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The impact of fibre broadband on online behaviour in a South African township

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ABOUT THIS REVISION:

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Executive Summary

The difference between mobile and fibre broadband is analogous to bottled versus tap water.¹ Each serves its purpose, but it quickly becomes expensive if you need to water a tree with Valpré.

Many households beyond the reach of fibre networks rely on mobile data, which can make data-intensive tasks such as online learning, remote work or running a business costly. For families living in South African townships, home fibre was often out of reach: until recently, the commercial case for installing it in low-income, high-density areas did not add up. Several network operators have since reworked their models to serve these communities.

Prepaid fibre products allow users to buy access without committing to a long-term contract. In Kayamandi, fibertime offered uncapped broadband at R5 per device per day and installed a free Wi-Fi router in every permanently electrified home reached by its rollout. Aerial fibre and the density of homes help reduce deployment costs. **Together, these changes make sustained, data-intensive internet use more affordable in communities where residents have largely relied on mobile data.**

Does affordable high-speed internet make a meaningful economic difference for residents of South Africa's low-income urban townships?

Intuitively, digital inclusion can support economic progress, but fixed broadband coverage typically favours already better-off areas. This makes it difficult to separate the effects of connectivity from pre-existing advantages.

The phased rollout of fibre in Kayamandi, a township adjacent to Stellenbosch, offered an opportunity to investigate this question. When fibertime piloted the network in late 2022, some homes were reached while others were still waiting, allowing us to compare their subsequent experiences.

¹We first heard this analogy from Richard Henn.

We surveyed the same dwellings in August 2022, before installation, and again in late 2023 and early 2025, collecting information on internet use and socioeconomic outcomes. Returning to these homes allowed us to track changes as the network expanded, although the person interviewed could differ between surveys.

Our analysis covers **609 dwellings: 317 reached before the 2023 survey and 292 reached between the 2023 and 2025 surveys**. Comparing changes over 2022–2023 in these early and later groups, with adjustment for observed differences, allows us to estimate the short-run effect of local fibre availability. Because the pilot began in formal homes and installation depended on permanent electricity, rollout timing was not random. The comparison rests on the assumption that, without fibre, the groups would have followed comparable trends, which we cannot test with only one baseline survey.

Our surveys show a substantial shift towards fibre, alongside continued use of mobile data. The weighted share mainly using fibre or Wi-Fi rose from approximately zero in 2022 to 83.5% in 2025, yet 70.9% used both connections in 2025. After excluding respondents who reported uncapped mobile data and matching spending bands for mobile and fibre, median monthly spending among the remaining users was R21–R50 on mobile data and R81–R100 on fibre. These exclusions address possible double-reporting of fibre spending.

The clearest estimated change in online behaviour is greater social-media use. The preferred comparison gives an increase of 14.8 percentage points over 2022–2023, significant after adjustment for multiple online outcomes. Although larger shares reported using the internet for work and education in 2025 than in 2022, the causal analysis does not establish that fibre increased these activities or online job search.

The estimates capture short-run effects, which may evolve as people adapt their internet use over time. They support the potential of affordable fibre to widen digital participation, while leaving open its longer-term effects on learning, employment and household welfare.

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Introduction

Fast and affordable internet has become increasingly important for socioeconomic inclusion. Mobile networks have widened basic internet access in South Africa, but being able to connect does not mean being able to afford enough data for sustained use.

Many low-income households live in high-density urban communities, or townships, where high rollout costs and uncertain returns have discouraged fibre investment.² Laying fibre and building last-mile infrastructure is expensive, and operators have historically concentrated on suburbs offering better commercial prospects. Households beyond these networks have had to rely on mobile data, typically sold by volume, so online education, working from home or running an online business can quickly become costly. **Where sustained internet use supports socioeconomic opportunities, inequalities in affordable access could reinforce existing economic inequalities.**

Mobile internet can offer high-quality service and the flexibility of a connection away from home; the constraint is often the cost of purchasing enough data. Our question is what affordable home fibre adds in a setting where most respondents already use the internet.

