question at hand, which will inevitably require systems mappers' judgment to identify and select components. In addition, while a systems map can characterize the components and the direction in which they are connected, it does not necessarily describe the intensity of the connections or quantify relationships in a way that allows for modeling the system's dynamics, which would provide an understanding of the most influential mechanisms or connections in a given pathway or how different changes in the system can affect outcomes of interest. While this project does not quantify impacts of the DCLI program, it lays the groundwork (through the systems map) for a future potential computational model. A computational simulation model incorporates the dynamics of the system and can be used to test the impact of different program iterations and then quantify the outcomes.

How to read this report

The overall map of the DCLI shows the three programs – Data Lab, Data Zetu, and DLIIC – their effects on the community, and their effects on broader sectors in Tanzania (e.g., research, data science & technology, education, government, health, and NGOs). The three programs, represented by dark blue circles on the perimeter of the map, are positioned at the top center (Data Lab), far left (Data Zetu), and far right (DLIIC) sections of the map.



In the Findings section below we highlight evidenced pathways and key potential pathways from the map to answer the five evaluation questions. We include snapshots of these pathways, which correlate to the map (above; also in the Appendix). The pathways connect the program components (dark blue circles) with effects on the community (light blue circles on yellow background) and subsequently to effects on the broader ecosystem (light blue circles on pink background). In the Findings, we use the pathways to demonstrate how the DCLI program impacted the community and the broader data ecosystem. As a note, there are four different types of arrows in the maps. Solid blue arrows represent program pathways and illustrate the connections between the different program mechanisms. Red arrows connecting program component output bubbles with program output represent evidenced pathways for which there is documentation showing the connection between the pathways. Dotted blue arrows represent potential pathways, meaning there is not currently available documented evidence for these pathways, however the effects could plausibly result from the program which indicate places for future monitoring and evaluation. The gold dotted pathways represent connections between broader ecosystem sectors.

Findings

DCLI sought to positively affect the data ecosystem in Tanzania through a set of interconnected projects. The program presents a set of ambitious long-term goals: to increase the frequency and effectiveness of data use for decision-making in policies and programs related to HIV/AIDS and health, gender equity, and economic growth; and to eventually improve the alignment between needs and budgets. In addition, the program targeted changes in decision-making processes among diverse audiences, including national and local governments, donors, NGOs, and individual citizens. The findings will be presented as answering the five evaluation questions.

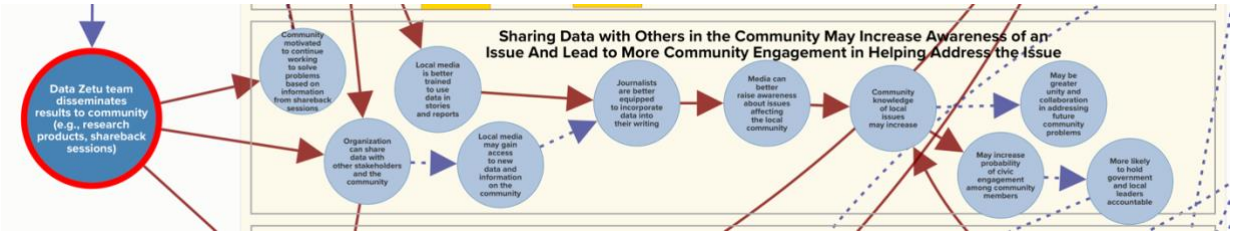
1. **What evidence exists that data is better incorporated into relevant decision-making processes since DCLI was implemented?**
   AND
2. **Through what pathways has DCLI/Tanzania influenced the use of data?**

The systems map shows both the evidenced effects of data included in various decisions at different levels as well as the specific interventions and innovations and subsequent pathways that influenced the use of data. Through direct and indirect pathways emerging from the DCLI program, data was incorporated into decision-making. The systems map reflects several specific themes, and also considered the ***most far-reaching and positively-viewed efforts***:

- Adopting a community-led planning process: Community dialogues served as the foundation for DCLI activities, using an open-ended approach to identify needs and set priorities - and then determine how data can contribute to a locally rooted solution.
- Providing high-quality training coupled with support: DCLI's training was highly valued, particularly when it was complemented by mentoring, support, and practical applications.
- Creating demand for data through individualized problem solving: Working directly with stakeholders to understand problems (above), identify data needs and support solutions, DCLI helped create demand for and use of data, particularly related to increasing data use for service delivery and resource allocation.

Adopting a community-led planning process fostered greater data used for decision-making and more effectively addressed community problems

One of the most positively perceived and effective aspects of the DCLI program were the ***community-driven dialogues (Listening Campaigns) and related community engagement activities*** conducted under Data Zetu. Listening Campaigns engaged citizens and local leaders to identify and prioritize the problems in their communities at the ward level. Through thoughtfully facilitated sessions, Data Zetu created an open and safe space for discussion, without significant limitations or predetermined plans. Priorities identified through these campaigns directed the



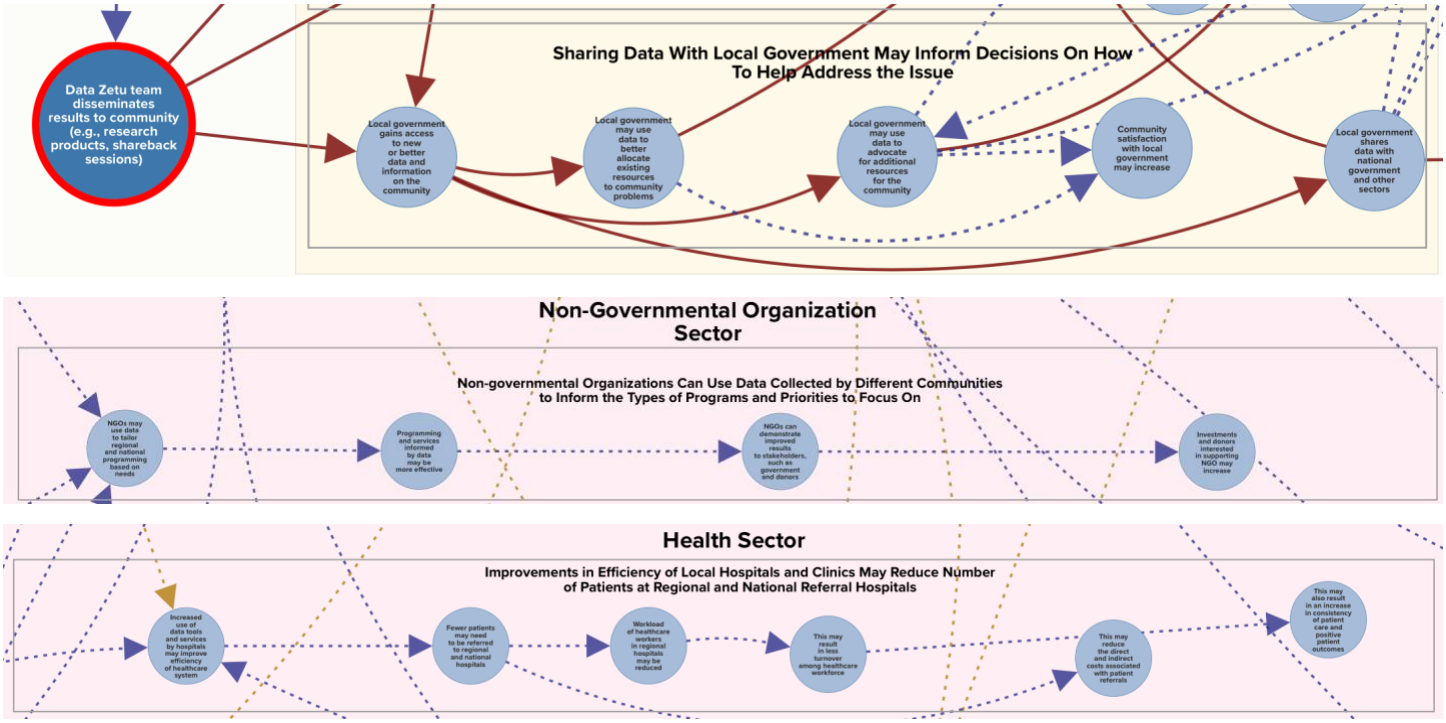
remainder of DCLI's activities in those districts. As shown in the map snapshots below, working to address local community issues can generate data leading to more awareness and engagement in future efforts to address these issues. Evidence from KIIs and use stories showed that organizations working as a part of Data Zetu shared this data with other stakeholders within the community. For example, as reported by Data Zetu, trainees shared their knowledge with an average of nine other people, while participants in Data Zetu's DCLI Practicum Fellowship reported sharing the skills they learned with approximately 60 other people. In addition to generating data, Data Zetu also trained journalists and individuals working within the news media to better incorporate data into stories and reports. By doing this, evidence from use stories showed that journalists were better equipped to incorporate data into their writing, leading to increased awareness of issues in the local community. Data Zetu's "Shareback Sessions," in which Data Zetu convened forums to share the results from projects developed out of the original Listening Campaigns with the community that had originally identified and prioritized the problems that the projects addressed, were highly valued by interviewees. These effect pathways may lead to further effects on the community, including greater unity and collaboration in addressing community problems, and an increased likelihood of holding government and local leaders accountable.

The pathway shown in the figure below (*Sharing Data With Local Government May Inform Decisions on How To Help Address the Issues*) illustrates how sharing data with local governments can increase the use of data for decision-making within local governments. Evidence showed that Data Zetu provided access to new sources of community data for the local government and new ways to collect and manage data, which in turn led to sharing of this data with national government and other sectors. For example, evidence from a use story indicates that one local government authority (LGA) worked with Data Zetu to receive trainings on data use practices, and helped formulate both a centralized data management tool and data collection tool to improve data collection in the community. There is evidence that local governments gained access to new data on the community, as well as some examples demonstrating how governments incorporated this data into their decision-making, either through allocating resources or advocating for help. For example, one use case described how a local medical officer's decision to allocate resources to a new medicine supply fund and supply center was a result of the Data Zetu team disseminating information gathered during community forums. The District Medical Officer describes this process:

> *Traditionally speaking, public health planning is often driven by central-level policies and resource allocation that trickle their way down the health system… The Listening Campaign actually acted as a bottom-up health planning platform which integrated citizens ideas in making the right investment decisions on the available limited resources in Kyela District.*

In another example, a ward executive officer (WEO) learned about the negative downstream effects of having a lack of medical dispensaries. For example, it results in high hospital admissions which contributes to lower quality medical services at the hospital and also leads to medicine shortages forcing community members to access more costly services and medications. After learning this, the WEO decided to prioritize investments and convert his office into a medical dispensary for the village. The WEO shared:

> *Before the Data Zetu intervention I knew less of the challenges faced by the community I lead, but after the intervention with Data Zetu, I have learned so much of the challenges. Health challenge was one of the issue[s] that stuck in my head, as we have a hospital nearby and I never knew that it wasn't enough for my people.*



