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# Insight

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## What is the impact of fibre connectivity in the Democratic Republic of the Congo?

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## Executive summary

The Democratic Republic of the Congo (DRC) lags behind in mobile connectivity compared to other countries in sub-Saharan Africa, with average mobile phone penetration rates of only 26 per cent in the DRC compared to 43 per cent in the region as a whole.<sup>1</sup> Similarly, internet penetration rates are low at the national level, with approximately 9 per cent of individuals using the internet.<sup>2</sup> High costs of connectivity and a lack of affordable options are a significant factor behind these challenges. When considered as a percentage of average income, the price of data ranks among the most expensive in the world.<sup>3</sup>

Based on the social and economic impact of expanded access to internet, CDC invested \$180 million in Liquid Telecom ('Liquid') in 2019. Liquid is the largest independent fibre and cloud provider in Africa, and has plans to expand internet access across the DRC. Connectivity is widely accepted to be an important enabler of economic growth and development. However, existing research and data that precisely quantifies its causal impact in emerging markets is surprisingly scarce, as CDC's recent evidence review on the topic demonstrates.<sup>4</sup> Our current study seeks to contribute to the evidence on the impact of connectivity by measuring Liquid's planned activities in the DRC.<sup>5</sup>

This Insight summarises findings from our baseline study, which measures the current state of connectivity in the DRC with a focus on urban Kinshasa, its capital and economic centre. Based on original surveys of 536 households and 270 enterprises, plus information from four telecom operators, we outline baseline conditions related to internet access, usage, barriers, and key socio-demographic indicators. This baseline study will be followed up with future data collection to measure the extent to which firm operations – and people's lives – have changed, based on Liquid's activities.

Key findings from our baseline analysis include:

### Firm analysis

- **Only about 30 per cent of surveyed firms in urban Kinshasa have dedicated business access to the internet.** This is driven by low rates of internet access in micro and small-sized firms, while medium and large-sized firms are much more likely to have access (91 per cent).<sup>6</sup> Of firms with internet access, 90 per cent connect via mobile phones.
- **On average, surveyed firms in Kinshasa use the internet for 5.6 hours per day.** The main reported uses of the internet among connected firms are monitoring news that could impact the business, researching potential competitors, and exporting/importing. 19 per cent of firms report using the internet for hiring purposes.
- **Over 70 per cent of these firms agree the internet helps expand their supplier network, helps staff improve skills, provides ideas for new or improved services, and helps to keep up with the competition.** However, among connected firms 55 per cent felt that the internet was too expensive or not worth it, underscoring affordability and familiarity issues.
- **Almost half of connected firms experience problems with internet connectivity on a daily basis.** Nonetheless, 40 per cent of internet-connected firms report to be at least moderately satisfied with their internet service quality.
- **Barriers to access for these firms include unfamiliarity with the internet and costs.** 47 per cent of unconnected firms cite a lack of need or know-how as the primary reasons for remaining unconnected.

1 World Bank Databank. Language from CDC.

2 [International Telecommunication Union \(ITU\) estimate, 2017.](#)

3 [Alliance for Affordable Internet, 2019.](#)

4 [What is the impact of investing in connectivity? Pantelis Koutroumpis, CDC Insight, August 2019.](#)

5 For a review of academic literature on the impacts of connectivity commissioned by CDC, see [What is the impact of investing in connectivity \(Koutroumpis 2019\).](#)

6 Firm access is lower than household access. We think many small business owners still access the internet via personal phones but have not included this in their survey answers when asked for business internet access.

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## Household analysis

- **Almost 90 per cent of surveyed households in urban Kinshasa have some form of internet access, primarily mobile** – much higher than the 10 per cent average across the DRC's total population.
- **97 per cent of surveyed connected working-age<sup>7</sup> individuals use mobile phones as their primary method of accessing the internet.** Only 28 per cent of users describe their internet connection speed as good or very good, while 23 per cent describe their service as being unstable with frequent disconnections.
- **The most common uses of the internet for individuals surveyed are social networking, educational purposes, and job searching.** 29 per cent of respondents say they have never used the internet to find work while about 20 per cent regularly access job search materials or content online. 65 per cent of respondents agree that the internet has helped to expand their work opportunities and 11 per cent engage in work-related activities online.
- **Costs are the primary barrier to internet access for households in urban Kinshasa,** with more than 30 per cent of individuals citing costs as the main limitation for internet use. Our survey suggests that average monthly spending on data is roughly 17 per cent of average income per working-age individual. Average monthly spending on mobile data averaged \$16.50 for the top income quintile in our sample compared to \$6.50 for the bottom income quintile.<sup>8</sup>

Over the next few years, the evaluation study will examine how key indicators change as a result of Liquid's projects. Some potential impacts to look out for include an increase in internet access, competition among network operators, improvements in quality and speed of connections, and reductions in prices. As access to – and use of – the internet becomes more widespread among firms and individuals, other outcomes, like income, and job creation, may also improve.

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# 26%

Mobile phone penetration rate in the DRC is 26 per cent, compared to 43 per cent across sub-Saharan Africa.

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# 9%

Approximately 9 per cent of the DRC's population uses the internet.

<sup>7</sup> Working-age is defined as between 15 and 50.

<sup>8</sup> Future research will benchmark these numbers against spending data by mobile phone operators.



# 01

## Introduction

### 1.1 The impact of connectivity and CDC's digital infrastructure strategy

Expanding critical digital infrastructure has the potential to improve access, quality, and affordability of internet services in markets with limited existing infrastructure. Digital infrastructure includes fibre backbone infrastructure, data centres and access networks such as towers and mobile phone companies. Digital infrastructure is a key enabler of economic growth, job creation, and other development outcomes in developed and developing nations, particularly in areas where internet access is low, like in many parts of Africa.<sup>9</sup>

Broadband (3G+) has been recognised by the Organisation for Economic Co-operation and Development (OECD) as a general purpose technology with similar transformative economic impacts as historical technologies such as the printing press, steam engines and electricity.<sup>10</sup> Broadband supports business by expanding access to new markets and facilitating exports, and there is strong evidence on the potential for increased broadband access to drive increases in GDP. While improvements in internet access in Africa has already boosted net employment, significant potential exists to further boost jobs through more investment in digital infrastructure. A recent study based on causal evidence on 12 African countries shows that employment increased by 4.2-10 per cent over the last decade, due to the increase in undersea internet cables, and driven by growth in new firm entry, productivity and exports.<sup>11</sup> The findings suggest that expanding digital infrastructure in countries still lacking adequate access may be among the greatest employment-creating opportunities in Africa.