Closing the gap: A township fibre revolution

Technological innovations and new business models are bringing high-speed internet into South Africa's township communities. Several network operators have redesigned their services to make fibre viable in lower-income, high-density areas.

The many small dwellings in informal settlements, once seen as a deterrent to fibre rollout, can help make it viable. More homes per kilometre of fibre means a lower cost of connecting each dwelling than in sparsely populated

²Vermeulen, Jan. 2025. '[Fibre companies in South Africa have a new target market](#)'.

wealthy suburbs. Operators can also reduce installation costs by mounting fibre on overhead poles. Some township projects go further, providing free installation of a ready-to-use Wi-Fi router in every eligible dwelling passed.

Pay-as-you-go fibre also changes how households can buy access. Traditional long-term contracts and credit checks often create barriers in township markets.³ Daily rates and month-to-month, no-contract plans with prepaid vouchers offer the flexibility that mobile users are accustomed to, allowing lower-income households to fit purchases around their cash flow.

fibertime follows this approach by installing a free router in each permanently electrified home it passes. The service described in our study offers uncapped internet at advertised speeds of up to 100 Mbps for R5 per device per day, whether a mobile phone, computer or television.⁴ Buying access a day at a time makes home fibre available on terms that differ substantially from a conventional monthly contract.

A low daily price does not, on its own, settle the affordability question. Households connecting several devices, or buying both fibre access and mobile data, may still face substantial costs. Affordability depends on how people combine these services and what they spend on each.

Evaluating the impact of home fibre in Kayamandi

Phased fibre rollout as a research opportunity

fibertime is one of several fibre network operators in Kayamandi, but its practice of installing a router in every eligible dwelling within its coverage area creates a valuable research opportunity. Broadband uptake usually depends on household characteristics as well as service availability, making cause and

³Mosimanegape, Lebang. 2025. 'Urban-township connectivity gap – sustainable solutions emerging'.

⁴fibertime. 2026. 'Home'.

effect difficult to separate. By studying the arrival of local infrastructure, we can distinguish availability from the decision to subscribe, although rollout timing remains non-random: the pilot began in formal homes, and installation depended on permanent electricity.

fibertime runs aerial fibre along poles, with drop cables connecting each pole to routers inside nearby homes (Figure 1). Connecting many homes from one pole reduces the marginal cost per dwelling, helping to make rollout commercially viable in a densely populated area.

Figure 1: An example of a fibertime box with drops into homes

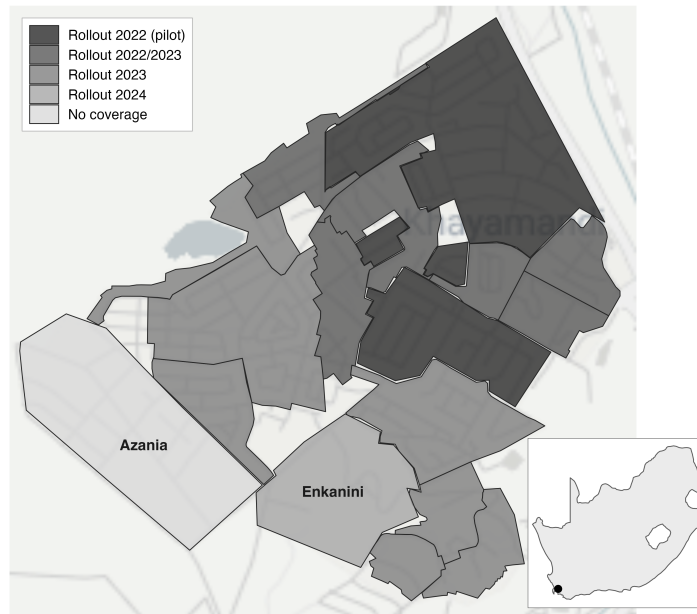


Source: Authors' photograph.