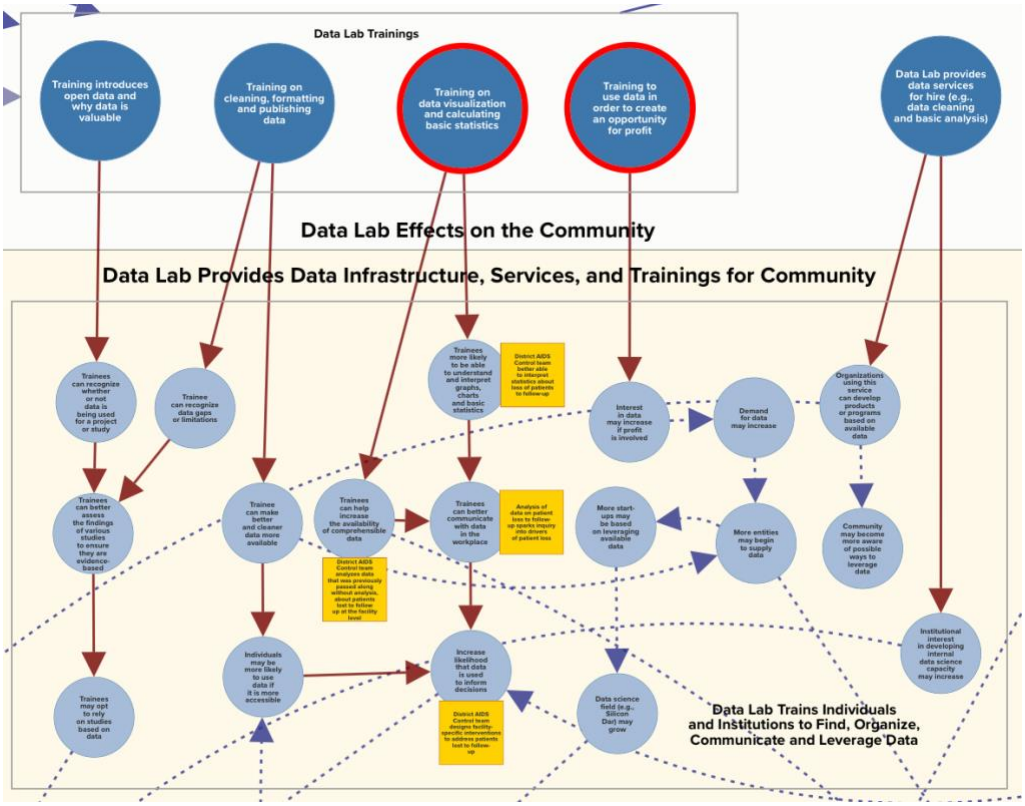
Incorporating data into decision-making starting at the local community level which occurred during the DCLI program has the potential to result in longer-term improvements in the local economy, as well as improved social and health outcomes. These improvements could motivate more hospitals, NGOs and other organizations to adopt similar processes for collecting data. The snapshots of the map illustrate how NGOs and hospitals (which serve as exemplars for this finding) are impacted by data use in decision-making but the effects could also occur in other sectors (e.g., education). During the Data Zetu project there was an increase in data use, collection, and sharing at the local level. Evidence of these benefits could generate interest amongst other regions and organizations to follow similar practices, which can further promote the use and collection of data among the NGO and other sector to inform strategic decisions about organizational priorities and how to fund different efforts.

Providing high-quality training, support, and data services can lead to greater appreciation of utilizing data, more valuable products, and sustainability

DCLI provided a wide range of training, mentorship, technical assistance, and related support on data skills. These were delivered through in-person sessions at the Data Lab in Dar es Salaam, as well as assistance to specific groups and organizations through all three projects. As shown in the figure below (*Data Lab Trains Individuals and Institutions to Find, Organize, Communicate and Leverage Data),* Data Lab's trainings and services helped individuals and institutions learn how to find, organize, communicate, and leverage data. Some of these effects were evidenced by interviews and program-provided use stories. For example, as indicated by the red solid arrows in the center of the section of the map shown above, training on data visualization and calculating basic statistics helped a district AIDS control team better and more efficiently interpret statistics themselves about loss of patients to follow-up (as opposed to sending to higher level management). This improved communication of the data and the likelihood that this information would be used for decision-making regarding interventions to improve patient retention. Another use story provides evidence that Data Lab trainings can help identify data gaps or limitations. Data Lab partnered with the National Bureau of Statistics (NBS) to review the Advanced Data Planning Tool (ADAPT), which the Partnership in Statistics for Development in the 21st

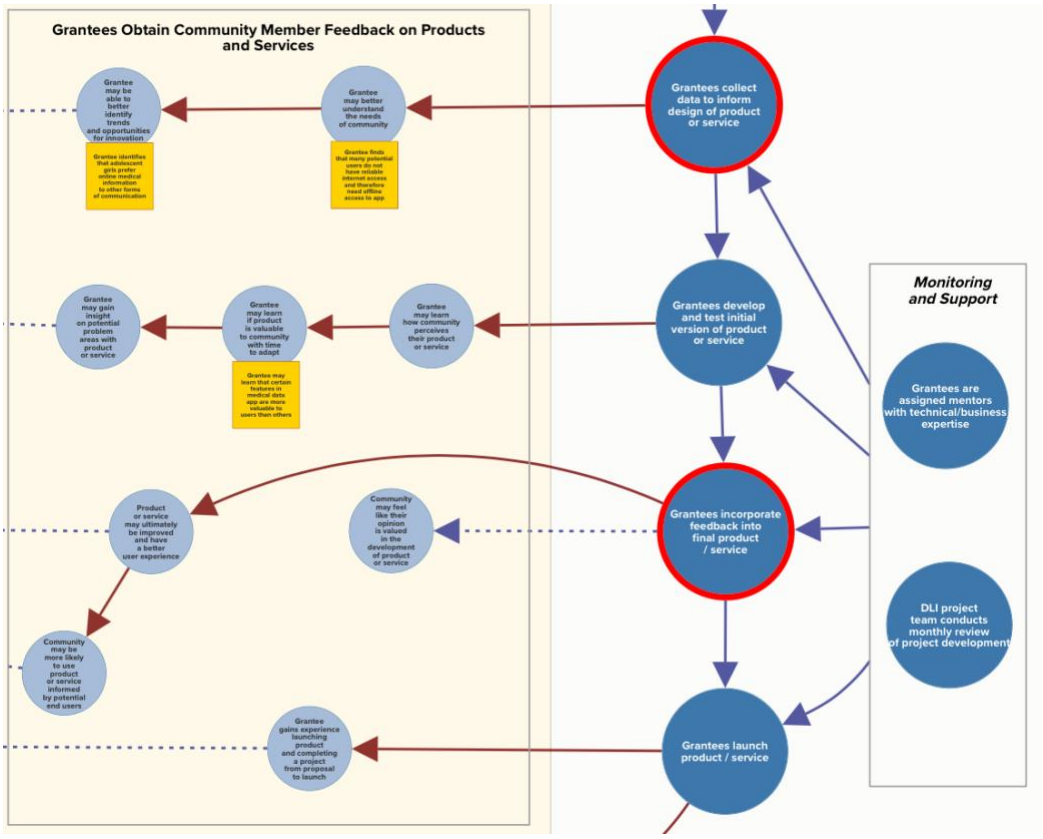
Century (PARIS21) was piloting in several countries including Tanzania. The limitations of the ADAPT tool were then shared with PARIS21 which led to the release of a more robust tool.

In addition to trainings, making services available for hire has helped Data Lab generate income that is critical to ensuring self-sufficiency and sustainability. This coupled with support from private and public sector funders is a clear demonstration that Data Lab can sustain itself as a center for data support, services, and engagement in the future.



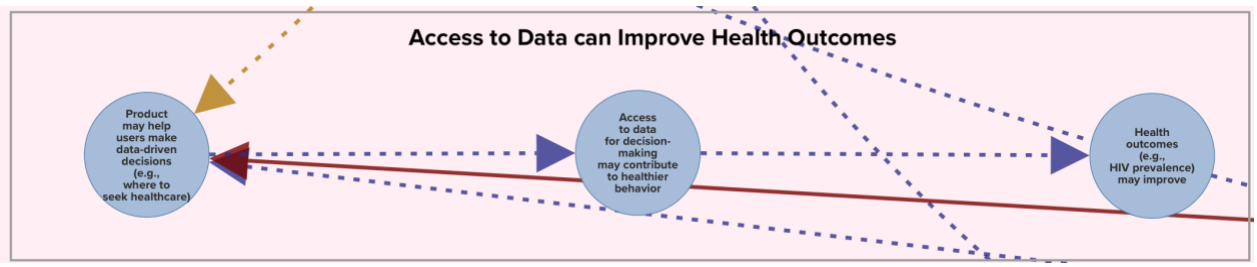
<u>Partnering with local actors to increase demand for data can generate more tailored solutions</u>

DCLI also ***partnered directly with local stakeholders to identify their data needs and support solutions***. This was cited across the DCLI program, including through specific innovation grants in DLIIC, community engagement and partnering with local organizations in Data Zetu, and institutional capacity development partnerships from Data Lab. These processes involved increasing the availability of data through new data collection and data sharing, as well as increasing the demand for data. Increasing demand appeared to be related to increasing individual data skills as well as increasing understanding on how data use related to specific HIV, health, and other goals.



For example, during the DLIIC, entrepreneurs were encouraged by their mentors to take a data-driven approach - grantees collected data and feedback from community members on their products and services, both pre-and post-design. Evidence from KIIs and use stories showed that collecting data to inform product development allowed the grantee to better understand the needs of the community and better identify trends and opportunities for innovation. For example, one innovator reported in the stakeholder validation workshop that during this step he realized that many members of the community relied upon free data provided by telecommunications companies during evening hours to download information from the internet to be read during the day. As a result, he prioritized offline use features in his mobile application. Further, evidence also showed testing early versions of a product or service helped generate feedback on how the product or service would be perceived or used within the community. These evidenced effects could have further potential effects on the community, including better product design and increased community interest in and potential uptake of a product or service.

Several of the products developed by grantees during the DLIIC project, aimed to put data in the hands of community members (e.g., in the form of a mobile app or platform) to inform daily decisions. This information could be one factor that contributes to and motivates behavior change and ultimately affects health outcomes on a broader scale. In fact, this use case shows how the NIPO software developed by a DLIIC entrepreneur helps track school attendance which in turn helps keep parents monitor of their student's behavior and whereabouts and ensure they attend school to ultimately lower the risk of adolescent girls contracting HIV/AIDS.



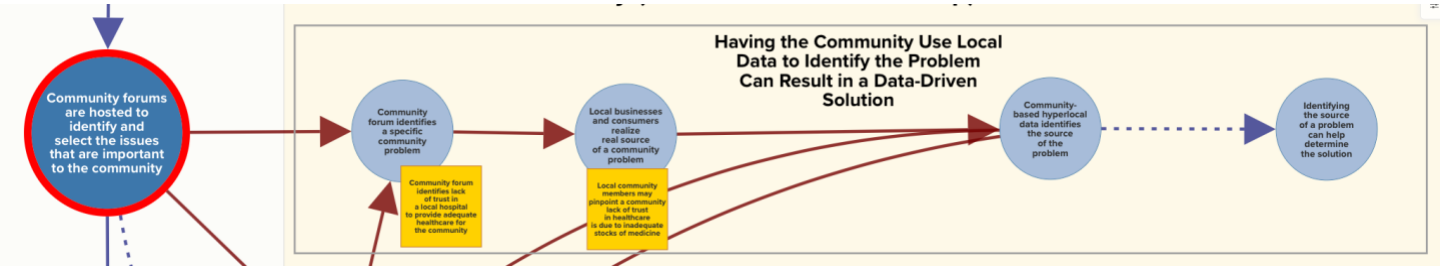
3. How did DCLI leverage or confront contextual factors facilitating or impeding change?

As part of a systems inquiry, we sought to understand the DCLI program's place in the wider development and data ecosystem in Tanzania. Several DCLI program components targeted and leveraged the factors specific to the Tanzanian data ecosystem, which affect the use of data for decision-making. The DCLI program harnessed existing expertise and local knowledge to facilitate training and problem solving - and by doing so augment that local capital.

- DCLI programs harnessed local leadership, knowledge and expertise to facilitate training and problem solving which leads to communities changing resource investment and allocation decisions.
- Basic infrastructure, access and sharing of data, availability of data, and crowded donor space and reporting requirements were relevant barriers.