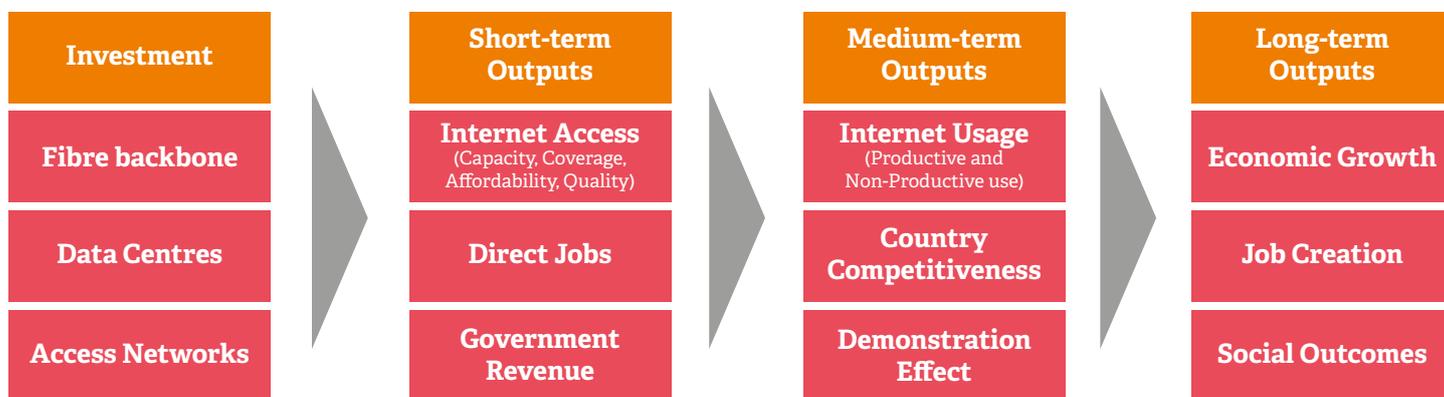
Improved internet access also means better access to information and services, potentially enhancing social outcomes in a range of development areas such as financial services, agriculture, civil engagement, health and education.

Aligned with this evidence and supporting the Sustainable Development Goal (SDG) of achieving universal and affordable internet access (SDG 9), CDC invests in digital infrastructure. Our investments are targeted at hard-to-reach geographies and serve a range of goals including improving internet access for underserved customers and enabling companies to test innovative technologies. Figure 1 on the following page outlines the impact chain of our connectivity investments and Figure 2 illustrates the whole connectivity value chain.

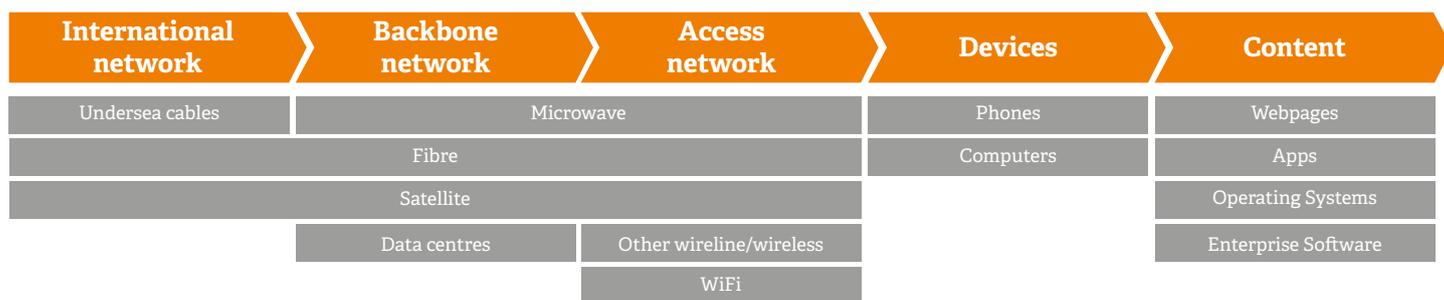
<sup>9</sup> The internet could grow from contributing \$18 billion to Africa's GDP in 2013 to up to \$300 billion per year by 2025. *Lions go digital: The Internet's transformative potential in Africa*. McKinsey, November 2013.

<sup>10</sup> *Digital Convergence and Beyond: Innovation, Investment, and Competition in Communication Policy and Regulation for the 21st Century*. Committee on Digital Economy Policy, Paris, OECD, 2016.

<sup>11</sup> *The Arrival of Fast Internet in Africa*. *American Economic Review*, Hjort and Poulsen 2017.



▲ Figure 1: Short, medium and long-term impact of investing in connectivity



▲ Figure 2: Value chain of digital infrastructure

## 1.2 Study goals

With an investment case focused on the potential social and economic impacts of expanded internet access, CDC has invested in Liquid Telecom, the largest independent fibre and cloud provider in Africa. Liquid is activating 2,500 km of fibre backbone across the DRC over the next year.

This Insight summarises the main findings of a baseline study commissioned by CDC to measure the expected socio-economic impacts from Liquid's fibre projects in the DRC, focusing on Kinshasa. Overall, the study provides a unique opportunity to better understand the specific channels through which the impacts of connectivity occur, by tracking impacts over time and precisely identifying who will and will not be affected.

Our baseline analysis focuses on establishing which demographic groups, and types of firms, have internet access and how it is used, as well as highlighting barriers faced by groups that are excluded from internet access. A subsequent endline study will examine whether access, usage, and quality issues have improved, and for whom, as well as exploring a range of longer-term social and economic impacts for households and firms. This information can help inform the decisions of other investors and companies interested in understanding the impacts of deepening and expanding connectivity.

## 1.3 Context: The state of connectivity in the DRC

DRC lags behind in mobile connectivity compared to other countries in the region, with average mobile phone penetration rates of only 26 per cent compared to 43 per cent in sub-Saharan Africa.<sup>12</sup> Over the last few years, while there has been rapid growth in mobile penetration in the DRC, a significant share of the population remains unconnected, particularly in rural and low-income areas.<sup>13</sup> Internet penetration rates are still low at the national level, with approximately 9 per cent of individuals using the internet in 2017 (Figure 3). This has increased from a base of about 1 per cent in 2010.<sup>14</sup>

