

# How does BII drive change in Nepal's internet service provision market?

*Insights from WorldLink*



## Evaluation

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## Foreword

Connecting people to fast, reliable and affordable internet opens up opportunities for businesses, families and entire communities. Yet until recently, large parts of Nepal remained unconnected. Less than a third of the population had internet access and only 6% of households had fixed broadband subscriptions in 2018.

When we first invested in internet service provider WorldLink in 2019, we backed a company that was ready to do something new: take high quality, fibre-to-the-home internet connection beyond Kathmandu Valley and into Nepal's smaller cities and remote areas. Our funding also helped unlock capital for WorldLink from Dolma Impact Fund and FinnFund. It was a bold move at the time, particularly given the nascency of fibre-to-the-home in Nepal, but since then WorldLink has grown from around 300,000 customers to more than one million, with most of that expansion happening outside Kathmandu Valley.

In doing so, WorldLink showed that building a commercially viable fibre network beyond major cities is possible. And the rest of the market responded. Other internet service providers followed into new regions; prices fell, speeds increased, and services improved for consumers. Rural and urban households alike have benefited from the competition and innovation. As of 2024, 48% of households have access to fixed broadband, up from 6% in 2018.

This evaluation looks at that journey. As well as WorldLink's growth, it explores how one company's progress can help shift an entire market. It is one of the clearest examples in our portfolio of how patient capital, at the right moment, can help a pioneering business unlock broader change. It also comes at a time when BII is sharpening its focus on market-level impact. The insights from this evaluation are helping shape how we apply this approach in our next strategy cycle.

We are learning from the study in other ways too. It shows the value of backing and providing consistent support to strong local market leaders who are ready to expand into underserved areas. It highlights how important it is for our capital to be flexible, so companies can take long-term decisions in markets with difficult economics. And it reinforces that building commercially viable models that reach lower-income or last-mile customers often depends on having a stable base of higher-margin customers first.

We are grateful to Greencroft Economics and Wellspring Development for leading this study, and to WorldLink for their support facilitating it. We hope that the findings offer useful lessons for others across the impact investment community working to deliver market-level impact.



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## Executive summary

### Objectives and scope

**Between 2014 and 2024, BII's Catalyst Portfolio (Catalyst) committed \$1.9 billion to over 100 businesses and funds.**

Often, when making these investments, BII sought to deliver changes in quantities, prices, range of (or quality of) services offered by companies, both through the direct effect of its investees, and by catalysing the behaviour of other companies and investors. The latter catalysing mechanism – catalysing market effects – is particularly important for investors seeking transformational change beyond the direct impact of their investments.

**This report evaluates the extent to which Catalyst's investments in internet service provision in Nepal – \$20.4 million committed since 2019 – have delivered direct and/or catalysing market effects.** BII made a \$12 million equity investment in Nepal's leading internet service provider (ISP), WorldLink, in 2019, followed by a second \$8.4 million equity investment in 2022. BII also committed \$14 million to the \$75 million Dolma Impact Fund II (DIF II), which subsequently invested \$7 million in WorldLink alongside BII in 2022.

### What changes have been seen in internet service provision in Nepal?

**Internet access in Nepal has increased rapidly in recent years, rising from less than 10 per cent of individuals in 2010 to 30 per cent in 2018 and 56 per cent by 2023.** This trend is mirrored by an increase in fixed broadband subscriptions, rising from 6 per cent of households in 2018 to 48 per cent of households in 2024, with 3.3 million households connected.

**Significant regional disparities remain – with rural regions still lagging in internet connectivity.** In 2022–23, internet access was 80 per cent in urban Kathmandu Valley, 43 per cent in other urban areas, and just 17 per cent in rural regions.

**The ISP landscape has become significantly more competitive since 2018.** There has been both a rise in the number of active companies, and a decline in the dominant market shares of major players such as WorldLink. Market concentration dropped from 'high' to 'low' between 2018 and 2023, over the same period as a rapid increase in internet users.

**This increase in competition has encouraged improvements in price and quality.** Affordability has improved, with 1 gigabyte (GB) of fixed broadband data costing 9 per cent of gross national income (GNI) per capita in 2015, falling to just 1.4 per cent in 2023. Internet quality, measured by speed, also improved, although it still lags behind global averages.

### Did BII's investments in WorldLink contribute to these changes?

**This evaluation examines three possible pathways through which BII may have supported these changes.** The pathways are: (i) changes in WorldLink's operations, namely direct effects; (ii) whether WorldLink successfully pioneered a new business model that other ISPs in Nepal replicated; and (iii) whether WorldLink contributed to greater competition, leading to other ISPs reducing their prices or improving their service quality. The latter two are examples of catalysing market effects.

**It finds that the direct impact of the WorldLink investment has been significant.** WorldLink scaled up rapidly from 300,000 customers at the point of BII's first investment in 2019 to 1 million customers in 2025, equivalent to 15 per cent of all Nepali households. It was the first ISP in Nepal to deploy fibre to the home (FTTH) at scale outside of the Kathmandu valley, and it has continued to grow its FTTH connections both within and beyond Kathmandu Valley. Most of WorldLink's growth has been driven by connections outside of Kathmandu Valley, in secondary cities and rural areas. WorldLink has also expanded into the construction of industrial scale data centres across Nepal, in part to support the rapid expansion of its FTTH business.