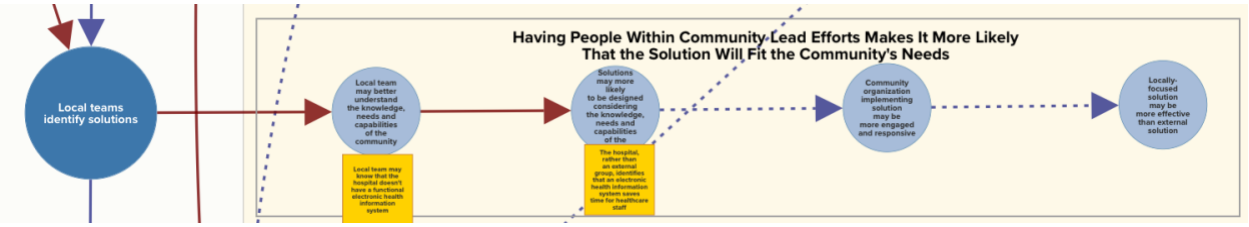
Local Leadership and Support:

Particularly when discussing efforts to promote data use at the local level ***local leadership and support*** played a key role in promoting data-use for change.



Within Data Zetu, the use of community forums to identify and select issues important to the community had multiple evidenced effects on the community, including helping local organizations and individuals realize the true source of a community problem, and increasing confidence that the problem will be solved. While Data Zetu helped identify local issues to address, the community forums also empowered others within the community to address issues outside of Data Zetu. For example, evidence from a use story showed that by attending Listening Campaigns hosted by Data Zetu in Kyela District, a local ward executive officer (WEO) who attended the campaigns realized that a lack of village dispensaries was a problem for the community. Equipped with this knowledge, the WEO began to devise a solution to the problem, including investing in a new dispensary. One of the red evidenced arrows from *Community based*

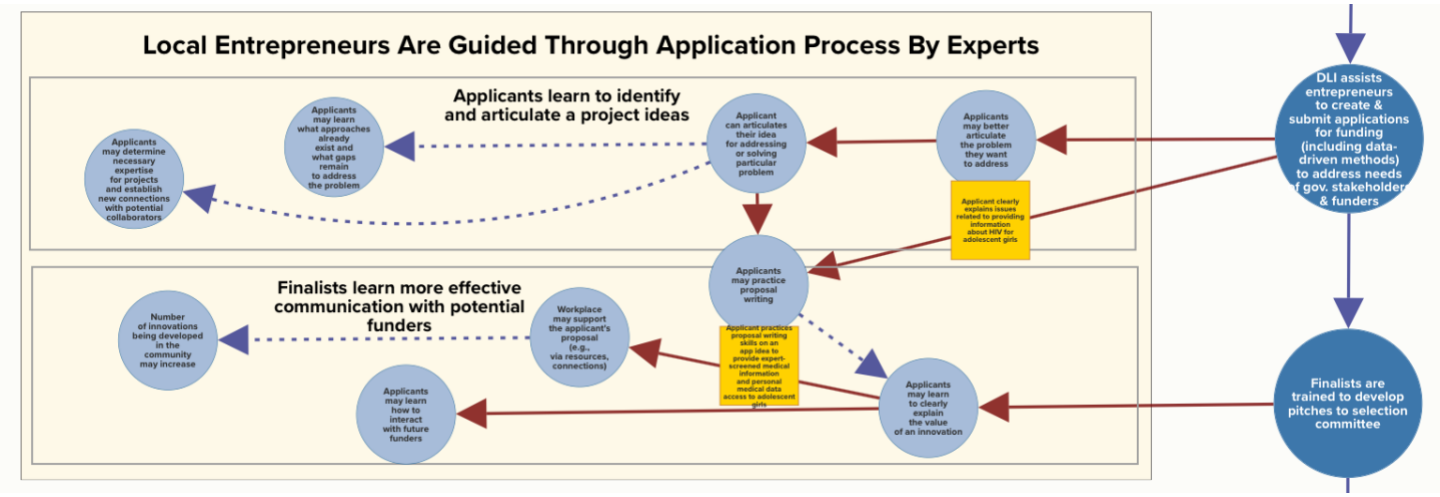
hyperlocal data identifies the sources of the solution connects to *Local teams identify solutions* reflecting that the discovery of a data driven solution occurred following the use of local data to identify the problem.

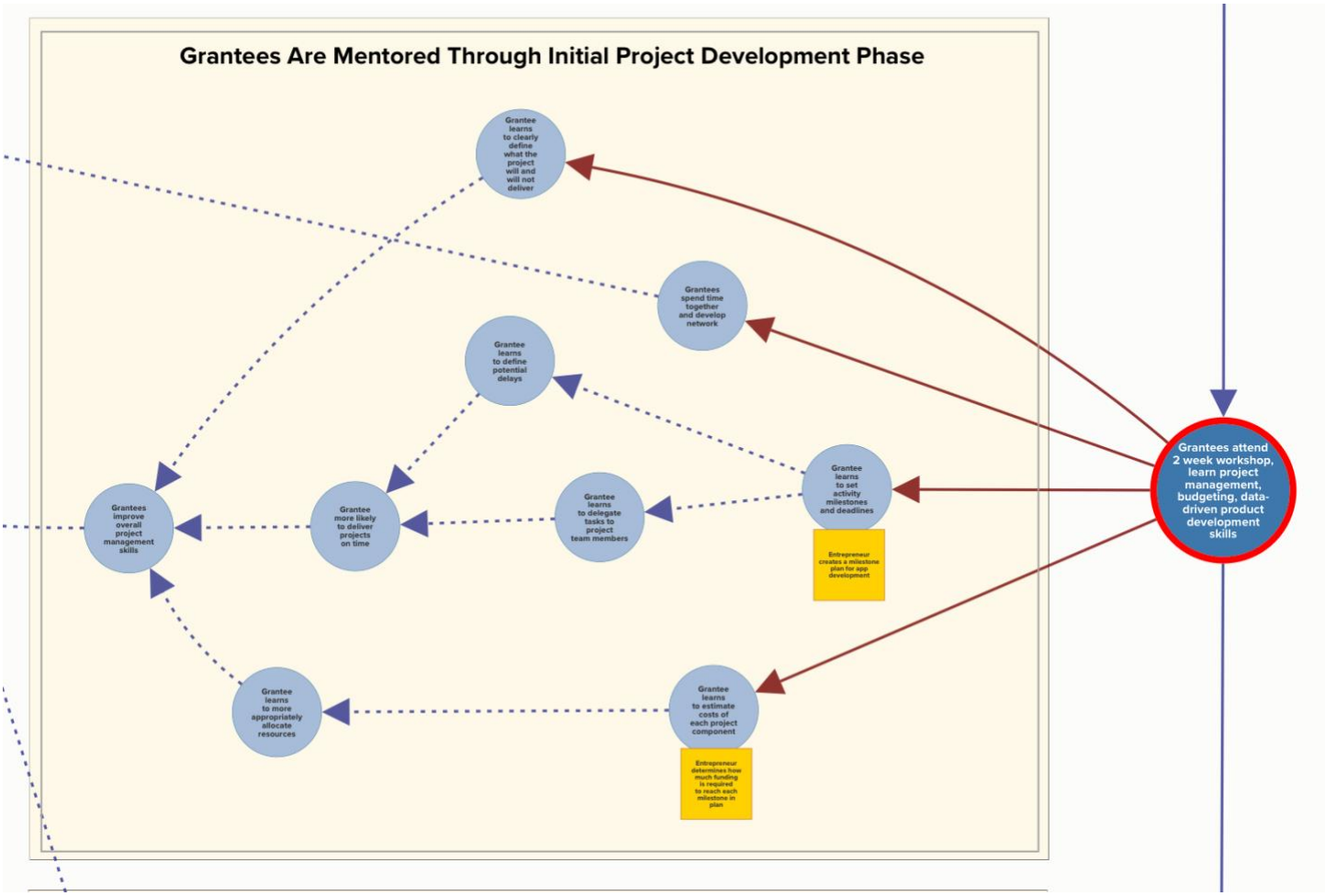


Another effect pathway of Data Zetu shows that working with local teams to identify solutions makes it more likely that the solution will fit the community's needs. Evidence from use stories shows that local teams may better understand the knowledge, needs, and capabilities of the community, which makes it more likely that the solution will be designed to address community needs. For example, Data Zetu worked with Humanitarian OpenStreetMap and KIHUMBE (non-profit home based health care service provider) at the local level to help allocate healthcare resources to people in need of HIV education and treatment. Importantly, Data Zetu recognized the need to train KIHUMBE on how to collect and use the data on their own, thereby making the solution more sustainable. By working with local teams to identify solutions and then training local organizations to sustain that solution over time, the solution may be more effective than if an external group had implemented their solution, though additional evidence is needed to support this potential effect.

The DLIIC program also leveraged local expertise, who guided applicants through the DLIIC application process.

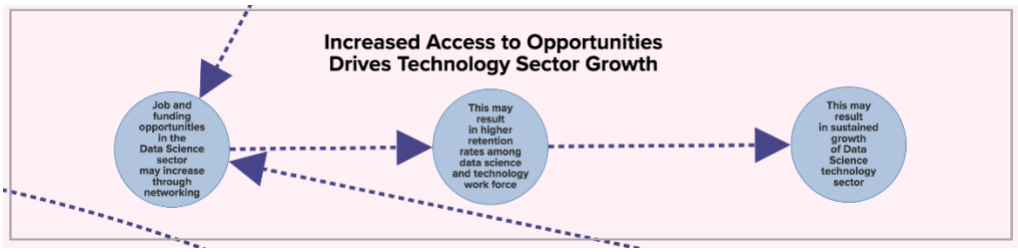
As this map section shows, by helping entrepreneurs (both males and females) create and submit their application for funding, evidence showed that applicants were able to better articulate the problem and their potential idea or solution as evidenced by the documentation (e.g., DLI Tracking Table) reporting the number of submitted applications and pitches for each window.





The DLI Innovation Challenge project also recognized that local entrepreneurs may not have the experience or expertise to successfully develop multiple product / service components. To overcome this challenge, DLIIC implemented a mentoring component where expert advisors helped grantees learn project management (e.g., developing timelines and milestones), budgeting, and data-driven product development skills. DLIIC also provided training and support needed for the entrepreneurs to measure their success through simple monitoring and evaluation strategies and metrics. Evidence shows that some initial benefits of these processes were to increase the skillset of grantees and to improve a grantee's network.

Both Data Zetu and DLIIC offer opportunities for entrepreneurs to network and develop a community of individuals in the Data Science, Technology, and Private Sector. A network can ultimately be a resource during a job search, which is not only valuable for the individual, but can also be leveraged to help facilitate the growth of the sector, as people may stay in the sector for a longer duration.



Similarly, DLIIC trained grant finalists to develop pitches to the selection committee. The effects of this guidance were not evidenced in interviews or use stories, but may have a number of potential effects. For example,

regardless of whether an applicant's proposal is selected for funding, applicants mentored in how to effectively communicate with funders may improve their ability to explain the value of an innovation, which could help them secure funding for the project through alternative means.

Basic infrastructure, access and sharing of data, availability of data, and crowded donor space and reporting requirements:

With regards to barriers and challenges, interviewees commented frequently that they enjoyed the skill building opportunities offered through DCLI, but the ***lack of basic infrastructure*** makes it impossible for them to use these skills effectively. Typically, this referred to the lack of computers, software, and internet connectivity. This further demonstrates the value of Data Lab's physical resources including a computer lab which students and other trainees could access. It also underscores the value of opportunities Data Lab provided for trainees to apply their skills. Future data for decision-making programs can continue to partner with organizations like universities and other stakeholders to ensure that skill development is coupled with the resources and opportunities to reinforce and use skills on a regular basis

Another challenge noted was related to ***availability of data at the program's onset***. One of the realizations was that the quantity and quality of data available especially at the local level was lower than originally anticipated. Some planners and implementors anticipated that DCLI could focus on unlocking data and increasing the use of existing data. As a result, the focus became on identifying gaps in what data was available, and advocating for the collection and sharing of this type of data. As described above (page 18) efforts like Humanitarian OpenStreetMap partnering with KIHUMBE found ways to conduct mobile data collection at the local level to overcome current data gaps.

Another challenge was cited related to ***restrictions in data access and sharing***. Increasing access to and sharing of data was a common objective in the earlier stages of the implementation period. At the onset of the program, Tanzania seemed poised to build on past successes in increasing data access and availability. However, major changes in the local political context occurred, including Tanzania's withdrawal from the Open Government Partnership and a new statistics law that restricted unauthorized release of data. While much of the DCLI program focused on creating a demand for data, this can have downstream effects of creating a culture of data use and sharing which could eventually have an effect on data sharing policies, though additional evidence on this pathway is needed.