The network has a shared service set identifier (SSID), or network name, so a person can buy access within range of any fibertime router, including one outside their own home. Receiving a router, using fibre and paying for access are therefore related but distinct aspects of digital participation.

fibertime piloted its technology and business model in Kayamandi, a low-income, high-density community adjacent to Stellenbosch in the Western Cape. The network was rolled out in phases, with different areas connected at different points in time (Figure 2).

Figure 2: fibertime network rollout in Kayamandi



Source: fibertime rollout information. *Notes:* Lines delineate study areas and shading describes rollout phases during the study period. 'No coverage' refers to direct router rollout during that period, not necessarily an inability to use a nearby connection.

fibertime began installing fibre in formal homes in October 2022. In an adjacent area primarily composed of informal homes, the pilot also used Wi-Fi access points on poles. During the pilot, connectivity problems arose inside metal structures, which can weaken Wi-Fi signals. Commercial rollout in 2023 extended router installation to permanently electrified informal as well as formal dwellings, proceeding through contiguous geographic zones that broadly corresponded to neighbourhood blocks.

Azania and Enkanini initially lacked the electricity connections needed for direct router rollout. Enkanini entered the rollout after electrification in 2024, whereas Azania remained outside it throughout the study period. Access to electricity thus shapes both digital inclusion and the choice of a credible comparison group.

We conducted three waves of household surveys around the rollout: a baseline in August 2022, before installation, followed by interviews in October–November 2023 and February–April 2025. The questionnaires

covered internet use and socioeconomic characteristics, including employment and household income.

Enumerators returned to the same dwellings and tried to interview the same individuals, with another eligible adult answering if the earlier respondent was unavailable. Respondents had to use the internet, have a qualifying device and be involved in data-purchase decisions. Interviews took place in person in 2022 and 2025; in 2023, telephone recontact was attempted first, followed by in-person visits when contact failed.

Our analysis uses respondents in the same 609 dwellings in all three waves.

Returning to these structures preserves the treatment location even when the respondent changes, giving us repeated cross-sections of respondents within tracked dwellings. The tables describe these sampled internet users rather than internet access among all adults in Kayamandi.

Assigning treatment

fibertime supplied the coordinates of each fibre drop and the date its connection became active. For homes connected after the pilot, we match each sampled dwelling to the nearest router within 20 metres, using a projected coordinate system, and take that router's earliest historical activation. A dwelling is classified as treated if activation precedes the interview date.⁵ This measure of local availability avoids relying on respondents' recollection of installation dates.

Unfortunately, we do not have individual activation dates for formal homes connected during the pilot. Sampled homes in that footprint are assigned 31 December 2022, reflecting documented completion after the baseline survey and before the 2023 interviews.

The 609 dwellings fall into two cohorts: the **early-treatment cohort** of 317 dwellings reached before the 2023 interview, and the **later-treatment cohort** of 292 reached between the 2023 and 2025 interviews. Restricting the

⁵Same-day activation remains untreated because its ordering relative to the interview is unknown. A later change in service status does not erase an earlier activation.

comparison to homes eventually reached excludes Azania and dwellings still untreated in 2025, where the absence of permanent electricity or other limits to rollout eligibility may explain why fibre had not arrived.

As mentioned earlier, although treatment is defined at the dwelling level, network access in Kayamandi extends beyond individual homes. People without a router at home can connect elsewhere through the shared network. If this access affects outcomes in the same direction as direct rollout, it can reduce the contrast between the two cohorts, so the estimates reflect local rollout in a setting where some fibre use is already possible elsewhere.

Identification strategy: Difference-in-differences

We use fibertime's phased rollout to estimate the causal effect of local fibre availability through a difference-in-differences (DiD) comparison. The analysis covers **2022–2023**, when both cohorts were untreated at baseline but only the early cohort had been reached by the follow-up interview.

This comparison assumes that, without fibre, outcomes in the two cohorts would have followed comparable trends after allowing for observed characteristics, even if their starting levels differed.

The DiD estimator compares changes in an outcome, such as internet use for a particular activity, between the early and later cohorts. It accounts for influences that affect both groups similarly, such as a township-wide economic shock, but not for unobserved developments that affect them differently.