**Other ISPs have replicated WorldLink's approach rolling out FTTH outside Kathmandu Valley.** Since BII's investment, WorldLink has demonstrated both the technical and commercial viability of scaling up FTTH outside of the Kathmandu Valley, and other ISPs have followed into the same or similar regions, in response to WorldLink's success. Several ISPs noted they had moved into Tier 2 and Tier 3 cities in Nepal after WorldLink had proven the model, and WorldLink is well recognised as a pioneer of FTTH beyond Kathmandu Valley. All of the ten largest ISPs in Nepal now provide FTTH outside of Kathmandu Valley, compared with only two or three at the time of WorldLink's expansion.

**Competition has helped drive price reductions and increases in connection speeds.** The cost of broadband internet has dropped sharply in Nepal, with ISPs reporting up to 50 per cent decreases in monthly average revenue per user (ARPU) since 2019, while connection speeds have increased by up to 10x over the same period. WorldLink has contributed to these competitive dynamics, alongside other ISPs such as CGNet, which has also played a significant role in driving price reductions and speed improvements.

**Without BII's investment in WorldLink, these direct and catalysing market effects would not have occurred, or would have been substantially delayed.** WorldLink's growth would have been delayed by several years without BII's initial investment, particularly given the Covid-19 pandemic struck shortly after the company's first equity round, which was critical in providing the capital to fuel its growth. BII's continued presence as a major shareholder has also played a major role in helping WorldLink secure co-investment from DIF II, as well as subsequent investment from FinnFund and the International Finance Corporation (IFC).

**The increase in access to affordable internet is likely to improve outcomes for Nepalese households and support economic growth.** Research in South Asia suggests a one percentage point increase in internet access is associated with a 0.18 percentage point increase in gross domestic product (GDP) per capita. Globally, a wide body of evidence points to the positive impact of internet access on a range of outcomes, including increasing farmer and household income by around 20 per cent. The expansion of FTTH access to 700,000 households (three-fold growth), provided by WorldLink, and of 2.4 million households (four-fold growth) by all ISP providers in Nepal between 2019 and 2024, is therefore likely to have delivered substantial benefits to Nepalese households and the wider economy.

## Implications and lessons

**The evaluation finds that investing in an established market leader has proved effective in catalysing other companies, given the structure of the ISP market in Nepal.** Supporting WorldLink, the dominant ISP, to scale up its operations outside of Kathmandu Valley has been effective in a market characterised by low regulatory barriers to entry, a fairly standardised product, and ample room for growth by both the incumbent (WorldLink) and its competitors. BII's patient equity has been a key driver of WorldLink's scale up, especially outside of Kathmandu Valley where capital costs are higher, and payback periods are longer. Technical assistance (TA) and non-financial support, such as strategic advisory by deal teams, helped WorldLink grow – particularly increasing managerial capacity and internal processes.

**Drawing on these insights, five lessons emerge for DFIs and other impact investors seeking to deliver improved outcomes both through the direct effects of their investees and through catalysing market effects, either in ISP markets or elsewhere:**

- 1. Where established market leaders with pioneer technologies or business models exist, supporting their scale up can be an effective route to catalysing others.** WorldLink had a dominant market share before BII's investment, which enabled WorldLink to scale up its FTTH offering rapidly into new regions in Nepal. This encouraged other ISPs to follow suit, resulting in all the top 10 ISPs in Nepal offering FTTH outside of Kathmandu Valley and WorldLink's market share declining. However, in nascent markets where it is challenging to find established market leaders with credible management teams and strong financials, spreading impact and investment risk across multiple opportunities may be a more pragmatic approach.
- 2. Investing in vertically integrated pioneer firms in nascent markets may increase the likelihood of catalysing market effects, as the ecosystem of upstream and downstream service providers, such as technology suppliers and distributors, may not yet be sufficiently developed.** WorldLink has a high degree of control over its success, as it operates the full supply chain from research and development through to customer sales. This increases the likelihood of commercial success in a market with a nascent ecosystem of supporting service providers, creating a positive signal that others can replicate. Investment strategies focused on driving catalysing market effects through pioneer firms should consider the extent to which these firms are reliant on other supply chain actors for commercial success.
- 3. Markets with low barriers to entry are more likely to result in replication of business models or technologies.** There were very low regulatory barriers to entry for other ISPs, so they responded quickly to the demonstration effects generated by a successful first mover such as WorldLink. Investors seeking to drive replication of business models or technologies should therefore consider barriers to market entry as an important enabling factor.
- 4. Being a lead investor in a nascent financing ecosystem enhances impact for the investee, but catalysing other financiers into the sector may be challenging.** In Nepal, there is little to no international equity or debt in the telecommunications sector. This means BII's investment was of high value to WorldLink and helped crowd in DIF II and Finnfund. But it has not yet resulted in international investment in other Nepalese ISPs. Investors seeking to deliver investor demonstration effects in markets with nascent financing ecosystems should recognise these effects are likely to take time to result in new investments being mobilised.
- 5. To demonstrate the viability of serving lower-income or last-mile consumers, it is important for investors to support companies that can do so from a base of higher-margin customers.** This increases the likelihood that expansion to lower-income or last mile-consumers is commercially sustainable. WorldLink could expand to smaller cities and rural areas because of a profitable core customer base in larger cities.