4. How were collective and network approaches to strengthening the data ecosystem applied?

Finally, on the topic of data use and decision-making, particularly with relation to health and HIV services, interviewees recommended reflecting on the Tanzanian context of a ***crowded donor space and increasing reporting requirements***. As in many other settings, a large quantity of short-term projects with varying objectives and indicators are all focused on the same beneficiaries, health centers, and health workers. This is exacerbated by underdeveloped ***health information systems and human resources***, and applies enormous pressure to local service delivery systems. Data Lab's partnership with NBS was one avenue the program supported information systems such as ADAPT, which helps monitor and plan for gaps in current data collection and required indicators.

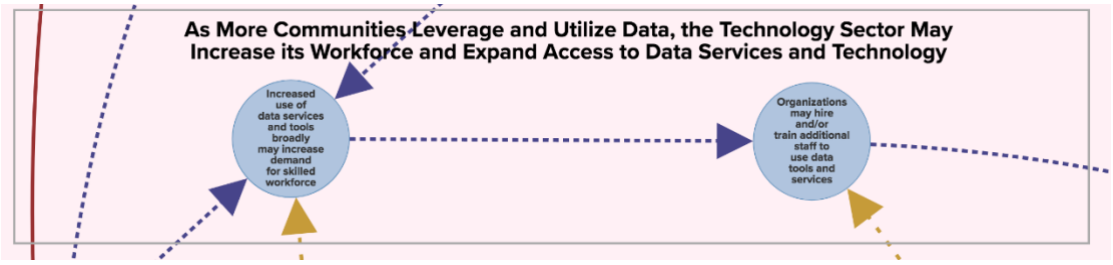
For the overall SPACES research effort, MCC demonstrated interest in understanding to what extent the DCLI program contributed to the ***development of a network of data enthusiasts***, as well as ***how far beyond the direct beneficiaries*** the program has reached. As shown in the systems map, there is supporting evidence for these themes:

- Strengthening existing system capabilities
- Spread and scale-up of interventions
- Connectivity among actors

Strengthening existing system capabilities:

DCLI was described by program planners as a ***set of interconnected investments*** that sought to reinforce each other and strengthen the overall data ecosystem. The central box in the systems map shows how the projects synergistically worked together to ultimately impact the broader sectors, including actors such as the Research Sector, Education Sector, Technology Sectors, National Government, NGOs and others.

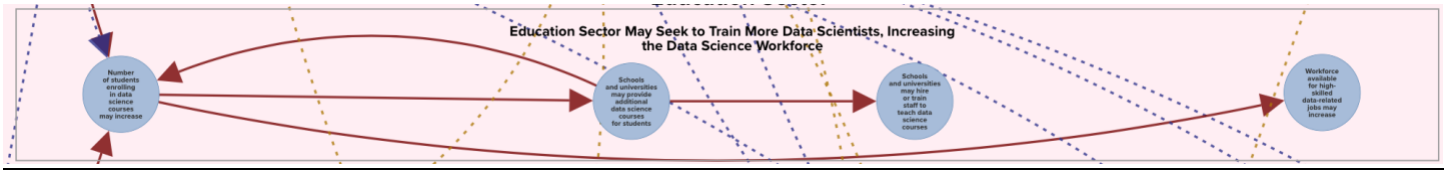
For example, arrows stemming from the Data Lab and Data Zetu project connect to this pathway in the Data Service, Technology, and Private Sector. This illustrates how an increase in a demand for data services and tools can potentially result in organizations shifting towards either internal capacity development or hiring external organizations to support this growing need.



Spread and scale-up of interventions:

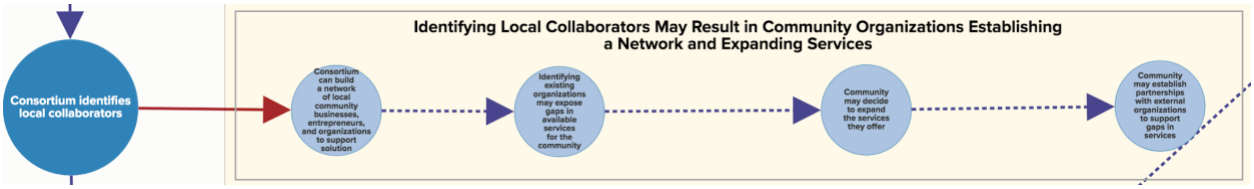
From the outset, DCLI envisioned the program as a starting place from which to grow and expand projects that supported data use for decision-making. With this in mind, the design of their projects allowed for natural scaling up and spread. One example of this occurring is the establishment of the Masters in Data Science Program at the University of Dar es Saalam. DCLI strategically headquartered Data Lab at the University to offer valuable computational resources and provide support educational opportunities in data science in addition to Data Lab project.

This facilitated the University's recognition of a growing community interest in developing data science skills. The figure below (*Education Sector May Seek to Train More Data Scientists, Increasing the Data Science Workforce)* shows how the broader education sector, which DCLI has already influenced, has played a key role in training and expanding the capacity for more individuals who can funnel into the Data Science workforce, as demand for them increases. Data Lab and Data Zetu collectively contributed to students enrolling in data science courses, which has resulted in a greater supply of trained data scientists to strengthen the data ecosystem.

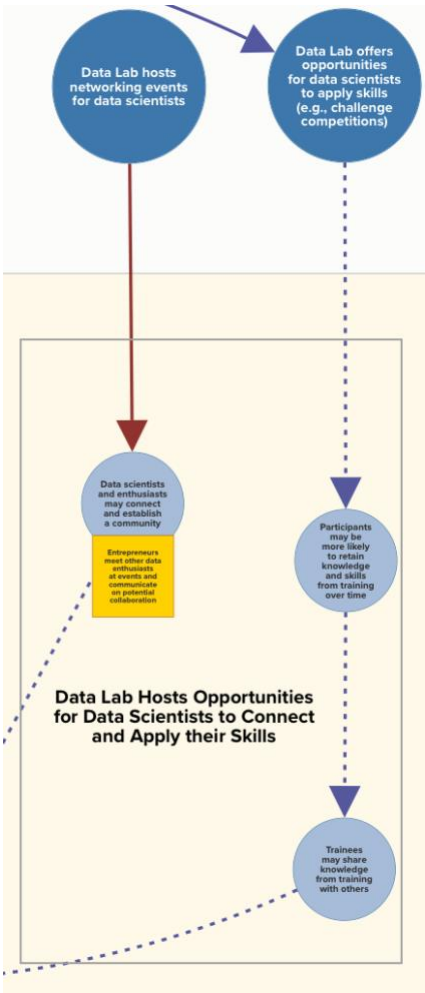


Connectivity among actors:

One key aim of the Data Zetu project was to engage Tanzanians at the local, community level and amplify their voices. Through efforts to engage with the community, the Data Zetu project not only identified local collaborators who could help address issues in the community, but may also have begun to build a network of local communities, businesses, entrepreneurs, and individuals who can provide data tools and services or knowledge of data-related issues in the future. Through this process, one potential effect is that the consortium may recognize gaps in certain data tools and services in the local community, which could spur future investment or trainings.



Data Lab also promoted connectivity among actors hosting opportunities and events for community members to connect and apply their skills. This included hosting networking events for data scientists to interact with each other, and hosting challenge competitions for data scientists. Evidence from interviews indicate that networking events helped data scientists grow their community. For example, participants reported that they enjoyed meeting other innovators and organizations through the different DCLI interventions. While evidence for the effects of the challenge competitions were not available, these events could help participants retain and improve their data knowledge and skills, increasing the likelihood that these skills are then shared with others. Additionally, a social networking analysis (described further under Evaluation Question 5) can help identify the current reach of these networking events.



5. What approaches were used to understand and measure systems change?

Influencing the system of factors was central to the design of DCLI. In this section, we describe how the DCLI program made efforts to understand and measure changes to how data is being used across the system.

DCLI aimed to understand and measure systems change through a suite of methods. First, a wealth of data exists through DCLI's Monitoring & Evaluation (M&E) system. As of December, 2020 key statistics from the project M&E system included:

- DCLI trained more than 2,000 people and 11 data scientists and data fellows.
- More than 2,800 organizations were involved in DCLI.
- Women comprised 49% of participants, and youth comprised more than 60%.
- Through five innovation challenges, 1,245 grant applications were received and 46 grants awarded worth more than $1.46 million.
- Communities generated 2.4 million data points.

Second, a series of specific outcomes of interest were identified in the program's logic models and in the evaluation questions provided for the DCLI evaluation. These outcome areas are summarized in **Table 1** below.
Evidence exists for each of these outcome areas in the systems map and specific information can be found as shown in the table. Based on our analysis, we identified evidence for each of the outcome areas specified by the program. Evidence for certain outcome areas was greater than others, potentially indicating that DCLI processes were more geared toward achieving certain outcomes. For example, data skills were impacted through various processes in DCLI, while transparency and accountability were less so. However, evidence exists that DCLI processes impacted each of these outcome areas in some ways. Generating additional evidence across these outcome areas can further determine the extent to which this occurred.

While the indicators that DCLI collected are key guideposts in the journey to data use for decision-making, it is also important to consider ways to track and capture the mechanistic steps between the DCLI program and outcomes of interest in order to show causal connections. Programs that understand the underlying mechanisms in the system, important barriers and facilitators, and how they connect to the outcomes of interest can design programs that effectively leverage facilitators and avoid or prevent barriers.

Table 1. DCLI Outcome Areas

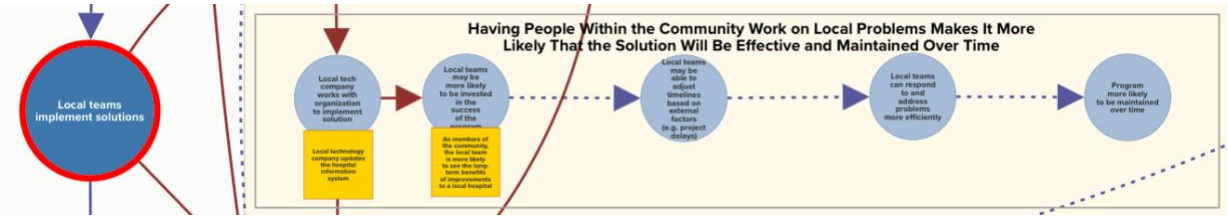
Outcome area	Description	SPACES Systems Mapping Assessment
Transparency and accountability	Government sharing of data with citizens, and citizens using data to hold government accountable	Evidenced under question 1 and 2 on page 13, question 5 on page 25.
Budgetary decision-making	Use of data in planning and allocating financial and human resources, making investment decisions	Evidenced under question 1 and 2 on page 13 and question 3 on page 17.
Service delivery decision-making	Use of data in delivering HIV, health, and other services, including to improve quality, efficiency, and customer satisfaction	Evidenced under question 1 and 2 on page 13 and question 3 on page 17 and 18, and question 4 on page 20 and question 5 on page 26.
Access to data and data sharing	Availability and accessibility of data for relevant plans and decisions	Evidenced under question 1 and 2 on page 15, question 3 on page 20, and question 4 on page 21.
Attitudes toward data	Perceptions of data, its value, and whether and how it is sought out and prioritized	Evidenced under question 1 and 2 on page 13-15, question 3 on page 20 and question 4 page 21.
Data skills	Skills to collect, analyze, and use data	Evidenced under question 1 and 2 on page 14.
Gender decision-making	Use of data to make decisions that affect gender equity, women, and girls	Evidenced under question 1 and 2 on page 16, question 3 on page 18 and question 5 on page 24 -25.
Citizen decision-making	Use of data to make decisions from the perspective of an individual citizen	Evidenced under question 1 and 2 on pages 13 and 15 and question 5 page 24.