With only one pre-rollout survey, we cannot test whether the cohorts previously followed parallel trends or use event-study plots to assess that assumption. Its plausibility rests on comparing groups that were eventually reached and adjusting for observed differences. By the 2025 survey, all 609 dwellings had been reached, so that wave adds descriptive evidence without providing an untreated comparison group.

Our causal estimates capture an early response to fibre availability, over 2022–2023. Effects may strengthen, weaken or take different forms as people gain experience with the service and adapt their activities, but this comparison cannot establish how they evolve.

Model specification

Because respondents could change between surveys, the estimated effect concerns the people living in treated dwellings at each interview. It should therefore not be interpreted as a change experienced by the same verified individual.

The preferred model uses a doubly robust DiD estimator, combining an outcome model with a model of which dwellings were reached earlier. Both adjust for the gender, age group and Grade 12 completion of whoever answered in each wave, alongside baseline household size, income and dwelling type. Keeping household and dwelling characteristics at their 2022 values avoids adjusting for changes that may themselves have followed fibre access.

We construct sample weights separately for each survey wave within the 609 dwellings, aligning age, gender and dwelling composition with population information, and Grade 12 completion with its weighted baseline share. Counts in the tables remain unweighted; percentages and median spending bands use these survey-wave calibration weights.

Standard errors allow for correlation within 15 rollout-related clusters, with the pilot zones combined. To account for examining multiple outcomes, the reported adjusted p-values cover all ten online activities in the causal table, including the six exploratory outcomes. The annexure gives details of weighting and statistical inference.

Limitations and caveats

Other developments may have coincided with the arrival of fibre in different parts of Kayamandi. Nearby construction projects, public works programmes or localised criminal activity, for example, could affect some households more than others over the same period. If outcomes in the early cohort would have followed a different path even without fibre, these differences would bias the estimated effect.

Self-reported internet use and spending are also subject to recall errors and differences in how people interpret questions. Changes in who answered, together with the use of both telephone and in-person interviews in 2023, may contribute to differences across waves.

The rollout did not give every home the same length or type of exposure before the survey. Some were reached during the pilot and others during commercial rollout, at varying intervals before their interviews. Because these differences are tied to geography and dwelling type, we cannot reliably estimate the effect of an additional month of connectivity.

The findings also reflect Kayamandi's particular setting. Its density, proximity to Stellenbosch, economic opportunities and community dynamics may differ from those of other low-income areas, limiting how far we can generalise.

Robustness checks

We check how the cohorts differed at baseline and how sensitive the estimates are to the control variables. We also repeat the analysis without the complete Enkanini inference cluster, which was electrified only in 2024, and then omit each inference cluster in turn to assess whether a particular area drives the results.

A further check links respondents at the same dwelling in 2022 and 2023 whose demographic and education records are consistent with their being the same person. Repeating the analysis in this proxy-matched sample helps assess the influence of changes in who answered, although the links do not

verify identity. These checks assess sensitivity to the sample and model; they cannot establish the untested parallel-trends assumption.

Internet access, spending and data use patterns

At the start of the study in 2022, 99.9% of respondents mainly used mobile data. By 2025, that pattern had changed substantially, with fibre or Wi-Fi the main connection for 83.5% (Table 1).

Table 1: Main connection used to access the internet (%)

Connection	2022	2023	2025
Mobile data	99.9	65.0	16.3
Fibre / Wi-Fi	0.0	35.0	83.5
Other / unspecified	0.1	0.0	0.1
Respondents (unweighted)	609	609	609

Notes: All 609 respondents in each wave, using the survey-wave calibration weights. Columns sum to 100, apart from rounding. The 2022 question asks the usual connection, 2023 asks the most-used connection and 2025 recovers the main connection from reported use when only one type is used. The same dwellings appear in each wave, but respondents may differ.

Source: Authors' calculations from the Kayamandi household surveys.