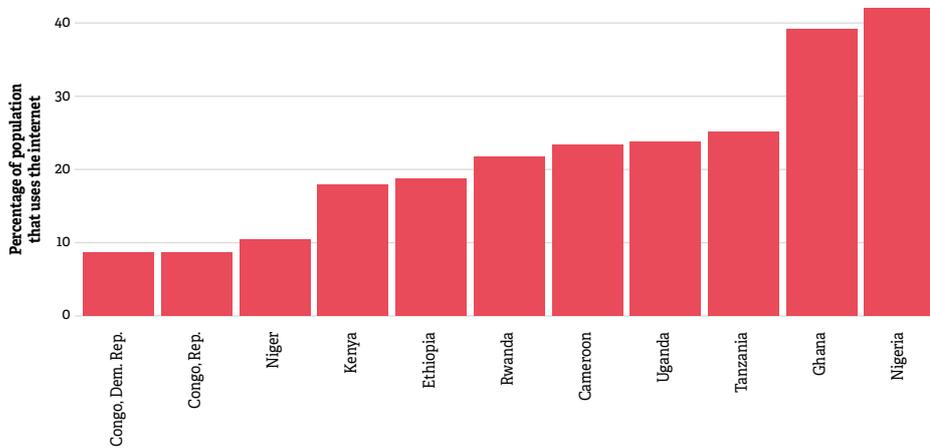
# 2,500km

Liquid is activating 2,500km of optical fibre backbone across the DRC over the next year.

<sup>12</sup> World Bank Databank. Language from CDC.

<sup>13</sup> *Reforming mobile sector taxation in the Democratic Republic of Congo* GSMA, 2018.

<sup>14</sup> *ITU estimates for individuals using the internet (2000 through 2017)*. Statistic refers to the percentage of individuals who used the Internet from any location in the last three months. This includes both fixed and mobile networks.

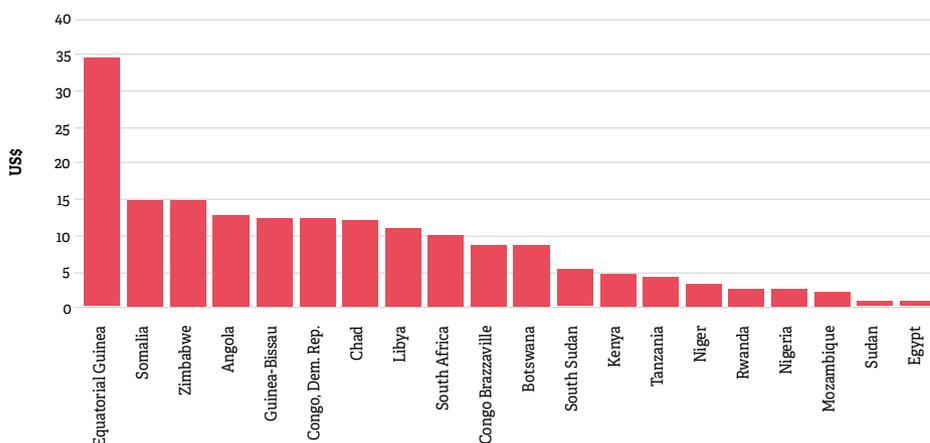


▲ **Figure 3:** Internet penetration rates in comparable African markets  
**Source:** 2017 International Telecommunication Union data available through World Bank Databank

High costs of connectivity – and a lack of affordable options – are significant challenges. When considered as a percentage of average income, the price of data ranks among the most expensive in the world. DRC ranks 28 out of 29 African countries on the latest affordability index developed by the Alliance for Affordable Internet (A4AI).<sup>15</sup> For instance, the estimated cost of the most basic mobile data package available in the DRC (100 Megabytes (MB) of data) is equivalent to 23 per cent of the monthly income for individuals in the lowest two quintiles of the income distribution.<sup>16</sup>

**\$12.57**

In the DRC, one Gigabyte (GB) of data costs \$12.57, representing a significant amount of monthly income, particularly for poorer households.



▲ **Figure 4:** Comparing costs of 1GB of internet in 20 African countries, 2017<sup>17</sup>  
**Source:** 2017 International Telecommunication Union data available through World Bank Databank

In DRC, one Gigabyte (GB) of data costs \$12.57, representing a significant percent of monthly income, particularly for poorer households, and making DRC the sixth most expensive country out of 48 African countries contained in A4AI's data set (Figure 4).



▲ **Figure 5:** Comparing costs of 1GB of internet with world regions<sup>18</sup>  
**Source:** Alliance for Affordable Internet

15 [Affordability Report: regional snapshot for Africa](#), Alliance for Affordable Internet 2019.  
 16 [Reforming mobile sector taxation in the Democratic Republic of Congo](#), GSMA, 2018.  
 17 [Mobile broadband data](#), Alliance for Affordable Internet 2019. Initial dataset contains 48 countries we selected 20 representative countries out of the sample.  
 18 [Mobile broadband data](#), Alliance for Affordable Internet 2019.

The number of fixed-broadband subscriptions has increased from about 500 in 2014 to approximately 4,600 in 2018, though there is still fewer than one fixed-broadband subscription per 1,000 people.<sup>19</sup> Research ICT Africa examined the 1GB basket, considered the cheapest prepaid broadband product. In the DRC, the average price for this bundle was \$8 (US dollars) in the third quarter of 2019, at the time just before our survey data was collected. At the same time, a similar basket was priced at \$2.44 in Kenya, \$2.78 in Nigeria, and \$3.39 in Cameroon.<sup>20</sup>

#### 1.4 Liquid Telecom's objectives and projects in DRC

Liquid was founded by Zimbabwean entrepreneur Strive Masiyiwa in 1997, with the mission to improve internet connectivity in Africa from Cape to Cairo. Liquid has since built Africa's largest independent fibre network, spanning over 70,000km, and state-of-the-art data centres bringing local cloud computing power to the continent.

Liquid provides connectivity services in the DRC, especially in Goma, eastern DRC, and is currently significantly scaling up its services across the country, including through:

- Activating a government-owned fibre link ('SNEL') connecting the country from Kinshasa (east) to Lubumbashi (west). SNEL was built a few years ago but remains dormant.
- Extending the SNEL network to the sea cable landing station in Muanda, and possibly also to the sea cable landing station in Angola. This would increase quality of Internet and reduce drop-off rates.
- Building a metro and last-mile fibre network in Kinshasa that will connect numerous mobile towers and homes and businesses directly via 'Fiber to the x' (FTTx) connections.

The SNEL activation will enable a fibre connection to nine cities between Kinshasa and Lubumbashi for the first time. In these cities, a shift from mobile to fibre backhaul will enable a significant increase in bandwidth. In turn, mobile operators upgrading their networks should significantly increase both internet availability and speeds.