## Impact pathway dashboard

### Impact pathway 1: WorldLink direct effects

Hypothesis: WorldLink scaled up the number of households served by its FTTH internet substantially, enabled by BII's investment.

Change in BII investee companies	Substantial	WorldLink scaled up rapidly from 300,000 customers in 2019 to over 1 million customers in 2025, with large increases both inside and outside Kathmandu Valley.
Change in direct outcomes	Substantial	This represents significant three-fold growth, reaching 700,000 additional households, bringing the total to 1 million. This amounts to 15 per cent of all Nepalese households, and WorldLink holds a 28 per cent market share.
BII's contribution to these changes	Substantial	WorldLink's rapid growth since 2019 would not have been possible without BII's equity investment.

### Impact pathway 2: WorldLink demonstration effects

Hypothesis: WorldLink demonstrated the commercial viability of its business model to other ISPs in Nepal, resulting in replication.

Change in BII investee companies	Substantial	WorldLink pioneered a FTTH model outside of Kathmandu Valley and increased customers there from 130,000 to 600,000 in a commercially viable way.
Change in other market actors' behaviour	Substantial	Other ISPs have replicated WorldLink's FTTH model outside of Kathmandu Valley, with several entering cities such as Biratnagar and Nepalgunj after observing WorldLink's success there. Nepal's top ten ISPs all now provide FTTH outside of Kathmandu Valley.
BII's contribution to these changes	Substantial	BII's investment helped WorldLink to expand and demonstrate the viability of the FTTH model beyond Kathmandu Valley. Addressing the "high demand-supply gap in internet access" outside of Kathmandu Valley was a key part of BII's investment thesis.

### Impact pathway 3: WorldLink competition effects

Hypothesis: WorldLink encouraged competition in the market by influencing other ISPs, which responded by reducing prices or improving service quality.

Change in BII investee companies	Substantial	WorldLink grew its customer base both inside and outside of Kathmandu Valley.
Change in other market actors' behaviour	Substantial	Other ISPs attempted to win market share by competing on price, speed and reliability, leading to 30-50 per cent lower prices and up to 10x faster fixed broadband connections in the last five years.
BII's contribution to these changes	Moderate	WorldLink, enabled by BII's investment, was one of several ISPs to contribute to the competitive dynamics.



# 1

## Introduction

**This report explores whether BII's investments in WorldLink have delivered significant direct effects and/or catalysing market effects in internet service provision in Nepal.** The primary audience is BII teams looking to develop investment strategies that will deliver substantial catalysing market effects, as well as other development finance institutions (DFIs), multi-lateral development banks (MDBs), and impact investors that share the same objectives. It outlines BII's experience in seeking to generate direct and catalysing market effects in the ISP Nepal sector and draws lessons both for investments in this sector and for investments aiming to deliver catalysing market effects more broadly.

**Between 2014 and 2024, BII's Catalyst Portfolio (Catalyst) committed \$1.9 billion to over 100 businesses and funds.** Catalyst takes a more flexible approach to risk in return for impact and, as such, may experience lower returns than the main BII Growth portfolio. This enables BII to offer financial support to a broader range of high impact businesses and projects,<sup>1</sup> with an ambition to 'transform markets'.<sup>2</sup>

**Catalyst's investments seek to deliver impact both through their direct effects, and by catalysing changes in and by other companies and investors operating in the broader market.** Catalyst seeks to influence the quantities, prices, range or quality of service offered by companies, as well as the way in which other actors in those markets behave in seeking to improve those outcomes, including changing their business models or financing arrangements. As set out in BII's Impact Framework (Figure 1), these changes can be achieved in three ways, of which this report focuses on two.<sup>3</sup> First, Catalyst investments and investees can have a direct impact. Second, Catalyst investments and investees can influence the behaviour of others; referred to as 'catalysing markets' effects. These are particularly important for DFIs and impact investors seeking to drive transformational change that goes beyond the direct stakeholders of invested projects.<sup>4</sup>

1 BII (2024), "Pioneering catalytic capital: a decade of learning", available at: <https://www.bii.co.uk/en/news-insight/insight/articles/pioneering-catalytic-capital-a-decade-of-learning/>

2 Catalyst might also make investments that deliver enhanced development impact.

3 The third way is when BII's investees supply essential inputs to companies in another market and BII's investment improves the provision of that input to the extent that it leads to market-level changes in that third market, such as investments in power generation that lead to market-level changes in a range of markets for manufactured goods.