Third, MCC commissioned a team to conduct a social network analysis to better understand how the relationships between different organizations changed as a result of Data Lab, Data Zetu, and Data for Local Impact Innovation Challenge. This work resulted in a social network map that showed the frequency of connections between organizations, the relationships and partnerships that were established or strengthened, and identified which organizations shared data as a result of DCLI. The social network map found:

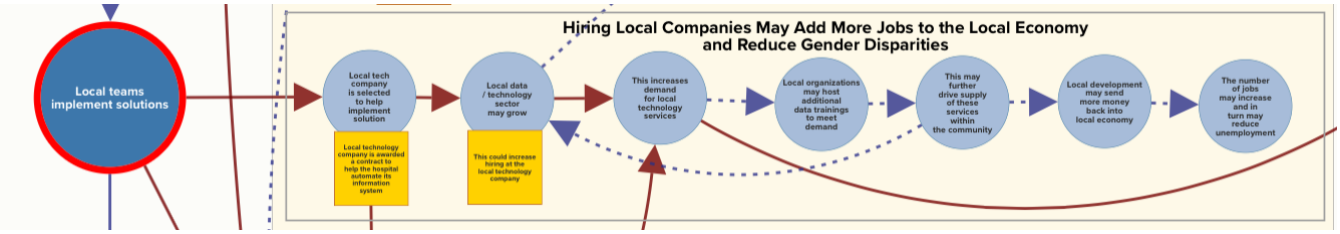
> *Months or even years, after originally engaging with DCLI, direct beneficiary organizations were sharing data skills, exchanging financial resources and partnering on projects and proposals.*

Finally, as described in the introduction, MCC established an agreement with SPACES to conduct an independent systems mapping effort. Below we have included emerging evidence of systems change as a result of the DCLI program.

<u>Working with local organizations can impact program sustainability and benefit the local economy</u>



One component of Data Zetu's community effects demonstrates that working with local organizations to implement solutions can help ensure the success of the solution. For example, interviewees reported that the strategic engagement of local actors was an important factor in program accomplishments and sustainability. However, while evidence exists to show that local teams may be more invested in the success of the program compared to external groups, there is not yet evidence to support some potential downstream effects on sustainability of programs addressing community problems in PEPFAR DREAMS districts. For example, local teams may be able to adjust timelines based on external factors like project delays, and may be able to respond to and address implementation problems more efficiently than external groups, resulting in an increased likelihood of project maintenance over time. However, there is not yet clear information to indicate that these occurred as a result of the program. Program implementers could survey each implementing organization to determine whether the program has been maintained over time and whether it has changed the local system, and if so, how using local teams has affected this.



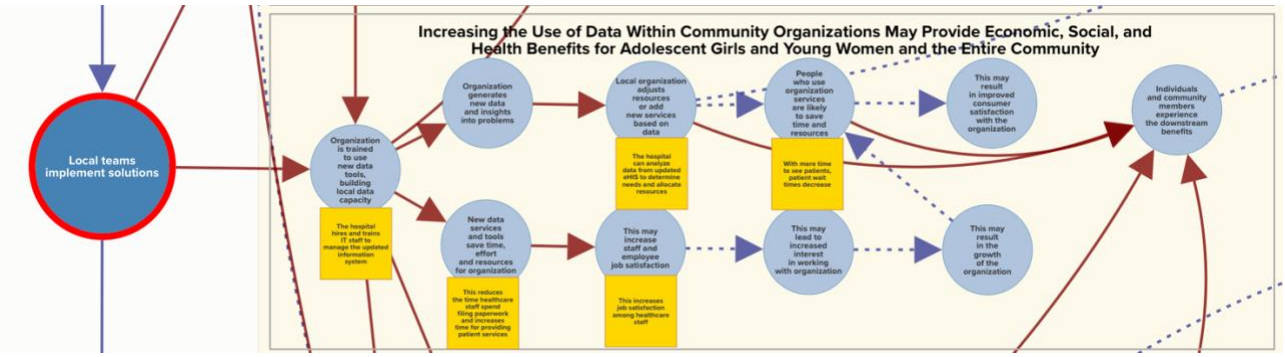
Additionally, as shown in the figure above (*Hiring Local Companies May Add More Jobs to the Local Economy*), hiring local technology can generate broader systems change. Interviews showed that Data Zetu partnered with local technology companies to help implement solutions and that this had a positive effect on the growth of local technology sectors and on local data ecosystems. For example, interviewees reported that Data Zetu excelled in reinforcing and building the capabilities of local organizations and subcontractors, which was important to strengthening the data ecosystem.

In addition to the interview evidence mentioned above, there is evidence from a use story showing that growth in the local data ecosystem and use of technology as a result of Data Zetu spurred additional demand for data tools and services. For example, one use story from Kyela showed that a local government leader advocated for additional data tools and services as a result of their interaction with Data Zetu. A project in Kyela sought to train LGA staff on data tools for improved decision-making. Until then, data collection primarily occurred on paper and was difficult to share. The initial round of data training through Data Zetu improved the capacity of the LGA staff to collect, manipulate, and analyze data. As a result of this, the District Executive Director planned to host additional data trainings and work on

adding new data tools and services for the LGA. This example provides insight into the potential systems level change that the program may be supporting.

While there is evidence that implementing local solutions may help grow the local data ecosystem and technology sector, driving an increase in demand for local technology services, there remain data gaps in how this can benefit the community economy. Further potential community effects include (1) increasing the number of data trainings and workshops, (2) increasing the supply of data services in the community, and (3) funneling resources back into the local economy, which can have positive economic effects, such as an increase in high-skilled jobs. Each of these potential effects do not have evidence, but follow-up data could be collected on the number of data trainings and workshops and the trends in data-related jobs available in a community to better understand and measure a systems change. Further, as mentioned above, a social network analysis, which was underway during the period of our research, can help measure how this and other program components helped establish new social connections in the field.

Local programming can ensure contextual and equitable solutions

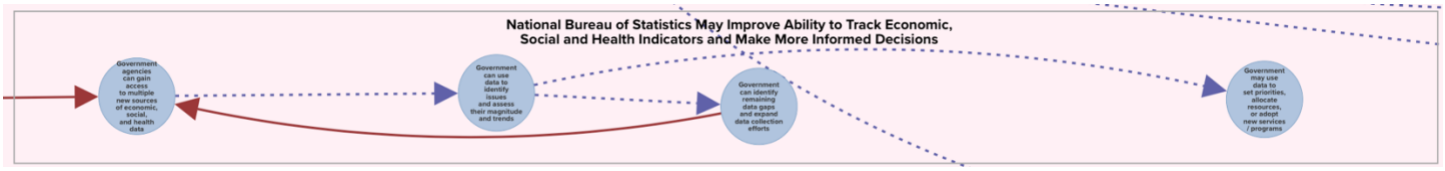


Another component of Data Zetu's Community Effects supported by available interviews showed that organizations that were trained to collect, interpret, and analyze data were able to generate new insights into existing organizational problems and adjust or add new services based on these insights. By utilizing data science, implementing organizations, Data Zetu, and other stakeholders were able to better understand the local community system in which they worked. For example, interviewees noted that Data Zetu trained and supported local leaders and community members to collect data and conduct surveys. These analyses generated new data and insights; for example, a local organization identified populations with poor access to healthcare and facilities with routine drug stock-outs that had not been identified through other efforts.

This map section also contains a number of connections supported by use stories. There is evidence from the use stories indicating that local organizations who adjust or add new services based on their data may provide downstream benefits to individuals within the community. For example, one project created a data mapping tool to identify HIV hotspots and connect sex workers to HIV testing and counseling services. Community providers demonstrated an increase in referrals of sex workers to healthcare facilities once the mapping tool was deployed. The use stories also provide evidence that an organization that learns to collect, interpret, and analyze data in new ways can save time, effort, and resources for their organization. For example, one hospital in Dar es Salaam implemented an electronic health information system and trained employees on the types of data to capture and how to assess and analyze the information. This helped the hospital administrators better determine how to allocate healthcare staff, equipment, and funds. Data became a primary factor in making operational and economic decisions for this hospital. As another example, staff and volunteers for a non-profit organization, the Mango Tree, were trained on data management and standardized a data collection tool to help collect and report data on children who had been orphaned. This process of standardization was reported to save hours of effort in data collection and reporting for volunteers. These improvements in organizational efficiency may have the additional benefit of increasing employee job satisfaction. For example, one team within Data Zetu worked to

digitize data on people who use drugs, while receiving training in how to access, clean, and share data. Employees reported that this type of training helped them learn new things and improve their work.

Increased data availability can improve decision-making capacity across multiple levels



Finally, local efforts to gain access to data during the Data Zetu project could motivate similar efforts at the regional and national government level. Accessing data can be used to understand the key issues and measure the trends over time to identify and quantify systems level change. This can also inform future work conducted by the government.

Leverage Points

Identified by bright red halos around a circle component, leverage points focus on places in the system that can lead to transformative change and guide future data use for decision-making. These leverage points were identified using the following criteria:

- The program component increases the reach of the program beyond its direct and immediate effects:

  The effects of some components clearly extend beyond the direct beneficiaries of the program.

- The program component can result in program sustainability:

  A component may have greater potential to lead to sustainability if there are multiple connections entering or leaving the component (e.g., a higher density of connections), and/or if the component and it's following pathway shows clear potential to influence data for decision-making.

Using this criteria, the 10 identified leverage points include:

1. Community forums are hosted to identify and select the issues that are important to the community

   Data Zetu's Listening Campaigns (LCs) allowed local communities to drive the problem identification and prioritization process, essentially directing the allocation of program funding. This ensured that problems targeted by the Data Zetu project were truly relevant to local communities rather than an external funder agenda being imposed from above. This level of engagement also increased buy-in and local ownership toward subsequent activities, a key requirement for sustainability of program processes and results. As identified in the SPACES preliminary report, this leverage point functioned as a gatekeeper to the pathway by which Data Zetu empowered local actors to lead change, supporting programs that are more effective and sustainable. It also demonstrated the type of flexible and adaptable programs, as called out in the preliminary report, that present opportunities to pilot innovative approaches and identify and scale up successful programs.

2. Local teams implement solutions

   Data Zetu hired local organizations to implement the plans addressing the problems identified and prioritized by the community in Listening Campaigns. By continuing to involve local organizations into project implementation, Data Zetu ensured local engagement and ownership in the problem-solving process, supporting sustainability, and also channeled resources and capacity-building projects into the local economy through these partner organizations. Partnering with local organizations to implement Data Zetu programming was an important way that Data Zetu empowered local actors to lead change.

3. Data Zetu team disseminates results to community (e.g., research products, Shareback Sessions)

   Data Zetu used multiple pathways to disseminate results back into the community, in a step that is often missed by development programs. Research products were designed in collaboration with local governments and then disseminated in order to support informed planning processes and data-driven governance. In addition, after

the completion of community projects that emerged from the Listening Campaigns, Data Zetu used excess funds to disseminate program results and data back into the community using forums called Shareback Sessions, which reflected communities' agency in identifying, prioritizing, and implementing solutions to community problems. In some cases, this inspired further engagement in community problem-solving outside of the Data Zetu mechanisms - an important sign of sustainable processes.

4. Grantees attend two-week workshop, learn project management, budgeting, data-driven product development skills

   In each DLI program window, new grantees attended a two-week workshop, during which they received training to construct a project milestone plan, budget, and scope documentation. In addition to the broader effects on their opportunities in the job market that they garnered from this skill development, grantees also were able to improve the impact of the projects they worked on in the course of the DLI grant window, which may have been implemented with less effect if not for these resource and capacity-building opportunities. The skills developed in this workshop formed the foundation of the skills that were built throughout the rest of the program. In addition to the explicit goal of skill development, the workshop provided an opportunity for grantees, within a single window, to spend time face-to-face and develop a network of like-minded data-driven entrepreneurs.

5. Grantees collect data to inform design of product or service

   In one key milestone in the DLI project, grantees were coached to collect market research data that would inform the design of their product or service. This step improved their ability to identify problems that need solving and to tailor solutions to real market needs. In addition, data collection fostered a culture of using data for product and service development, consequently increasing demand for data in the Tanzanian data ecosystem.