Most respondents continued to use mobile data alongside fibre. In 2025, 70.9% used both services, compared with 20.2% using only fibre and 8.8% using only mobile data (Table 2). Fibre was the more frequently used connection: 68.4% of respondents described using it 'all the time', compared with 47.0% for mobile data.

Table 2: Mobile and fibre use in 2025

Measure		
Connection-use profiles	Share (%)	N
Mobile only	8.8	52
Fibre only	20.2	140
Both mobile and fibre	70.9	416
Neither	0.1	1
Frequency of use	Mobile (%)	Fibre (%)
All the time	47.0	68.4
Most of the time	13.2	16.3
Sometimes	19.5	6.4
Never	20.3	8.9
Respondents (unweighted)	609	609

Notes: Profiles and use frequencies are based on all 609 respondents in 2025, including reported non-users. Shares are weighted; N is unweighted. Use of a connection does not necessarily mean the respondent pays personally. Frequency categories are respondents' own descriptions, not measured hours online.

Source: Authors' calculations from the Kayamandi household surveys.

Someone who relies on fibre at home may still need mobile data while travelling or working beyond router coverage, which could help explain why mobile use remained common even as more respondents reported low data volumes. Across the 609-dwelling sample, the share reporting up to 500 MB rose from 21.9% in 2022 to 34.6% in 2025, while another 20.3% reported no mobile use in 2025 (Table 3). This pattern is consistent with some substitution towards fibre, although it does not identify the effect of rollout on mobile-data volumes.

Table 3: Reported monthly mobile-data volume (%)

Response	2022	2025
Up to 500 MB	21.9	34.6
501 MB-1 GB	36.3	8.9
2-5 GB	38.5	7.8
6-15 GB	2.3	2.6
More than 15 GB	0.7	2.2
Reported uncapped	0.2	23.3 ^a
Don't know	0.0	0.4
Does not use mobile data	0.0	20.3
Respondents (unweighted)	609	609

Notes: Shares use all 609 respondents per wave and the survey-wave calibration weights. The 2023 question concerned only the main connection, so that wave is omitted. ^aUncapped was an allowed answer. Some respondents may have meant fibre: among dual users, 94.2% of uncapped reporters gave the same spending band for mobile and fibre, compared with 21.5% of finite-volume reporters (135 and 278 respondents respectively). All volume responses are retained here. Tables 4 and 5 exclude only the 127 respondents who reported both uncapped mobile data and matching spending bands.

Source: Authors' calculations from the Kayamandi household surveys.

Mobile spending remains part of the affordability question, even where fibre is widely used. The 2025 survey asked separately about spending on each service, allowing us to examine how respondents paid for connectivity that year. Earlier questions covered mobile data in 2022 and the main connection in 2023, so they do not provide a consistent measure of total spending over time.

We exclude 127 respondents who reported uncapped mobile data and the same monthly spending band for both services, because they may have reported their fibre spending twice. This leaves 341 mobile users and 429 fibre users in Table 4, with those using both services appearing in both columns.

Table 4: Reported connectivity spending and purchase frequency, restricted sample, 2025

	Mobile	Fibre
Reported monthly spending (%)		
Up to R20	23.1	26.3
R21-R50	32.7	14.5
R51-R100	22.0	17.2
R101-R200	12.8	33.7
Above R200	9.5	8.3
Median reported band	R21-R50	R81-R100
Purchase frequency (%)		
Every day	14.2	48.9
Several times a week	34.1	25.0
Once a week	8.0	5.3
Two or three times a month	13.1	5.7
Once a month	17.1	13.9
Less than monthly	13.5	1.2
Included users (unweighted)	341	429

Notes: Excludes 127 respondents who reported uncapped mobile data and the same monthly spending band for mobile and fibre. This may reflect fibre spending reported twice, although matching bands can also be genuine. The table includes 341 mobile users and 429 fibre users from the 609-dwelling sample; dual users appear in both columns. Counts are unweighted. Percentages and median bands use the original 2025 calibration weights within each column. Amounts are monthly respondent spending in nominal rand. The lowest questionnaire band is 'up to R10'.