4 BII (2025), "Driving market-level changes in impact investing", available at: <https://assets.bii.co.uk/wp-content/uploads/2025/02/04162936/Driving-market-level-changes-in-impact-investing.pdf>

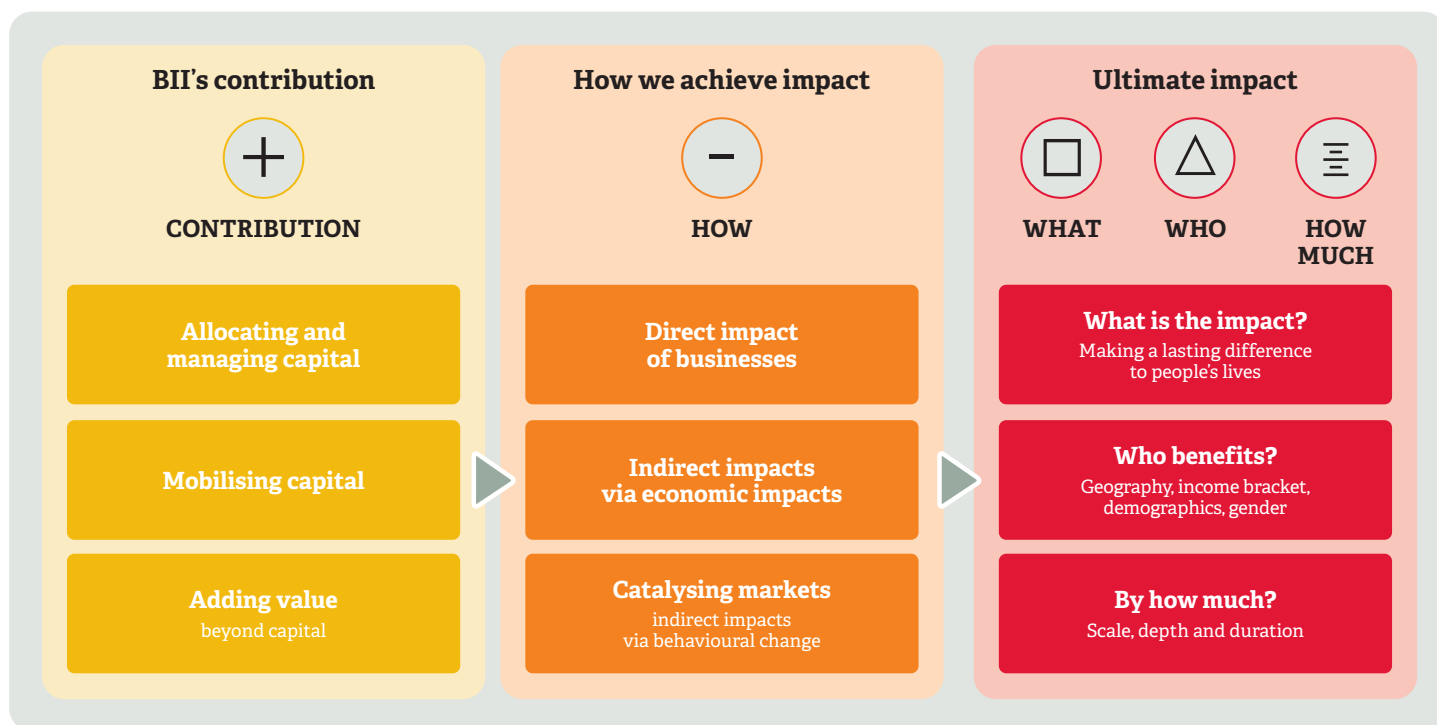


Figure 1: BII Impact Framework for the 2022-26 strategy period  
 Source: BII (2023) "What impact means to us: an overview of how we manage impact"

**This report considered four channels through which investments may catalyse markets:<sup>5</sup>**

- **Enhancing competition:** supporting existing companies or new entrants in a way that enhances competitive pressure, resulting in product innovation, improvement in product quality, or price reductions.
- **Providing demonstration effects:** by pioneering a new business model or proving the viability of a market that is not yet mature. One signal of demonstration effects being successfully transmitted is when others replicate the business model or other behaviours of the firm providing the demonstration effects.
- **Building skills and capacity:** in workers or suppliers who move on to work for or start rival firms, or by helping to develop new products that enter another firm's supply chain.
- **Improving the enabling environment:** for example, by proving elements of regulation or a structure, such as investing in the first public-private partnership in a country or sector.

**When BII made its first investment in in 2019, only 33 per cent of Nepali households had internet access, and the sector was characterised by a small number of dominant companies.** As access to internet is an important enabler of productivity growth across sectors,<sup>6</sup> increases in household income,<sup>7</sup> and better education outcomes,<sup>8</sup> there was a strong case for DFIs like BII to invest to increase internet service provision in Nepal. Barriers to scale-up of affordable and high-quality internet access included: (1) uncertainty (high-risk) and high structural costs associated with scaling up internet service provision (particularly for FTTH) beyond the main city region of Kathmandu, (2) a lack of competitive pressures to drive price and quality improvements.

**BII has provided substantial support to the market leading ISP in Nepal since 2019.** BII and the BII-supported Dolma Impact Fund II (DIF II) have committed over \$27 million in equity investment to WorldLink, to scale up its fibre to the home broadband offering, including using the equity investment to support expansion to new regions outside of Kathmandu Valley.