6. Grantees incorporate feedback into final product/service

   In the product development portion of the DLI grant window, grantees rapidly prototyped and tested their product or service with potential users, gathering feeding and incorporating it into the final version for launch. This step made the final product more relevant to end users, potentially increasing its uptake and use by the target market. Use of the product or service could potentially encourage entrepreneurs to continue innovation outside the grant window, further fueling the effects of the program such as demand for data, experienced job applicants, and a network of entrepreneurial data enthusiasts.

7. Data Lab is built to house lab space and computational resources for the data community

   Creating a physical resource for the data community had multiple downstream effects, including serving as a resource for students, faculty, and others in the community to access and work with data. It also provided a space to host trainings and workshops as well as a place to provide data services to the community. This leverage point highlights the importance of physical infrastructure as a gatekeeper, as it was required in order to facilitate the necessary logistics for the other components of the Data Lab project and their resultant downstream effects.

8. Training on data visualization and calculating basic statistics

There was clear evidence that the training that Data Lab provided on data visualization and calculating basic statistics improved communication of data and ultimately decision-making at various levels (local, national). While Data Lab provided training on a variety of data topics, data visualization, which taught trainees to tell a clear and convincing story with data, was critical in making data more digestible for a broader audience, which ultimately helped push forward the use of data.

9. Data Lab establishes relationship with University

   Data Lab established a relationship with the University early on in the project, which was critical for the existence and maintenance of Data Lab. This partnership helped bridge the gap between the data ecosystem and the role of the education sector. Over the course of the project, the University saw the value and importance of championing data science, which not only facilitated the development of Data Lab's physical space but also supported the development of the Masters in Data Science program to grow the capacity of community members and the data science workforce. This leverage point underscores the importance of the DCLI project connecting with key stakeholders early on to solidify their partnership in order to support the sustainability of the work.

10. Training on data use results in financial incentives and opportunities

    In another important leverage point, Data Lab both trained students how data science can be leveraged for profit and demonstrated it in practice through offering data science services to the community. This may have motivated other community members to gain these skills, and as the interest increased, the need and demand for data may have also increased. DCLI initially aimed to capitalize on the availability of the Open Data Portal, but when it became less accessible, Data Lab had to find other avenues for generating the interest and demand for publicly available data sets. Increasing the investment at this leverage point has the potential to generate a longer-term desire for data availability and use in the community at both the local and national level.

Conclusions

The systems map of DCLI demonstrates how all three projects within DCLI – Data Lab, Data Zetu, and DLIIC – are influencing the use of data for decision-making at both the community and broad sector levels. This includes, for example, the empowerment of individuals, organizations and local governments to better address their community's needs (Data Zetu), the training of individuals on data science to make more informed decisions within their organization (Data Lab), and the mentorship of entrepreneurs to develop data tools and services aimed at reducing health disparities and achieving gender equity. Overall, an increase in the use of data for decision-making was demonstrated across multiple levels as evidenced by program documentation and key informant interviews, but further evidence is needed to understand the extent to which these data were incorporated in higher-level decisions.

Because the DCLI project was developed with the goal of effecting systems change, it is especially relevant to use a systems map to highlight a broad range of effects that might go unnoticed in traditional approaches. By mechanistically mapping out how the program effects change at the community and broad sector levels, the map demonstrates the potential effects of each program, and highlights areas where additional data may be collected to further measure this program or future programs' success. In addition, this systems map shows not only the potential effects of each program on the community and on broader sectors, but the potential effects of each component of each program. Future programs can use this information in multiple ways. For example, this map shows the range of benefits that occur just from hosting a community forum to identify local issues (Data Zetu) – a program component that could be intentionally included and strengthened in future implementation. Furthermore, developing and utilizing a systems map at the onset of a program can help guide the design and monitoring and evaluation plan to ensure information is captured to demonstrate the effect on the data ecosystem.

The map also highlights several leverage points in the system which are program components that are key processes that can effect change in the data ecosystem. Listening Campaigns were important because they allowed local communities to drive the problem identification and prioritization process, which ensured that problems targeted by the Data Zetu project were truly relevant to local communities, rather than an external funder agenda imposed from above. Additionally, Listening Campaigns increased stakeholder buy-in and ownership toward subsequent program activities, a key requirement for sustainability of program processes and results. Local implementors were also critical for ownership and ultimately sustainability. Further, intentionally disseminating research products can lead to reverberating community effects, by sharing how community engagement has effected change and sparking interest in continuing community-led processes. The DLIIC two-week workshop served as an important opportunity for mentoring the entrepreneurs in areas such as project management, budgeting, and product development which not only improved their projects but also more broadly, could affect the job market. Grantee data collection and incorporating feedback into final products was important for fostering a culture of using data and increasing demand for it. Creating a physical resource for the data community had multiple effects, including acting as a data resource for students, faculty, and others in the community, as well as providing a space to host trainings and workshops or provide services to the community. The physical infrastructure was critical to the other processes that Data Lab provided and their resultant downstream effects. Training on data visualization and calculating basic statistics was clearly evidenced to improve data communication and ultimately decision-making. Training individuals on how to leverage data for profit also generated interest in Data Science. Another leverage point was Data Lab's relationship with the University which served as a key partnership for furthering, championing and sustaining the goals of the program beyond the work of DCLI.

MCC designed the components of DCLI to strengthen the data ecosystem from multiple angles with the intention of gaining synergistic effects in the system. The systems map shows where the effects of these components may converge to amplify the overall program effects. For example, one potential collective effect of Data Zetu, Data Lab, and DLIIC is their effect on community members' interest in pursuing educational opportunities (e.g., coursework and trainings) in

data science. While Data Lab provided a physical space for data science and helped catalyze educational opportunities in the field, Data Zetu increased local awareness and interest in data and data science. The DLIIC also demonstrated how these skillsets could lead to more useful products and potential profit. In this example, developing computational simulation models representing enrollment in data science trainings, and the effects of trainees incorporating and leveraging data into their routine work following the training, may help demonstrate and quantify the synergistic effect of the three projects.

The multiple projects, organizations, and activities that make up DCLI operate within and across a complex data ecosystem, making a visualization of the systems-level interactions critical to accurately communicate the program's scope and reach to key stakeholders. This systems map can be used to show how DCLI fits within and affects this complex system. In addition to improving communication and understanding of a complex system, this systems map goes beyond traditional program evaluations to show the potential effects that may not yet be evidenced by initial interviews or use stories, particularly those pathways which may go unnoticed or for which data is difficult to collect. This serves to highlight both the large potential impact of the DCLI program and provide guidance for program officials in future data collection efforts.

Based on the available evidence, DCLI has begun to spur wider changes in Tanzania's data ecosystem. This reflects the overall success of the DCLI program and the applicability of its lessons learned to the wider data and development community. We recommend that donors, governments, and civil society partners reflect on the leverage points and lessons learned from the DCLI program and seek to incorporate the more successful pathways to change in their work, as appropriate.

Figure 1: Comprehensive Systems Map of the Effects of DCLI Program

* NB: Higher resolution figures are available as separate attachments.

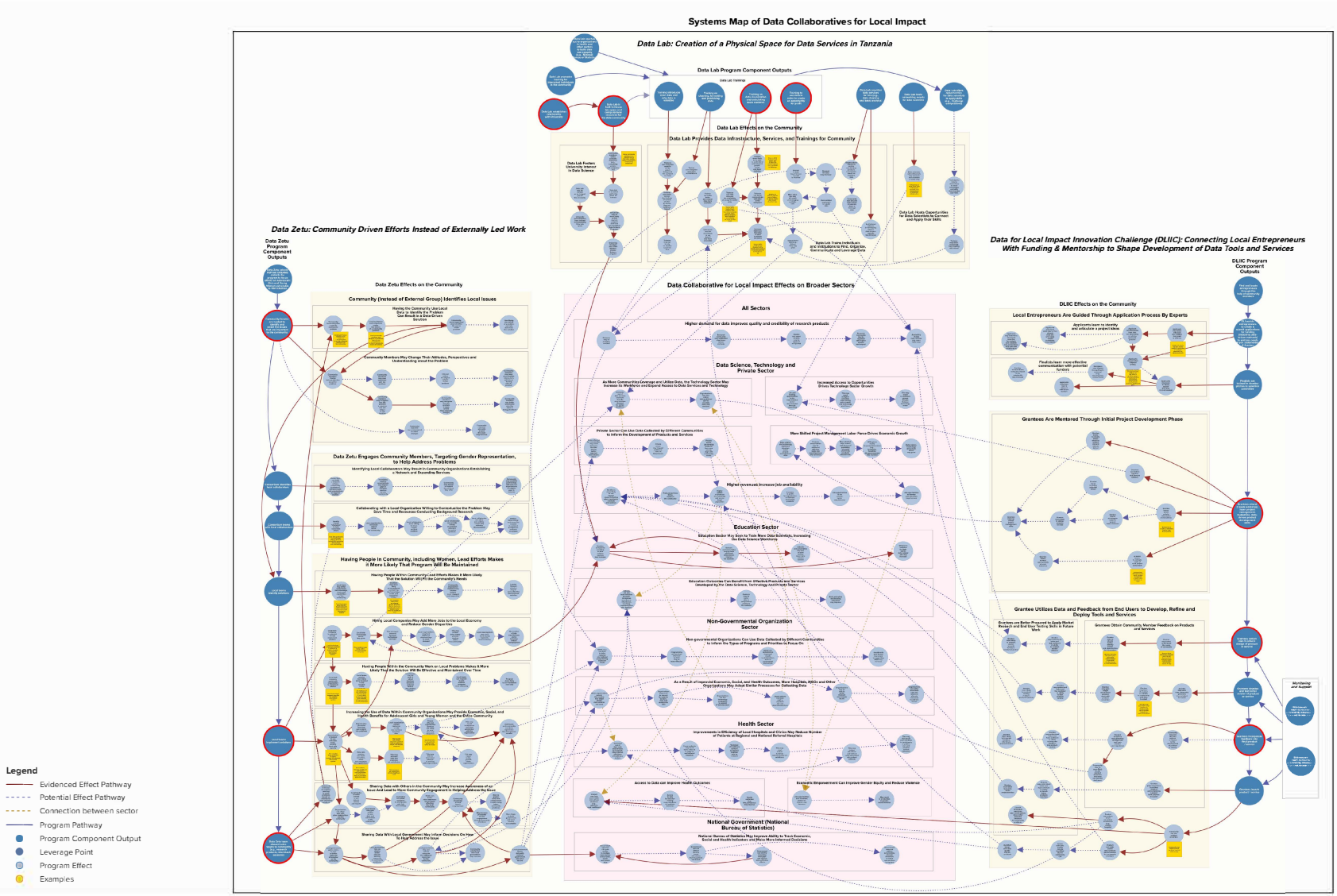
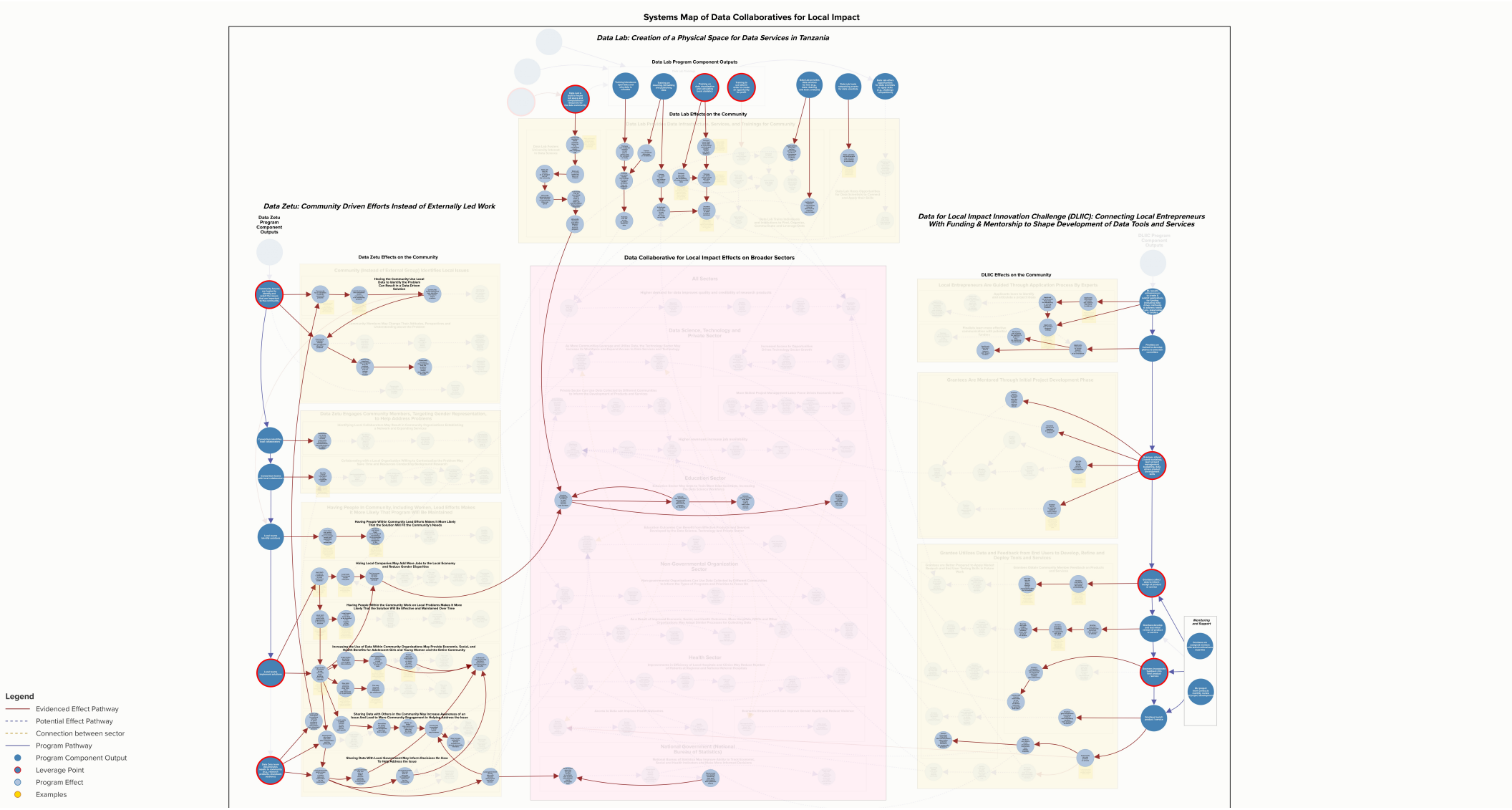