In Kinshasa, we expect the various projects to improve internet availability, reliability and speeds, and for costs to fall. Currently, there is only one fibre connection between the Muanda landing station and Kinshasa. It experiences frequent outages and is expensive due to its monopoly position. With the SNEL activation and Muanda connection, we expect improved internet quality and lower costs. The metro fibre network, through replacing mobile with fibre backhaul, is also expected to significantly improve bandwidth availability. As mobile operators upgrade their networks and last-mile networks are rolled-out, internet availability and speeds should increase and cost per MB should go down.

According to one modelled estimate, activation of the SNEL network could reduce the price of mobile internet by 60 per cent over the next five years and increase mobile internet penetration from 26 per cent to 38 per cent.<sup>21</sup> These improvements would result in over nine million additional people gaining access to mobile internet, mainly in and around urban and semi-urban areas.

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## >70,000km

Liquid has built Africa's largest independent fibre network, spanning over 70,000km.

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## 60%

Activation of the SNEL network could reduce the price of mobile internet by 60 per cent over the next five years.

<sup>19</sup> [Individuals using the internet, 2005-2019](#), ITU and Autorité de Régulation de la Poste et des Télécommunications.

<sup>20</sup> [Mobile pricing](#), Research ICT Africa, 2020.

<sup>21</sup> According to a study by Dr. Pantelis Koutroumpis from the University of Oxford commissioned by CDC, 2017. Note that the model relies on several assumptions given limited data available and so the margin of error may be high.

## 1.5 Study methodology

This report outlines baseline conditions, using firm and household data collected across urban Kinshasa in advance of the SNEL network activation and FTTx project. This information provides a basis against which outcomes can be compared during and after implementation.

The baseline analysis is drawn from primary data of 536 households and 270 firms collected between November 2019 and January 2020 in Kinshasa, DRC. The team also conducted key informant interviews with firms and telecom operators.<sup>22</sup> CDC collaborated with Fraym, a geospatial data and analytics company, for the survey design and study plan. The surveys were enumerated by Sagaci Research, a provider of market intelligence across Africa.

A combination of existing household survey data, spatial demographic data, and satellite imagery was used to inform the sampling frame. The areas for data collection covered 15 of Kinshasa's 24 communes, and were selected to be representative of key dimensions along urban Kinshasa, including asset ownership, access to essential infrastructure, and demographics. Before analysing the survey results, the data were re-weighted to reflect available population parameters for population, gender, and firm composition across urban Kinshasa. More details on the sampling are provided in Annex 1.

The plan is to collect additional data in Kinshasa in the future with an endline survey planned in two or three years. This survey will be used to understand how key outcome variables have changed for firms, households and individuals that gained access to broadband, in relation to similar groups without access. As a robust test of potential internet connectivity effects, the study will apply a 'difference-in-differences' methodology, identifying counterfactual communities in Kinshasa to form the basis for deriving causal estimates regarding the socio-economic impacts of the fibre roll-out in communities within the treatment area. This should help isolate the impacts of internet connectivity on both firms and households. The study may leverage additional research methods in the future, such as key informant interviews or case studies, use of satellite imagery with existing data sources and mobile phone surveys, to provide additional insights and examine impacts elsewhere in the DRC.

<sup>22</sup> CDC partner with Fraym to manage the study and develop questionnaires. Sagaci Research was commissioned for data collection in DRC.



## 02

### Firm analysis

#### 2.1 Overview

Better access to broadband for enterprise customers is expected to increase business productivity and create jobs. The internet also enables firms to reach new markets and customers, helping to facilitate trade.

To capture these and other potential impacts, the baseline survey collected data from 270 enterprises in urban Kinshasa. For each firm, a top executive (e.g. top manager or owner) or the financial controller was interviewed.

Our sample of 270 firms included 173 micro firms (1-20 employees), 41 small firms (21-50 employees), and 56 medium and large firms. However, the sample was re-weighted to be representative of the distribution of firms by size in urban Kinshasa, where micro firms comprise 87 per cent of all firms, small firms are 11 per cent and medium/large firms represent 2 per cent of all firms. 73 per cent of firms were engaged in retail activities, 18 per cent in other services and 9 per cent in manufacturing. Only a minority of firms engaged in business outside the country either through customers (4 per cent) or through suppliers (14 per cent).

# 87%

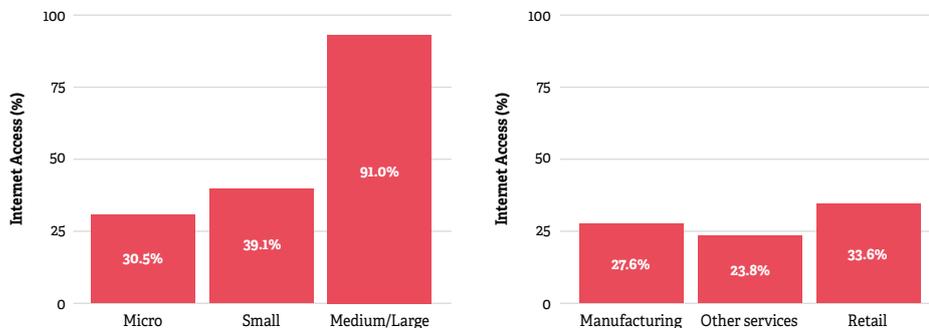
of all businesses in urban Kinshasa are micro firms.

Key indicators	Average for urban Kinshasa
Exporting firms	4%
Local suppliers	86%
Firm age (in years)	7
Established within last five years	59%
Average # of suppliers	4
Average # of customers/month	341
Average # of full-time employees	5
Average annual sales, in USD	\$90,885

▲ **Figure 6:** Key indicators for firms in urban Kinshasa  
**Source:** CDC and Fraym baseline data

## 2.2 Internet access

The baseline survey data indicate that only 31 per cent of firms in Kinshasa have access to internet (fixed and/or mobile). This is considerably lower than the surveyed households (90 per cent). The survey did not capture the percentage of users that access their personal phones for business purposes. As expected, internet access rates are highest among medium and large-sized firms (91 per cent) and lowest among micro firms (30.5 per cent). There is not much variation across the different sectors, with around a third of firms in manufacturing, retail and other services having internet access (Figure 7).