Source: Authors' calculations from the Kayamandi household surveys.

Median monthly spending among these users was R21–R50 on mobile data and R81–R100 on fibre. About a third of fibre users spent R101–R200 a month, although lower spending bands were also common. Daily purchases were particularly common for fibre: 48.9% of fibre users purchased daily, compared with 14.2% of mobile users. This flexibility may suit people with irregular cash flows.

Median spending on each service was lower among those who used both (Table 5). Mobile-only users reported a median band of R151–R200, compared with R21–R50 among dual users. For fibre, the median was R101–R150 among fibre-only users and R21–R50 among dual users.

Table 5: Median spending bands by connection-use profile, restricted sample, 2025

Profile	N	Mobile	Fibre
Mobile only	52	R151-R200	Not applicable
Fibre only	140	Not applicable	R101-R150
Both mobile and fibre	289	R21-R50	R21-R50

Notes: Excludes the same 127 respondents as Table 4: those reporting uncapped mobile data and the same spending band for both services. All exclusions are from the dual-user group; mobile-only and fibre-only users are retained. N is unweighted. Medians use the original 2025 calibration weights within each group. 'Not applicable' means the connection is not used. The one respondent using neither connection is omitted.

Source: Authors' calculations from the Kayamandi household surveys.

Lower mobile spending among dual users may reflect some substitution towards fibre, as well as differences between people who use one or both services. It does not establish that total household connectivity spending fell, since the survey records individual spending and other household members may pay for their own access. The separate mobile and fibre medians also cannot be added to obtain median total spending.

Expansion of online activities

General internet usage trends

Internet use in Kayamandi appears to have diversified between 2022 and 2025, although the path differed across activities and survey waves (Table 6). More than 90% of respondents already used the internet for communication in 2022. Social-media use became more widespread over the full period, rising from 63.9% to 82.3% by 2025 despite a fall in 2023. School-related use, including research, educational websites and online classes, also grew: 30.5% reported these activities in 2025, compared with 19.1% at baseline.⁶

⁶The survey was limited to adult respondents. 'School purposes' is the questionnaire category and includes research, educational sites and classes; it does not establish enrolment in a formal programme or improved learning.

Table 6: Reported online activities by survey wave (%)

Activity	2022	2023	2025
Social connection			
Communication	92.3	91.0	92.4
Social media	63.9	53.0	82.3
Work and learning			
Job search	37.9	18.7	30.2
Work	15.1	13.3	29.1
Education	19.1	9.6	30.5
Transactions and services			
Online banking	21.2	23.8	17.7
Online shopping	2.1	5.0	7.7
Transport services	6.4	6.6	14.1
Entertainment			
Television streaming	13.7	12.9	21.0
Music or radio streaming	7.1	6.3	14.0
Online video	20.8	14.7	9.6
Downloads	18.3	10.6	3.2
Respondents (unweighted)	609	609	609

Notes: All 609 respondents in each wave are included using that wave's calibration weights. Activities are multiple-response and do not sum to 100. Communication combines instant messaging, contacting friends or family and personal email. Education refers to school purposes, including research, educational sites and classes. Downloads include music, videos, series and movies. The question measures whether an activity is reported, not its frequency, quality or benefit. These are wave descriptions, not fibre-effect estimates.

Source: Authors' calculations from the Kayamandi household surveys.

Watching television online through services such as Netflix, DStv Now and Showmax became more common, as did streaming music. Yet reported online video use, including platforms such as YouTube, fell from 20.8% to 9.6%, and downloads also declined. These categories capture different activities, so their movements cannot be read as a single measure of data consumption.

The share using the internet for work, such as emailing or attending online meetings, almost doubled, from 15.1% to 29.1%. Use of transport services such as Uber or Bolt also increased markedly, although the survey does not distinguish customers from drivers.⁷

⁷During fieldwork, some participants reported buying just enough mobile data to request an Uber home after shopping in town. These accounts illustrate one use of mobile data; they do not establish its prevalence.