5 BII (2025), "Driving market-level changes in impact investing", available at: <https://assets.bii.co.uk/wp-content/uploads/2025/02/04162936/Driving-market-level-changes-in-impact-investing.pdf>

6 Hjort & Tian (2021), "The economic impact of internet connectivity in developing countries", available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3964618](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3964618)

7 Poliquin (2021), "The Wage and Inequality Impacts of Broadband Internet", available at: [https://www.chrispoliquin.com/files/poliquin\\_jmp.pdf](https://www.chrispoliquin.com/files/poliquin_jmp.pdf)

8 Wainer, et al. (2015), "The association between having access to computers and Internet and educational achievement for primary students in Brazil", available at: <https://www.sciencedirect.com/science/article/abs/pii/S0360131514001808>



## 2

### Scope and approach

#### 2.1 BII's activities in Nepal's internet service provision market

The relevant market is defined across three dimensions:<sup>9</sup>

- **Product:** internet service provision in Nepal, which includes both FTTH and mobile broadband. The main focus is WorldLink's business model of rolling out FTTH technology, but mobile broadband is an important alternative product segment serving the same customer base.
- **Geography:** Nepal, with a differentiation between customers located within and outside of Kathmandu Valley.
- **Users:** households and businesses.

**BII has invested \$20.4 million of equity into WorldLink, while DIF II, to which BII contributed \$14 million out of a total fund size of \$75m million, invested a further \$7 million.** BII's first equity investment of \$12 million, made through Catalyst in 2019, was to support rollout to underserved customer groups outside Kathmandu Valley. This was followed by an \$8.4 million equity investment in 2022, this time through BII's Growth portfolio, as WorldLink's commercial risk profile, and customer base no longer met the revised impact thresholds of the Catalyst portfolio.<sup>10</sup> DIF II invested \$7 million alongside the BII Growth investment.

**Alongside this capital, BII provided non-financial support in the form of technical assistance (TA) and board advisory support as a major shareholder.** BII supported the development a Health and Safety support facility for WorldLink. The facility's objective was to improve the capacity of WorldLink's Health, Safety and Environment (HSE) team and support the development of an Environment and Social Management System. As the major external shareholder, BII also has a role in board advisory, in supporting strategy development, and in strengthening senior management and human resources (HR) functions.

<sup>9</sup> BII (2025) "Driving market-level changes in impact investing", available at: <https://assets.bii.co.uk/wp-content/uploads/2025/02/04162936/Driving-market-level-changes-in-impact-investing.pdf>

<sup>10</sup> BII's enhanced development impact criteria target people living "people living below \$5.5 (PPP 2011)/day" – for more information see (2022) "Our approach to enhanced development impact", available at: [https://assets.bii.co.uk/wp-content/uploads/2022/11/08094501/EnhancedDevelopmentImpact\\_BII\\_December-2022.pdf](https://assets.bii.co.uk/wp-content/uploads/2022/11/08094501/EnhancedDevelopmentImpact_BII_December-2022.pdf)

## 2.2 Evaluation approach and defining impact pathways

### 2.2.1 Methodology

**The first step of this evaluation was to develop a theory of change (Figure 2).** This was based on: (1) the evolution of BII's strategy for the sector as reflected in various internal documents, (2) investment cases for the Catalyst and Growth investments into WorldLink, and (3) wider BII literature on how Catalyst seeks to deliver impact through both the direct effects of its investees and through catalysing market effects (summarised in Section 1).

**Next, four evaluation questions were developed, based on an initial analysis of key market trends and the outcomes that BII's investments would have been expected to influence:**

1. How has ISP provision in Nepal changed since BII's investments?
2. How has the amount and type of capital invested and available to companies providing ISP services in Nepal changed?
3. How have BII investment activities contributed to the product and capital market changes observed?
4. Have the product and capital markets changed in a way that supports impact for Nepali households and businesses?

**Finally, three impact pathways were defined to trace BII's contribution to changes in the ISP sector in Nepal:**

- **Impact pathway 1: direct effects of BII's investments into WorldLink.** The hypothesis was that WorldLink scaled up, resulting in a substantial increase in the number of households served with fixed broadband, and that this was enabled by BII's investment. This is explored in Section 4.
- **Impact pathway 2: WorldLink demonstration effects.** The hypothesis was that WorldLink encouraged other ISPs in Nepal to replicate its (or elements of its) business model. This is explored in Section 5.1.
- **Impact pathway 3: competition effects.** The hypothesis was that WorldLink encouraged competition in the market by influencing other ISPs, which responded by reducing their prices or improving their service quality. This is explored in Section 5.2.

**The assessment of BII's contribution to the changes in the sector through these impact pathways was based on detailed analysis of industry data, and stakeholder interviews.** To answer the evaluation questions and test the impact pathways, a detailed analysis of industry data and industry reports was carried out and a phased series of interviews were conducted with BII's investment teams (Phase 1 interviews), its investees WorldLink and Dolma Impact Fund (Phase 2), as well as seven interviews with other ISPs and sector experts (Phase 3).<sup>11</sup>

<sup>11</sup> The Phase 3 interviewees were selected as a representative sample of industry experts and representatives of other ISPs, to test hypotheses within each impact pathway. They included representatives of (but not speaking on behalf of their organisation): the Ministry of Communication and Information Technology, the Nepal Telecommunications Authority, Nepal Telecom, Vianet, DishHome, and Finnfund.