▲ **Figure 7:** Internet access rates by firm size and sector  
**Source:** CDC and Fraym baseline data

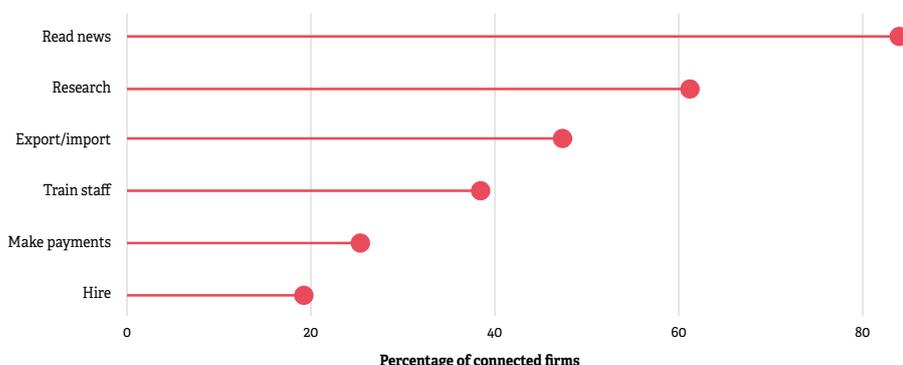
Overwhelmingly, connected firms are accessing the internet via mobile phones (over 90 per cent of firms). Relatively few firms rely on fixed internet (8 per cent) and even fewer (1 per cent) use public services such as internet cafes. 11 per cent of all firms have a website, and among connected firms, the figure is 33 per cent.

Firms with internet access see its benefits: around 80 per cent agree that the internet helps expand their supplier network, improves staff skills, and presents ideas for how to expand or enhance services. However, 55 per cent said the internet is not worth it or is too expensive, and about 40 per cent noted that the internet poses a risk to the firm's reputation or exposes the business to risk.

## 2.3 Internet usage and quality

On average, firms in urban Kinshasa typically use the internet for 5.6 hours per day. Larger firms generally report more hours on the web than smaller firms, at an average of 9.3 hours of daily use for large firms compared to 6.2 hours a day for micro-firms. We find very little variation in hours of internet usage across sectors.

Within connected firms, on average about 67 per cent of the workforce has access to the internet. The most common-reported uses urban Kinshasa include reading about news that could impact the business (84 per cent), researching potential competitors (61 per cent) and exporting/importing (47 per cent). Other uses include training staff, making payments, and for hiring purposes (Figure 8). Usage reasons are similar across sectors.



▲ **Figure 8:** Main reasons for internet use  
**Source:** CDC and Fraym collected baseline data

31%

of firms in Kinshasa have access to internet.

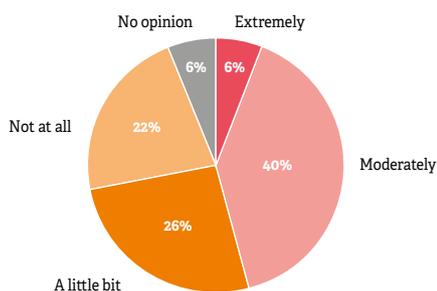
80%

of firms with internet access agree that the internet brings benefits such as expanding supplier networks and improving staff skills.

Almost half of internet-connected firms report experiencing problems with connectivity on a daily basis (e.g. slow speed, insufficient bandwidth, internet outages) (Figure 9). Nonetheless, 40 per cent of internet-connected firms report to be at least moderately satisfied with their internet service quality (Figure 10). In our future research, we plan to monitor other data sources on internet speed to track expected changes.

Frequency of internet-related problems (% of connected firms)	
Every day	44%
Once a week	18%
Once a month	7%
Rarely	31%

▲ **Figure 9:** Internet quality  
Source: CDC and Fraym baseline data



▲ **Figure 10:** Satisfaction with internet service among connected firms  
Source: CDC and Fraym baseline data

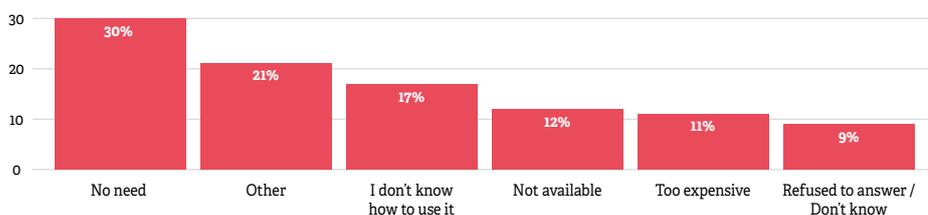
## 2.4 Affordability and other barriers

As noted earlier, internet costs in the DRC is among the most expensive in Africa and the world. In Kinshasa, firms reported spending differs markedly and increases with firm size (Figure 11).<sup>23</sup>

Size	Internet cost (USD)	Mobile phone cost (USD)	Satisfied with cost <sup>24</sup>
Micro	\$61	\$24	34%
Small	\$169	\$47	25%
Medium/large	\$178	\$54	29%

▲ **Figure 11:** Internet costs by firm size  
Source: CDC and Fraym baseline data

One third of all firms with an internet connection are at least moderately satisfied with their internet cost, whilst 25 per cent answered in their survey that they are not satisfied at all. At the same time, 55 per cent of connected firms say they think the internet is too expensive or not worth it. Firms without internet access cite a lack of knowledge on how to leverage its benefits or a lack of need as the main reasons for being unconnected, with cost reported as the top barrier by only 11 per cent of firms (Figure 12).



▲ **Figure 12:** Barriers to access  
Source: CDC and Fraym baseline data

40%

of internet-connected firms are at least moderately satisfied with their internet service quality.

55%

of connected firms say the internet is too expensive or not worth it.

<sup>23</sup> Note there is considerable variation in the values reported by firms on costs and some uncertainty about their reliability, so caution is advised when interpreting these estimates. Some respondents were not very confident in their ability to estimate these costs. It is possible that some firms grouped mobile phone-related costs into internet costs, and vice versa, complicating the distinction between both costs. Fraym replaced outliers for internet and mobile phone costs with the median value found for each cost category. Outliers were defined as values greater than the median + 3\*IQR.

<sup>24</sup> "Satisfied" is coded to include "moderately" and "extremely satisfied".

## 2.5 Trade and suppliers

Internet access can increase export rates by opening paths to new markets and sources of revenue, which, in turn, can boost sales volume. Only 4 per cent of firms in urban Kinshasa are exporters, according to the baseline data.<sup>25</sup>

Exporting firms tend to have wider access to the internet than non-exporting firms (86 per cent vs. 39 per cent) as well as higher annual sales (around \$4 million vs. \$1 million) and more customers (7,000 vs. 1,000 customers monthly).<sup>26</sup>

Popular target regions for exports for the baseline sample include Africa (76 per cent), Europe (38 per cent) and North America (14 per cent). As internet access increases, we may see firms exporting more and to further away places, increasing their ability to reach more customers and grow sales.

Similarly to exports, internet access has the potential to help firms find and access a wider range of suppliers and inputs to support their businesses.