Figure 2: Systems Map of Evidenced Pathways of Effects of DCLI Program



SCOPE OF WORK

INTRODUCTION

The $22 million Data Collaboratives for Local Impact (DCLI) program is the result of a partnership between MCC and PEPFAR, working together to test and demonstrate beneficial use of data for development. (DCLI is funded and overseen by PEPFAR, designed and implemented by MCC.) DCLI explores how data-driven decision making can lead to sustainable development. Key elements that guide us include

- Country ownership is essential to advancing development in a sustainable manner. Setting a high-quality standard for data use and empowering local governments, the private sector, and civil society by enabling in-country analysts to provide sound, actionable information to decision-makers is critically important.
- Data presentation through visualizations, localization and delivery through applications permits digestible, citizen-centric ways for people to make use of data – leading to "data democratization". Infomediaries like data-driven journalists write stories from data and provide context with which to understand important data sets.
- Sub-national data use enables beneficiaries to become participants. Listening to local citizens and documenting their needs is the first step toward engaged, responsive economic development. DCLI has experimented successfully with hyper-local engagement and collection of citizen-generated data. Data provides a tangible, objective, re-usable way to document community needs, capturing the voices and ideas of local citizens in an analyzable way.

DCLI uses an ecosystem approach of interconnected projects in key areas to build a country's capacity to use data to tackle development challenges and improve lives. Establishing data science capabilities sets a high level of analytical skill, while investments in women's empowerment and innovation connect information and resources to local, national, and bilateral priorities. Combined, these projects build the demand and capacity of local governments, private companies, and individual citizens to use data to innovate, improve decision-making and put data into action.

- Establish a center: A key component of the DCLI model is establishing a center of data analysis, which raises national capacity in data use. From this core of capability skills can be diffused through practical data analytics, data science training, and community events.
- Set the environment: Establishing a policy and regulatory environment conducive to data use and innovation is critical – including rules governing data openness, data privacy and use. Coordination with global organizations guides countries' national statistics offices, planning ministries and others to align their work with global efforts to harness data for beneficial use.
- Foment change: Fostering innovation, through targeted grants or challenges, identifies, networks and incentivizes youth and entrepreneurs to create data-driven innovations to real life problems. Making data-driven decision-making commonplace at various levels involves surfacing new, locally-grounded ideas and supporting them through implementation.
- Engage locally: Community engagement makes data meaningful and accessible locally – where real change takes place; and demonstrates to local government officials how they can use available data to advance local priorities, align scarce budgets, and improve the flow of data across levels of government.

BACKGROUND

The DCLI program in Tanzania was designed following from in-country consultations, which showed that the "data supply" and "enabling environment" side of the ecosystem (see diagram) was being

stimulated through a DFID-funded World Bank project called SOGDAT (Support for Open Government Data and Accountability in Tanzania). What was deficient were the "data demand" and "data capacity" sides. Accordingly, the program logic shown in the Appendices was developed.

This led to the design of a model of interconnected investments to strengthen the data ecosystem, embodied in three projects:

- Tanzania Data Lab (dLab), a center of data-related activity including physical space and computing resources, training and skills-building on the analysis and use of data, planning and hosting of data-focused events, convening on data topics such as strengthening of HIV/AIDS analysis and data policy discussions such as development of a national data roadmap, and extending its reach both sub-nationally and internationally.
- DLI, a flexible platform used to launch grant challenges ("windows") in a variety of themes. The projected strategically engages, mentors and connects local innovators and entrepreneurs with global technology partners, advocates and south-to-south collaborators to unlock datasets and fill data gaps to strengthen the overall data ecosystem and respond to requirements of DREAMS and other data-related opportunities as they arise in Tanzania.
- Data Zetu, a demonstration of how the data revolution can be harnessed at the subnational level by improving the capacity of subnational (district and ward) institutions to provide and make use of actionable data. It will increase participation of citizens, infomediaries[1], community stakeholder and civil society organizations (CSOs), and small and medium enterprise (SME), making use of data to improve services and decision-making on the use of resources – increasing economic growth and improving lives.

A fourth component, a partnership and grant to the Global Partnership for Sustainable Development Data (GPSDD), was added to build high-level support and facilitate a national data roadmap. As part of its work on the national data roadmap, the DCLI and GPSDD worked with PARIS21 to implement the ADAPT tool to identify data gaps in SDG reporting.

In order for DCLI to better understand the effectiveness of its program in Tanzania, and to inform similar efforts in other countries, MCC is seeking independent evaluation and systems mapping services to be contracted through the USAID Global Development Lab.

This document outlines a scope for collaboration between the Lab - MERLIN Team (EIA) and MCC for network analysis of the data ecosystem and systems mapping methods and tools, and an independent performance evaluation report. Through this Task Order, SPACES should evaluate the DCLI program in Tanzania, as detailed below and agreed during the initial activities.

OBJECTIVE

Provide to MCC consultative and advisory services to create a systems map of the DCLI program in Tanzania, and utilize the map to analyze the impact of the program.

SCOPE OF WORK and TASKS

SPACES (Strategic Program for Analyzing Complexity and Evaluating Systems) is an initiative of the Monitoring, Evaluation, Research and Learning Innovations (MERLIN) Program through the U.S. Global Development Lab in partnership with the Bureau for Policy, Planning and Learning. SPACES aims to bring a variety of systems tools and methodologies that decision makers can use to enhance assessment of innovation impact potential to provide a comprehensive systems analysis. This approach to program

[1] An infomediary is company, group and/or website that gathers, organizes and repackages information and acts as an intermediary and/or advocate between those who want or need the information and those who supply the information. In many cases, infomediaries can help to put information into a format that is more accessible or more understandable to others that may not have as much experience with data, for example through products such as infographics amongst others.

design and implementation for USAID and its partners is an operational innovation championed and pioneered by the Lab and being tested throughout Operating Units within the Agency.

The SPACES team, drawing on its experience in innovative systems mapping and evaluation, will draw from its partner organizations to mobilize a team with the core expertise needed to successfully evaluate the DCLI program in Tanzania.

Millennium Challenge Corporation is interested in understanding the performance and outcomes of its project, Data Collaboratives for Local Impact (DCLI), which aims to enable effective use of data by organizations and individual citizens. This Task Order outlines the Lab - MERLIN Team (EIA)'s engagement with MCC for systems mapping and evaluation reporting of the DCLI program in Tanzania.

SPACES will use the systems map to address the following high-level questions:

1) To what extent has DCLI / Tanzania been effective in achieving its objectives of enabling effective use of data by government, donors agencies, non-government organizations and individual citizens?
2) How can the findings and recommendations of this evaluation inform DCLI programming in Cote d'Ivoire and elsewhere?
3) To what extent has the DCLI program contributed to the development of a network of data enthusiasts?
4) How have the beneficiaries of DCLI innovation grants, training, and interventions propagated the data ecosystem in their own lives and communities? How far beyond the direct beneficiaries has the project reached?
5) What have been the most far-reaching and positively-viewed efforts from the DCLI programs?

The systems map can help address a set of questions that will be provided by DCLI and agreed with SPACES at the outset of the project. An indicative list of possibilities is as follows:

Outcome Level	Outcome	Evaluation Question
Impacts (Estimated Timeline from Completion: Early Adopters: 1 - 3 years; Average: 2-4 years)	Improved Outcomes for and by the People	Did target groups (organizations, public entities, and individuals) change how they use data? Why and why not? What barriers still exist? For those organizations, entities, and individuals who changed how they use data to support decision making, how have final outcomes changed as a result? (Final outcomes include: HIV/AIDS and broader health, including health-related aspects of gender equality and economic growth. Broadly, SDGs: 3,5,8 and 17)
	Improved Alignment between Needs and	To what extent and in what ways has the alignment of needs and budgets (amongst target groups) changed as a

	Budgets	result of the program?

	Data are More Frequently and Effectively Used for Decision Making	To what extent and in what ways have target groups changed their decision making processes to incorporate more data as a result of the program?
		To what extent is available information used by decision makers to improve outcomes for women and girls?

ILLUSTRATIVE ACTIVITIES

Activities and deliverables for the assessment will include:

Activity 1: Develop Research Plan

Over the course of the first 4-6 weeks, SPACES will work to develop a research plan. The research plan will draw from information from the existing M&E plan, the project NOFOs (Notice of Funding Opportunity) which describes the intent of the activities and the logic behind them, as well as additional discussion with DCLI team members to determine a method and timeline for the following:

- Collection and transfer of data,
- Identifying and collaborating with key stakeholders,
- Conducting analysis and generating systems maps, and
- Validation of systems maps.

The SPACES research plan will outline specific steps associated with each activity as well as detailing project roles and timelines.

Deliverable: Research Plan

Activity 2: Secondary Research

SPACES will review key research shared by MCC and other available documentation to gain an understanding of the DCLI program and related systems. The team will construct a general map of the DCLI system which will serve as a framework to understand the performance of the project. This research will constitute the backbone of Systems Map generation.

During this activity, SPACES will review relevant documents, reports and evaluations provided by the DCLI team, ask questions of the DCLI team and identify gaps in knowledge.