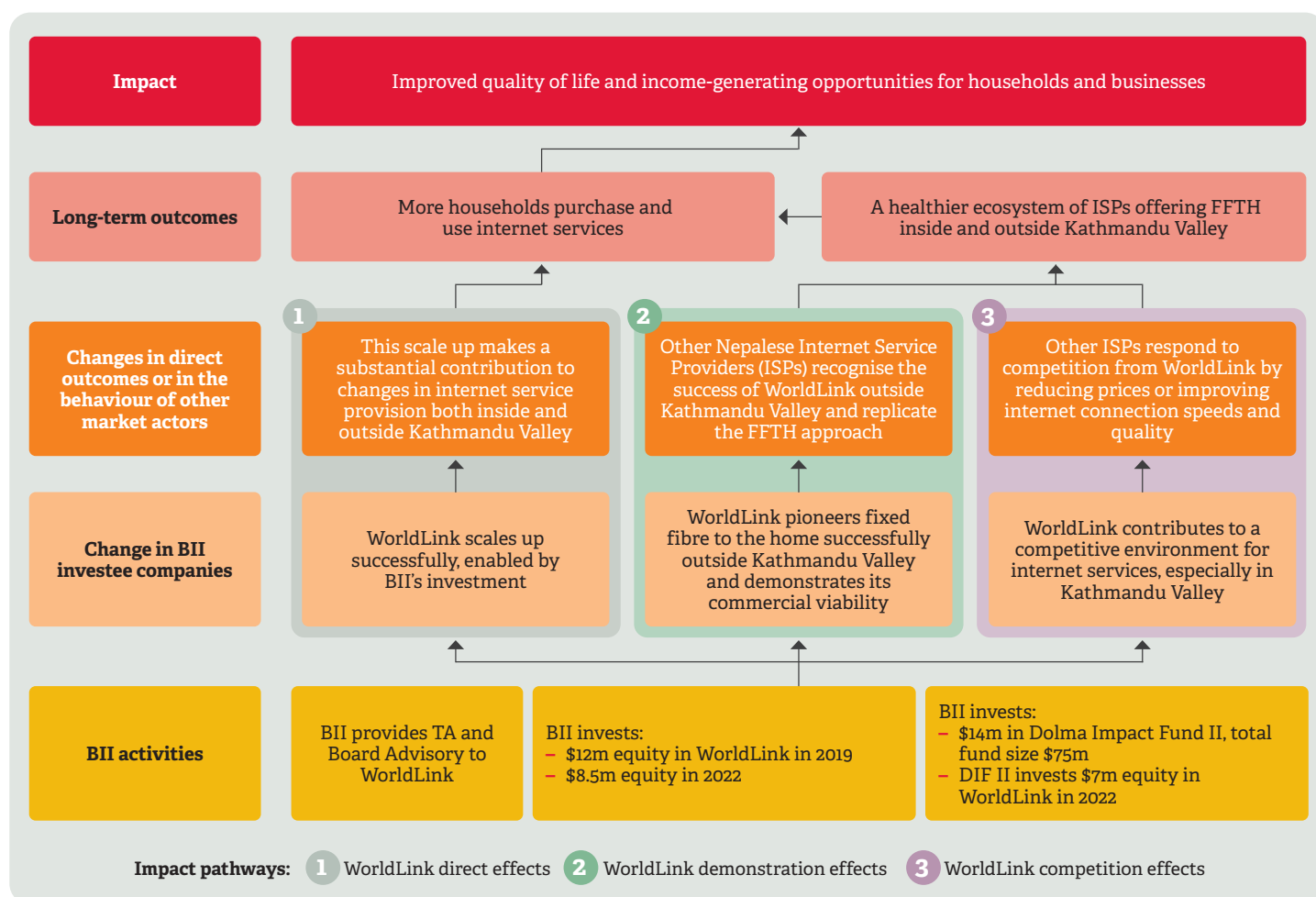


Figure 2: BII Catalyst Portfolio in ISP Nepal: Theory of Change  
Source: greencroft Economics

## 2.2.2. Presentation of results

Each of the impact pathways is assessed along three steps:

1. Step 1: Change in BII investee companies.
2. Step 2: Changes in direct outcomes<sup>12</sup> and/or in the behaviour of other market actors.
3. Step 3: BII's contribution to these changes.

For each step, the same four-point scale is used.

- Substantial – there has been substantial change in WorldLink (step 1); and/or there has been substantial change in direct outcomes or the behaviour of other market actors (step 2); and/or BII and WorldLink have made a substantial contribution to the observed changes (step 3).
- Moderate – the change within WorldLink has only been modest (step 1); some changes in direct outcomes or behaviour of other actors can be observed, but they are limited (step 2); BII and WorldLink have played an important, but not lead, role in contributing to the observed changes (step 3).
- Limited – there has been little or no change within WorldLink (step 1); and/or changes in direct outcomes or behaviour of other actors are very small or not evident (step 2); and/or BII and WorldLink have not played a significant role in contributing to the changes observed (step 3).
- Too early to tell – insufficient time has elapsed for sufficient evidence to be available to make an informed judgement (all steps).