Currently, firms in Kinshasa rely heavily on businesses from nearby towns and villages for their supplies, with 85 per cent of firms sourcing their business inputs from local vendors. 27 per cent of internet-connected firms use suppliers from abroad, compared to 3 per cent of unconnected businesses. Nearly all firms said that they communicated with their suppliers using text messages, while communication in person or via mobile phone (both 63 per cent) were the next most common methods. 23 per cent of firms communicate with suppliers using social media and 12 per cent by email.

Average annual sales are higher for internet-connected firms than for non-connected firms. This gap is starkest in manufacturing, where connected firms average \$1.6 million in sales, while non-connected firms average \$120,000. In the retail sector, connected firms average \$71,000 and unconnected firms average \$23,000.<sup>27</sup>

## 2.6 Innovation, new technology and marketing

Internet access has the potential to expose businesses to new ideas, technologies, and management practices. Over 70 per cent of firms with an internet connection agreed that the internet can be a source for ideas on improving business operations. Across sector and size, firms with internet access were, on average, 20 percentage points more likely to invest in new management practices and 22 per cent more likely to invest in new technologies compared to firms without internet. For instance, in the retail sector, 36 per cent of connected firms invested in new improvements, while 19 per cent of unconnected firms invested in new improvements.

The survey also finds that 77 per cent of firms with an internet connection advertise compared to 52 per cent of unconnected firms. The most common way to advertise is via social media (22 per cent), mobile phone (6 per cent), or a website (4 per cent). 35 per cent of firms reported advertising via 'other' means, which refers to traditional offline strategies such as word of mouth, posters, and door-to-door solicitation.

In summary, our data shows internet-connected firms tend to be larger, with higher sales and a wider supplier network, and are more likely to invest in new management practices. Future stages of our research will aim to assess the evidence of a causal link behind these correlations through analysis over time. Expanding internet access rates for firms, particularly for small and micro-sized firms where access is currently most limited, is expected to have a positive impact on business growth and wider economic growth, by streamlining business operations and opening access to different information channels.

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# \$1.6 million

Connected firms average \$1.6 million in annual sales, while non-connected firms average \$120,000.

25 This statistic is based on a weighted sample of 29 out of 270 firms. Since the sample size of exporting firms is very small, the additional analysis on this group of firms should be interpreted with caution.

26 The same small sample size caveat applies here. 25 out of 29 exporting firms in the sample have an internet connection.

27 Very few firms reported total costs from the past year (70 out of 270), so it was not possible to derive total profits. As a result, Fraym focused on sales revenue as the best proxy for profit. Fraym cautions against viewing the sales figures as precise, given the large variation and potential for underestimating or overestimating monetary values. Further, just over half (51 per cent) of the firms surveyed felt comfortable enough to provide raw sales figures. The remainder selected a sales bracket instead.



## 03

### Household analysis

#### 3.1 Overview

Improved internet connectivity can bring several potential benefits to people in the DRC. Alongside more direct benefits of using the internet, improved connectivity has the potential to improve longer term outcomes related to education and health, employment, financial inclusion and civic engagement, helping to reduce poverty. To measure some of these impacts, our baseline study surveyed 536 households from 15 of 24 communes representing the more urbanised areas of Kinshasa. Within each household, the head of household and one working-age individual between the ages of 15-50 were interviewed. We examine current patterns of internet access, use, and costs, and the use of digital products and services, as well as demographic indicators such as employment and income.

The demographics between the sampled households – and those across Kinshasa as a whole – tend to be largely similar. This includes comparable levels of access to electricity, mobile phone ownership, bank accounts and literacy rate. On average, households in Kinshasa fare better than those of the DRC as a whole in terms of connectivity, access to technology, and socio-economic proxies such as asset ownership (see Annex 2).

The average age of individual respondents was 26 years, 53 per cent were female, and there were three working-age individuals on average per household. Average monthly income was around \$160 and 17 per cent of households have access to a formal bank account. Only half of respondents reported that they had consumed an adequate amount of food in the past month and even fewer were satisfied with their economic progress as a whole. Employment is low at 58 per cent, and over 50 per cent of employed individuals work in either sales or professional positions. Over 90 per cent of these households have a mobile phone, and about 30 per cent have access to at least one computer.

## \$160

Average household monthly income for survey respondents was around \$160.

### 3.2 Internet access, quality and usage

Almost 90 per cent of households in urban Kinshasa reported having access to the internet, which is high compared to about 10 per cent for the DRC as a whole. 97 per cent of working-age internet users cite mobile phones as their primary method of accessing the internet, and only 3 per cent report using laptops, desktops or tablets. Our survey data finds that 81 per cent of the working-age population in the areas sampled own a smartphone. Fixed internet penetration is relatively low at approximately 13 per cent.<sup>28</sup> Our baseline figures were higher than comparative indicators for the Kinshasa province as a whole, where 28.5 per cent of women and 54.4 per cent of men reported using the internet according to UNICEF's 2017 MICS survey.<sup>29</sup> Overall, 86 per cent of internet users reported using it daily, including 66 per cent who access the internet at least once an hour.

These findings are largely consistent across genders, age categories, employment status, occupations, and other key demographics. The most variation in smartphone use appears between education levels and across household income quintiles. For example, 87 per cent of individuals who have completed secondary education use smartphones compared to 79 per cent of individuals who have not completed secondary education. On average, men access the internet on mobile phones more often than women. For example, 70 per cent of men surveyed access the internet on mobile phones at least once an hour compared to 59 per cent of women. Finally, one age-related observation is that on average, those most frequently using the internet tend to be younger.

Fixed internet services are largely unaffordable at present for most households in urban Kinshasa and are also not available in all areas of the city. Our study finds that households with fixed internet connections tend to be wealthier on average than households without fixed internet and located closer to cell phone towers.

We find that 62 per cent of users describe their connection speed as "normal," 28 per cent of users describe it as good or very good, with 10 per cent describing it as bad or very bad. Individuals not satisfied with the speed of internet connection tend to be younger and more educated on average. In terms of reliability, 23 per cent describe their service as being unstable with frequent disconnections.

Perception of internet speed (% of internet users)	
Very bad	2%
Bad	8%
Normal	62%
Good	22%
Very good	6%

▲ **Figure 13:** Internet speed quality in the baseline data

The baseline survey finds that people use the internet most commonly for social purposes, educational purposes, and job searching.<sup>30</sup> This is consistent with recent Global System for Mobile Communications (GSMA) findings that instant messaging and social media dominate mobile internet usage across most low and middle-income countries.<sup>31</sup> 36 per cent of working-age internet users in Kinshasa use the internet for educational purposes, including online courses, reading news articles and watching educational videos. About 20 per cent access job search materials online. Finally, a smaller proportion of internet users, approximately 11 per cent, engage in work-related activities online. While very few reported using the internet for online banking, mobile money use is more prevalent, with 70 per cent of individuals reporting the use of mobile money services. Focusing on job searching via the internet, 30 per cent of working-age individuals report having ever used the internet to find employment. Overall, 46 per cent of working-age individuals say the internet has helped to expand work opportunities very much.