Just under one in five respondents used online banking in 2025, a lower share than in 2022, whereas online shopping rose from 2.1% to 7.7% but remained uncommon. Job search followed a different path, falling from 37.9% to 30.2%. People may search through social networks without describing it as job search, or their need to search may change with employment; the activity questions cannot distinguish these explanations.

Participation widened in several online activities, but not across the board.

Communication remained widespread, while work, learning, financial services and entertainment followed different paths. These changes occurred alongside fibre rollout and may also reflect economic conditions, so they cannot on their own establish its effects.

Did getting home fibre influence online behaviour?

The 2022–2023 DiD estimates compare changes between the early and later rollout cohorts (Table 7). They estimate the short-run effect of local fibre availability under the assumptions described in the identification strategy.

Social-media use shows the clearest short-run effect. After adjustment for observed characteristics, earlier rollout is associated with an estimated increase of 14.8 percentage points, which remains statistically significant after adjustment across all ten online outcomes.

Table 7: Estimated effects of early fibre availability, 2022–2023

Activity	Effect (s.e.), p.p.	Adjusted p
Primary online outcomes		
Job search	-1.9 (7.9)	0.828
Work	-3.9 (5.6)	0.818
Communication	+2.0 (4.9)	0.818
Social media	+14.8 (5.0)	0.001
Additional exploratory outcomes		
Education	-2.4 (5.2)	0.818
Online banking	+2.4 (7.4)	0.818
Television streaming	+7.4 (4.5)	0.290
Music or radio streaming	+2.2 (4.7)	0.818
Online video	-3.1 (6.5)	0.818
Downloads	+10.1 (4.5)	0.032

Notes: Adjusted difference-in-differences estimates: 317 early-treated and 292 later-treated dwellings, 15 inference clusters. Effects and standard errors are percentage points. Adjusted p-values use estimator-aware cluster-bootstrap inference and Benjamini–Hochberg correction across all ten online outcomes, including the six exploratory outcomes. Values below 0.05 meet the 5% threshold.

Source: Authors' calculations from the Kayamandi household surveys.

This positive estimate can coexist with the fall in social-media use across the combined sample between 2022 and 2023. DiD measures the difference between the cohorts' changes, after adjustment, rather than the overall movement in use. Its positive sign therefore does not imply an absolute increase over that interval.

There is no statistically clear increase in internet use for education, work or job search in the year immediately following rollout. Although more respondents reported education and work use in 2025, the later survey provides no untreated comparison group with which to attribute those increases to fibre.

Greater social connectivity may itself matter for digital inclusion. In a labour market where contacts and referrals are important, online networks can expose people to information and opportunities.⁸ This offers a possible mechanism for economic benefits, although the survey cannot establish

⁸Burns, Justine, Susan Godlonton and Malcolm Keswell. 2010. 'Social networks, employment and worker discouragement: Evidence from South Africa'. *Labour Economics* 17 (2): 336–44.

whether the additional use involved job information, general communication or leisure, or whether it improved employment.

Conclusion

The rollout of affordable fibre broadband in Kayamandi coincided with a substantial change in how respondents connected to the internet. Over three survey waves, a sample that had relied almost entirely on mobile data came to use fibre as its main connection. Most nevertheless continued to use both services, making the cost of mobile data relevant even where home fibre was available.

Within the spending sample, dual users reported a lower median mobile-spending band than mobile-only users, consistent with some substitution towards fibre. Many users bought access daily, an option that may help them manage irregular cash flows.

The clearest causal finding concerns social-media use. The estimated effect of earlier local fibre availability was an increase in reported use over 2022–2023. The larger shares using the internet for work and education by 2025 show wider participation, but due to a lack of suitable controls the analysis cannot attribute them to fibre.

These estimates cover only a short period after fibre became available. As residents gain experience and find new uses for the service, its effects may change. The early response need not represent the longer-term outcome, which our comparison cannot trace beyond 2023.