<sup>12</sup> Such as a change in WorldLink's reach in terms of customer numbers, or in pricing or quality of WorldLink's service provision.

**The different steps place different weight on the types of evidence collected.**

- Step 1 is based on an empirical data relating to WorldLink, complemented by interviews with BII and WorldLink.
- Step 2 combines empirical data and qualitative evidence from key informant interviews. The relative weight given to these different types of evidence depends on the impact pathway in question; for direct effects, it draws mainly on empirical data, for pathways that relate to company or investor behaviour that is not captured in market statistics, interview evidence plays a greater role, especially where interviewees corroborated one another's perspectives, and could provide clear examples to support their statements.
- Step 3 relies primarily on interview data where an informed judgement is then taken by combining both the number of interviewees that gave an assessment of BII's contribution and the weight that can be attached to their perspective. For example, when considering whether BII has contributed to changes within its investees, greater weight is given to evidence from investees. On demonstration effects, greater weight is given to evidence from other companies, or from investors that could provide specific examples of demonstration effects they had observed in other companies.



# 3

## The evolution of internet services in Nepal

### 3.1. Product market trends

**The proportion of people in Nepal with access to internet services has increased rapidly from below 10 per cent of individuals in 2010, to 30 per cent in 2018, to 56 per cent in 2023.** This equates to 17 million people with access to the internet at home by 2023. There remain large differences in urban and rural areas. In urban regions (excluding Kathmandu Valley) access has risen from 19 per cent in 2016-17 to 43 per cent by 2022-23, while in rural regions it has increased from 8 per cent to 17 per cent over the same period.<sup>13</sup> In 2022-23, urban Kathmandu Valley had the highest rate of internet access nationwide at 80 per cent.<sup>14</sup> The overall increase in internet penetration is comparable to other countries in South Asia (Figure 3).

**Fixed broadband subscriptions account for most of this growth – rising from around 6 per cent of households in 2018 to 48 per cent in 2024.** Fixed-broadband subscribers increased from 60,000 in 2012 to 400,000 in 2018 and to 3.3 million in 2024, a 300 per cent increase over a six-year period (Figure 4).<sup>15</sup>

<sup>13</sup> This dataset does not show separate data for Kathmandu Valley, only the urban/rural split. Source: Government of Nepal (2017) “Annual Household Survey 2016/17”

<sup>14</sup> Government of Nepal (2024) “Nepal Living Standards Survey IV 2022/23”, available at: [https://giwmscdnone.gov.np/media/app/public/36/posts/1719375782\\_27.pdf](https://giwmscdnone.gov.np/media/app/public/36/posts/1719375782_27.pdf)

<sup>15</sup> Data comes from monthly telecommunication indicator reports from the Nepalese Telecom Authority

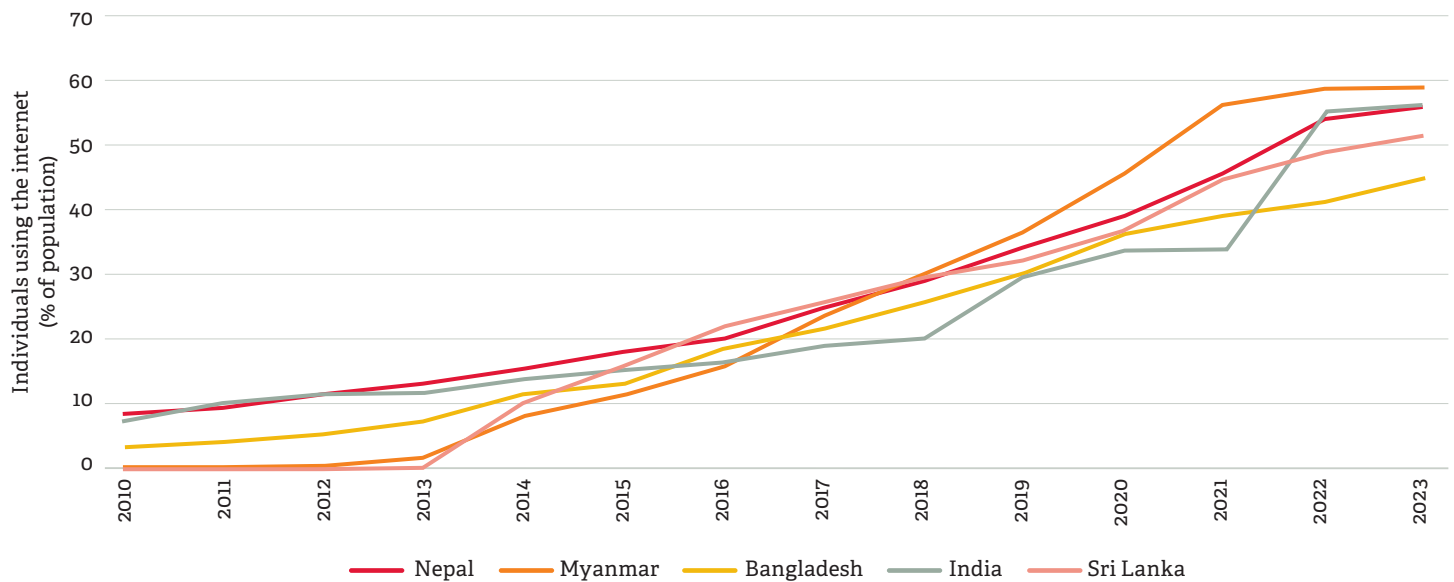


Figure 3: Internet use in Nepal and neighbouring countries between 2010-2023  
 Source: Greencroft Economics, based on World Bank, World Development Indicators, [Link](#)