90%

Almost 90% of households in urban Kinshasa have access to the internet.

97%

of respondents primarily use mobile phones to access the internet.

81%

of respondents own a smart phone.

66%

of respondents access the internet through their smartphones at least once per hour.

86%

of respondents access the internet through their mobile phone at least daily.

36%

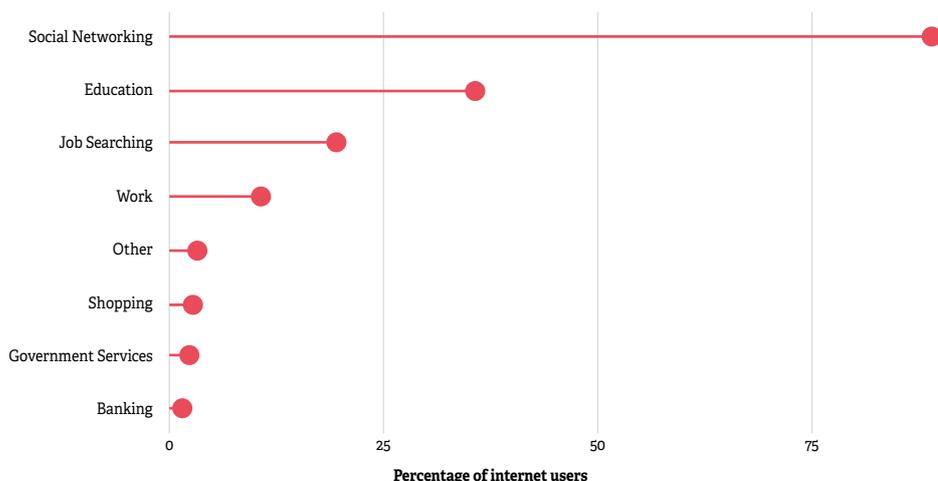
of working-age internet users in Kinshasa use the internet for educational purposes.

<sup>28</sup> An individual is considered to have access to fixed internet if they reside in a household with a fixed internet connection. An individual is considered to have access to mobile internet if at least one person in the household owns a smartphone.

<sup>29</sup> MICS UNICEF surveys.

<sup>30</sup> Respondents could report multiple uses of the internet.

The survey also finds some differences between men and women on how they used the internet, for example, men tend to engage more in online educational and job searching activities than women. Specifically, 21 per cent of men cite their most important internet activity as education-related compared to 8 per cent of women. Meanwhile, 82 per cent of women cite social networking as their most important internet activity compared to 63 per cent of men.

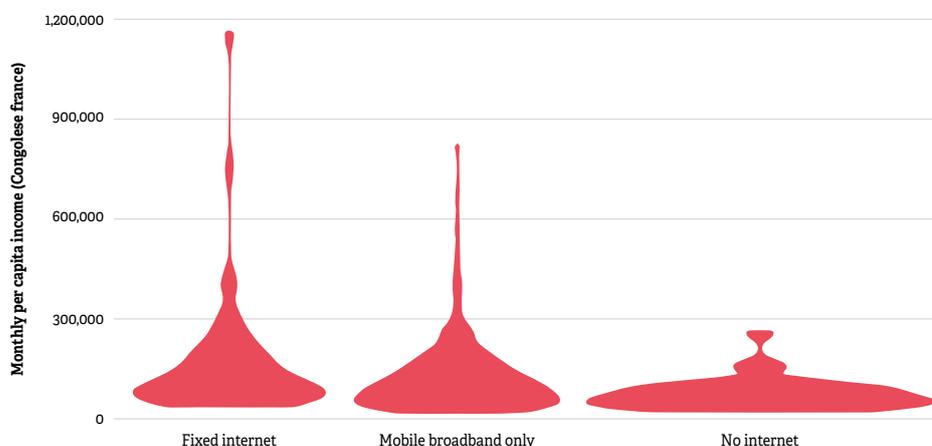


▲ **Figure 14:** Internet activities  
**Source:** CDC and Fraym baseline data

### 3.3 Affordability and other barriers

Average monthly spending on data in Kinshasa is reported at approximately \$11 per working-age individual, or 17 per cent of average income.<sup>32</sup> Monthly data spending patterns are similar across age, gender, and employment status, but differ significantly by occupation. For example, monthly spending ranges from \$7 for manual labourers and services personnel to \$16.50 for professional workers (including technical and managerial workers), for example. Some households report monthly spending up to \$170 on mobile data.

The survey also shows that individuals with more education and those living in higher-income households tend to spend more on mobile data. For example, individuals with a secondary education spend on average \$3 more per month on mobile data than individuals who have not completed secondary education (\$12.50 vs. \$9.50). Average monthly spending on mobile data for someone in the top income quintile is approximately \$16.50, compared to \$8.25 in the middle-income quintile and \$6.50 in the bottom quintile. As illustrated in Figure 15, households with fixed internet have significantly more income on average, and households with no internet are almost all at the bottom of the income distribution.<sup>33</sup>



▲ **Figure 15:** Income distribution for different connectivity groups  
**Source:** CDC and Fraym baseline data

**\$170**

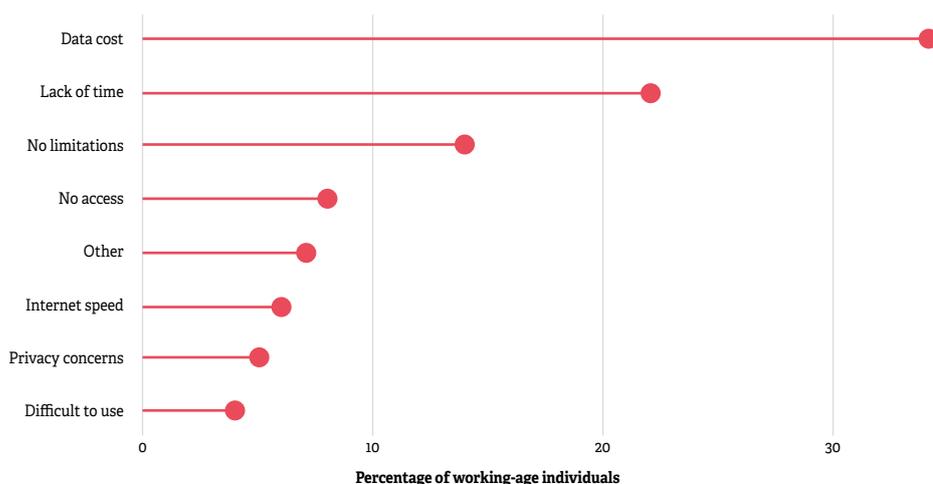
Some households report spending up to \$170 on mobile data monthly.