Affordable fibre has the potential to widen digital participation by lowering the cost of sustained, data-intensive use, but it should not be viewed in isolation. Electricity access also shapes who can receive fibre, making complementary infrastructure an important part of extending broadband to underserved communities. Understanding that potential requires evidence on what people do online, how they combine and pay for different services, and what those activities achieve. This is our first step in that direction. Our next

note explores whether these changes had any meaningful effect on economic participation.

Annexure

Weighting scheme

The descriptive tables and preferred estimates use weights calibrated separately within the 609-dwelling sample for each wave. Calibration first aligns four gender-by-age cells with Kayamandi population shares, then aligns dwelling type with the shares of backyard, formal and informal homes. GeoTerralimage (Pty) Ltd supplied these population shares.

A third step aligns Grade 12 completion with its weighted 2022 share in the sample, reducing the influence of changes in respondents' educational composition. The resulting weights are not trimmed and are normalised to mean one, summing to 609 in each wave.

Full-sample descriptive percentages use these weights, while conditional tables, such as spending among mobile users, retain the weights and calculate percentages within the stated group. Median bands identify the response category containing the weighted 50th percentile; counts remain unweighted. We do not assign non-users a zero spending amount or use spending-category midpoints to construct a total-spending trend.

Detailed results and measurement checks

Reading the causal table. Effects and standard errors are expressed in percentage points, with standard errors calculated using a clustered multiplier bootstrap across the 15 rollout-related clusters. Pointwise p-values come from a studentised cluster bootstrap based on the estimator's cluster-level influence contributions, using 9,999 Rademacher draws. Adjusted p-values

apply the Benjamini–Hochberg correction across all ten online outcomes, including the six exploratory activities, to account for multiple comparisons.

Of the 142 respondents reporting uncapped mobile data, 127 also reported the same spending band for mobile and fibre. We exclude these 127 from the spending tables because they may have reported fibre spending twice, retaining the other 15 and the three users who did not know their mobile-data volume. Table A1 shows the effect of this exclusion on reported mobile spending.

Table A1: Spending sensitivity to the mobile-volume classification, 2025

Group	N	Median band	Up to R50 (%)
All mobile users	468	R81–R100	40.9
After spending exclusion	341	R21–R50	55.8

Notes: The second row excludes 127 respondents reporting uncapped mobile data and the same monthly spending band for mobile and fibre, as in Tables 4 and 5. Other uncapped reporters and the three users with unknown volume remain included. Both rows use the original 2025 calibration weights within the stated group; N is unweighted.

Source: Authors' calculations from the Kayamandi household surveys.

The exclusion changes the mobile-spending median from R81–R100 to R21–R50 and increases the share spending up to R50 from 40.9% to 55.8%.

Among the 556 fibre users, 69 reported daily purchases but monthly spending of no more than R20, possibly confusing the amount paid per purchase with the amount paid per month. Excluding these 69 alone leaves 487 users and the fibre median unchanged at R101–R150. We make no further exclusions on this basis.

Table A2 compares rollout availability with reported fibre use among the same 317 early and 292 later dwellings.

Table A2: Rollout availability and main fibre use by cohort (%)

Wave and cohort	N	Reached	Mainly fibre
2023 Early cohort	317	100.0	40.2
2023 Later cohort	292	0.0	29.2
2025 Early cohort	317	100.0	86.0
2025 Later cohort	292	100.0	80.9

Notes: The same 317 early and 292 later dwellings are followed. 'Reached' is administrative treatment at interview; 'mainly fibre' is the respondent's main connection. Shares use the survey-wave calibration weights within cohort. Both cohorts were reached by 2025, so no untreated 2025 comparison is created. Fibre use before local rollout may reflect access through another router; this table does not identify the source or effect of that access.

Source: Authors' calculations from the Kayamandi household surveys.

Reported fibre use before local rollout may reflect access through another router or location, although the table cannot identify where that access occurred or its effect. By 2025, rollout had reached both cohorts, but their main-connection choices still differed.