Deliverable: Interview Guide

Activity 3: Consultations / Key Informant Interviews

SPACES will remotely (phone, internet) conduct targeted Key Informant Interviews with relevant informants, primarily anticipated to be MCC staff leading the DCLI program, and potentially DCLI program participants. Our ability to conduct interviews will be based upon availability of relevant informants given the remote nature of the work and the time-frame. SPACES will work with MCC in the process of gathering accurate information.

As part of this activity, SPACES will draft a list of interviewees and DCLI will help identify specific key

informants. SPACES will schedule key informant interviews with assistance from the DCLI team.

Deliverable: Interview results

Activity 4: Develop a systems map of DCLI programs and participants and their role in the complex development system

The goal of this activity is to map the pathways of impact to illustrate the ways the DCLI program affects different people and sectors. The map will identify each of the choices and decisions impacted by leveraging data and then show who is affected by those decisions. This resulting systems map will be developed from a wealth of data, including a review of qualitative reports on DCLI, DCLI participant assessments, key informant interviews with current and former DCLI participants, their instructors, supervisors and those knowledgeable of the current systems they operate in. Together, this information will capture the processes behind how DCLI participants engage with the system. The map will also identify leverage points where the DCLI program aims to improve the way data is leveraged to inform decision making - all of which affect various systems and people.

We anticipate the development of both broad systems and sub-systems maps, depending on the actors and issues that emerge in the analysis. Illustrative visualizations may be:

- Issue-based, identifying the dynamics between multiple interconnected issues in the system;
- Actor-based, highlighting actors of interest in the DCLI program and their relationships, including delineation of actors based on specific attributes (e.g. position, function, etc.);
- Event based, visualizing the real or hypothetical impacts of certain events relevant to the DCLI team;
- Group-based, highlighting particular groupings of actors (geographic, sector etc.) and the factors driving their relationships.

Deliverable: Systems Map

Activity 5: Independent Evaluation Report and Presentation

Based on the patterns and leverage points identified in system map, SPACES will develop a set of evaluation findings for the evaluation questions presented above and agreed during Activity 1 for the DCLI program. A draft report will be developed and sent to team members for feedback before the report is finalized.

In addition to systems and evaluation content and items referenced above, the evaluation will:

- Identify barriers to using data for decision making identified during the evaluation analysis
- Identify key take-away lessons for future innovation and data initiatives
- Advise on M&E framework deficiencies and adaptations for future projects

The report and findings will be presented separately or jointly, as agreed with DCLI, to groups at PEPFAR and MCC, and to selected external groups as agreed.

Deliverable: Final report and presentation of findings

In alignment with the above-listed activities, USAID Lab - MERLIN Team (EIA) and the SPACES project team will regularly or as needed:

- Hold briefings, bi-weekly or more frequently if needed, with DCLI to advise on progress and barriers

to progress
- Contribute to learning events and other public fora to inform others

MCC AND USAID RESPONSIBILITIES

USAID's RESPONSIBILITY

The Lab - MERLIN Team (EIA) and SPACES Commitment

Each SPACES pilot engagement is designed to meet the monitoring, evaluation, research and learning needs of its activity, while also contributing to a larger MERLIN learning agenda. This includes testing the various MERLIN approaches to contribute to a broader learning agenda with SPACES as an approach. Each engagement will contribute to a set of core questions about using SPACES approaches in USAID, as well as questions specific to the approach used and the activity being monitored. To facilitate these dual learning objectives, each SPACES engagement will involve a series of M&E approaches to assess whether SPACES is effective as an approach and in generating better program outcomes.

Periodically, the SPACES consortium, the Lab - MERLIN Team (EIA), or the Policy Planning and Learning Bureau's office of Learning, Evaluation and Research (PPL/LER) will solicit feedback and document the learning process and its outcomes with MCC participants. Data sources may include program/extant data, rapidly conducted survey data, key informant interviews, and/or focus groups. This may involve participation by representatives from the Lab MERLIN Team (EIA), SPACES**,** and other the implementing organizations.
The Lab - MERLIN Team (EIA) is committed to developing a systems map and evaluation of the MCC-PEPFAR DCLI program in Tanzania through the SPACES Consortium, and providing resources that will ensure the best possible environment for successful application of SPACES.

In addition to mobilizing the team, contract staff or partner firms as needed, to cover the technical assistance and capacity building needs of the Project, USAID will provide MCC with the following:
- Make MCC aware at least two weeks in advance if there is any change to personnel on the team and strive to fill the positions with suitable expertise drawing from USAID staff and/or contractor staff.
- Regularly update MCC and USAID leadership of the program progress, major milestones and outcomes.

MCC's RESPONSIBILITY

MCC is committed to working in cooperation with the SPACES Consortium through the Lab - MERLIN Team (EIA) and agrees to perform the following activities and provide the following resources:
- Provide necessary staff time and resources to support the involvement of the SPACES Consortium, including regular calls with SPACES Consortium.
- Provide overall direction and leadership for work.
- Provide resources, if needed and as agreed to, to support SPACES activities.
- Commit to data sharing based on information collected that can support SPACES activities and learning agenda.
- Participate in qualitative interviews and quantitative surveys as related to SPACES activities.
- Commit to collaborative learning and transparent decision-making with the SPACES Consortium to ensure effective coordination throughout the SPACES engagement.

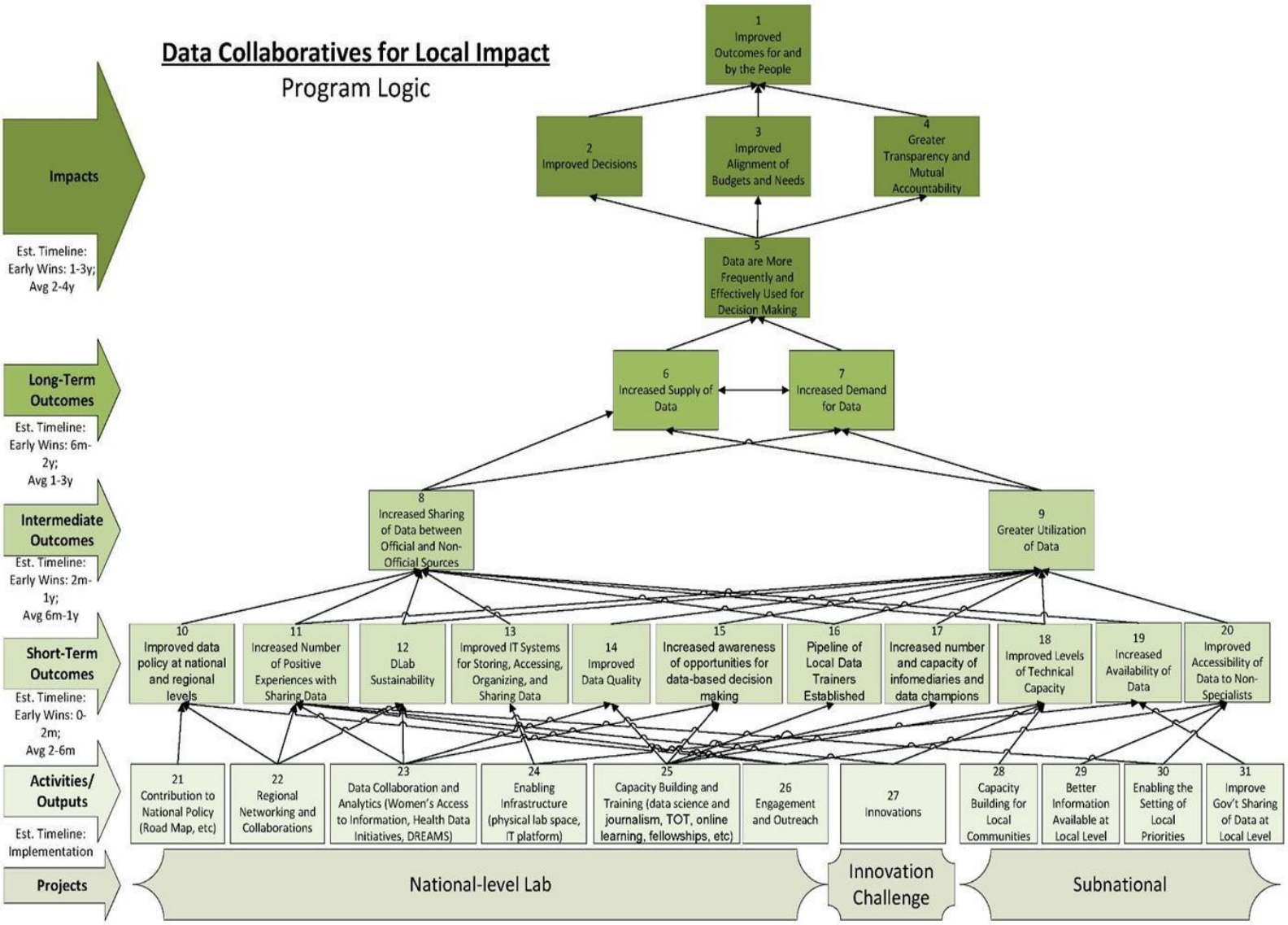
DELIVERABLES ACCEPTANCE CRITERIA

Deliverables are associated with the tasks identified above. All reports, plans and analysis are to be submitted in English in electronic copy using Windows-based MS-Office products including WORD for text, data tables in EXCEL, appropriate MS-Office 2010 or later versions of programs for exhibits, and schedules using MS-Project. Files containing graphs, flowcharts or diagrams should be submitted in PDF printable version as well as native editable form. Digital photo files should be submitted in JPG format. GIS data should be submitted in PDF printable files as well as native editable form. Presentations should be prepared with PowerPoint or similar tools.

Acceptance Criteria

The deliverables will be evaluated according to the following criteria:

- Thoroughness and timeliness in complying with all of the elements in the tasks specified.
- Quality and clarity of analyses and work produced.
- Timeliness and efficacy of communications with relevant counterparts at MCC, MCA, and other relevant organizations.
- All reports should be written in excellent English with no errors and be well formatted. Some reports/deliverables may require a 3-5 page summary in the language of MCA country.
- MCC reserves the right to review draft reports, plans and analysis one week before the due date and provide comments before they are finalized.


Data Collaboratives for Local Impact
Program Logic
Impacts
Est. Timeline: Early Wins: 1-3y; Avg 2-4y
Long-Term Outcomes
Est. Timeline: Early Wins: 6m-2y; Avg 1-3y
Intermediate Outcomes
Est. Timeline: Early Wins: 2m-1y; Avg 6m-1y
Short-Term Outcomes
Est. Timeline: Early Wins: 0-2m; Avg 2-6m
Activities/ Outputs
Est. Timeline: Implementation
Projects
1 Improved Outcomes for and by the People
2 Improved Decisions
3 Improved Alignment of Budgets and Needs
4 Greater Transparency and Mutual Accountability
5 Data are More Frequently and Effectively Used for Decision Making
6 Increased Supply of Data
7 Increased Demand for Data
8 Increased Sharing of Data between Official and Non-Official Sources
9 Greater Utilization of Data
10 Improved data policy at national and regional levels
11 Increased Number of Positive Experiences with Sharing Data
12 DLab Sustainability
13 Improved IT Systems for Storing, Accessing, Organizing, and Sharing Data
14 Improved Data Quality
15 Increased awareness of opportunities for data-based decision making
16 Pipeline of Local Data Trainers Established
17 Increased number and capacity of infomediaries and data champions
18 Improved Levels of Technical Capacity
19 Increased Availability of Data
20 Improved Accessibility of Data to Non-Specialists
21 Contribution to National Policy (Road Map, etc)
22 Regional Networking and Collaborations
23 Data Collaboration and Analytics (Women's Access to Information, Health Data Initiatives, DREAMS)
24 Enabling Infrastructure (physical lab space, IT platform)
25 Capacity Building and Training (data science and journalism, TOT, online learning, fellowships, etc)
26 Engagement and Outreach
27 Innovations
28 Capacity Building for Local Communities
29 Better Information Available at Local Level
30 Enabling the Setting of Local Priorities
31 Improve Gov't Sharing of Data at Local Level
National-level Lab
Innovation Challenge
Subnational

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