31 [Global System for Mobile Communications. The State of Mobile Internet Connectivity, 2019. UK, July 2019.](#)

32 Note that reported values for data and internet costs suggest some inconsistencies in whether households and individuals included data costs when estimating overall internet costs. As a result, this analysis focuses on mobile data costs, rather than internet costs overall.

33 A similar pattern is found when analysing internet access in relation to an asset-based wealth index. See the Annex for additional details on the asset-based wealth index.

High costs of data are a primary limiting factor in urban Kinshasa for access to both fixed and mobile internet (Figure 16). One in three adults cited the cost of data when asked what prevented them from consuming more internet services, making it the most common barrier. The second most-common barrier reported was a lack of time, cited by about 20 per cent of respondents.



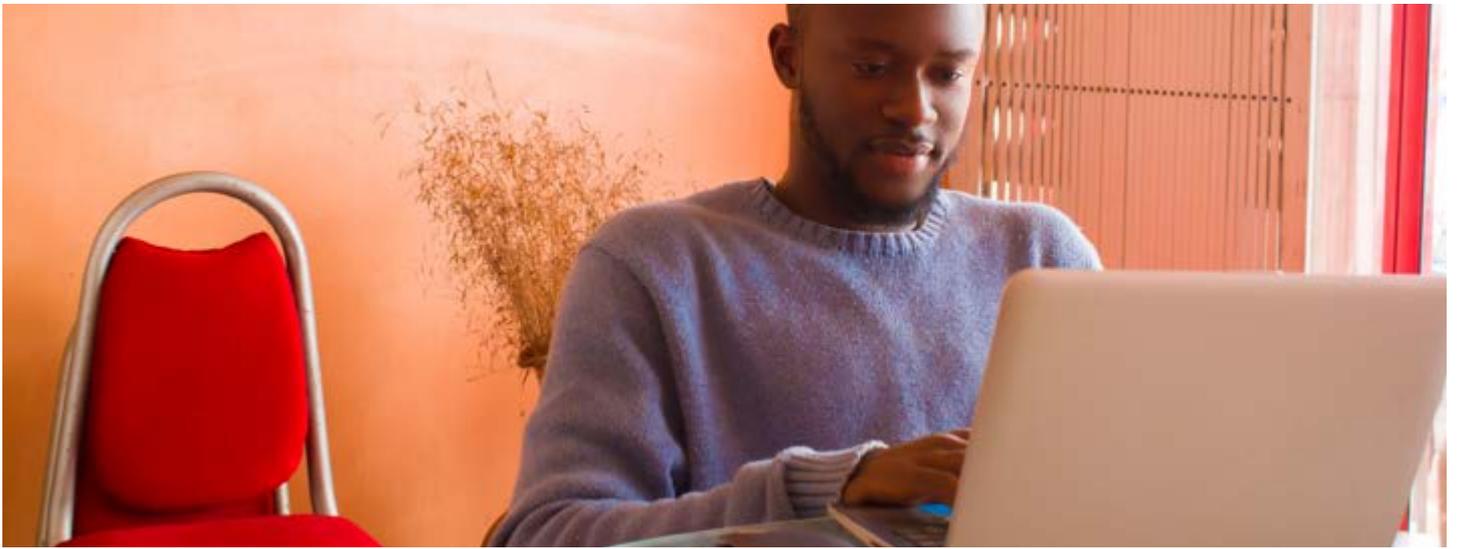
▲ **Figure 16:** Barriers to internet use  
**Source:** CDC and Fraym baseline data

In terms of fixed internet alone, cost also appears to be the primary barrier for access. 50 per cent of household heads cited the high cost of service or equipment as the main reason for not obtaining a fixed internet connection.

Interestingly, for the 16 per cent of individuals who do not use the internet, few cite cost as the main limiting factor. For these individuals, knowledge of or familiarity with the internet is the primary barrier to access, with 43 per cent of this group saying they would use the internet if they were trained on how to use it.

1 in 3

adults cited the cost of data as a barrier to internet use.



## 04

### Future plans

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The baseline findings summarised in this study have provided insight into the current internet connectivity situation in the DRC, focusing on Kinshasa, establishing who has access to internet and how it is used as well as highlighting barriers faced by groups with limited or no access. Moving forward, we aim to measure the expected socio-economic impacts from Liquid's fibre projects in DRC over time by tracking changes in access, usage, and quality of internet for different types of people and companies.

As well as collecting more data from Kinshasa in the future with an endline survey, we hope to leverage additional data sources on internet infrastructure, pricing, and reliability to broaden our insights and examine impacts elsewhere in the DRC. We hope these findings will be useful for investors and companies interested in understanding and deepening the impacts of internet connectivity.

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## Annex 1: sampling methodology

The household and firm survey data were re-weighted to account for the population distribution according to 2018 WorldPop data, the gender breakdown in the 2014 DHS survey, and firm size and sector in the 2013 World Bank Enterprise Survey.

For the firm survey, Fraym used the 2013 World Bank Enterprise Survey sampling frame as a starting point. To ensure an adequate sample of larger firms and non-retail firms, Fraym over-sampled certain firm types relative to the World Bank sampling frame. Following the World Bank Enterprise survey conventions, respondents are defined as senior managers or executives who were available to answer questions at the time of the survey; respondents include business owners, financial managers, IT directors and senior managers.

For the household level surveys, Fraym and Sagaci applied a two-stage sampling procedure. This begins with a random selection of primary sampling units, based on treatment or control status, followed by the selection of a starting point for a walking methodology called the 'left approach'. Within each household, the household head responded to questions relating to the whole household while the individual modules of the questionnaire were completed by one working-age household member using the Kish method.

## Annex 2: household demographics

Indicator	DHS survey in 2014		Baseline survey data
	National	Kinshasa	Urban Kinshasa
<b>Computer ownership</b>	5%	18%	30%
<b>Bank account ownership</b>	8%	27%	17%
<b>Mobile phone ownership</b>	49%	96%	93%
<b>Household access to electricity</b>	22%	90%	92%
<b>Employment rate</b>	68%	58%	58%
<b>Literacy rate</b>	65%	93%	98%
<b>Secondary education rate</b>	19%	47%	49%

▲ **Figure 16:** Review of selected indicators (DHS 2014 and baseline survey data)

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