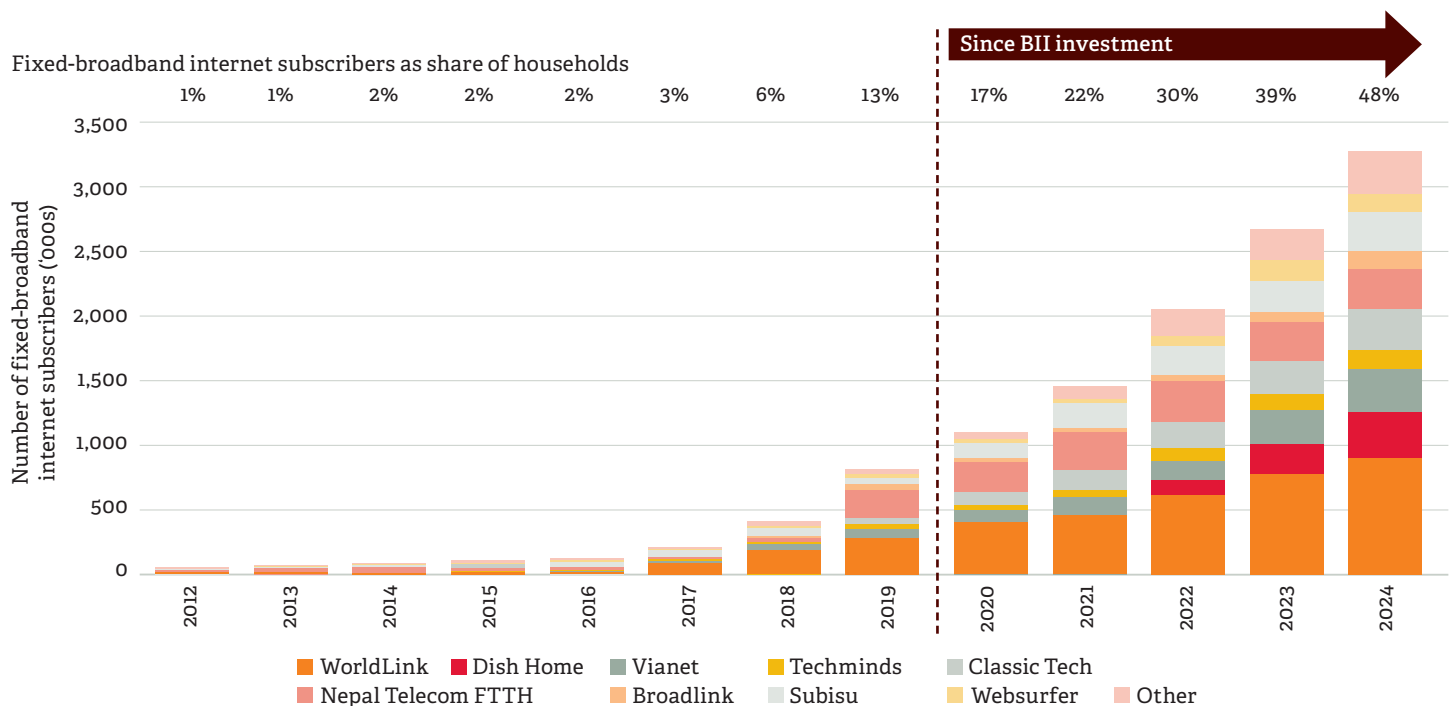


Figure 4: Number of fixed broadband subscribers from 2012-2024  
 Source: Greencroft Economics, based on Nepal Telecommunications Authority (2024), “Telecommunication Indicators Chaitra from 2012–2023”

**The landscape of ISPs has evolved significantly, with an increase in the number of companies and a decline in the market shares of the largest actors.** WorldLink was a first mover in providing FTTH, with its market share (of fixed broadband) peaking at 47 per cent in 2018 as it scaled up its FTTH broadband offering (Figure 5). While this growth continued, discussed further in Section 4.1) other providers have since entered or scaled up. This includes new actors such as DishHome expanding its satellite television business into FTTH since 2022. Previously dominant ISPs such as Broadlink and Subisu have seen their market share decline, while major telecommunications provider Nepal Telecom began offering FTTH in 2019 and has also seen its market share decline.

**This evolution has resulted in a more competitive ecosystem of providers.** The Herfindahl-Hirschman Index (HHI),<sup>16</sup> which reflects the extent of market concentration, shows that in the five years from 2018, the market has gone from ‘high’ to ‘low’ concentration, indicating a much more competitive ecosystem of ISPs (see Figure 6). Notably, this increase in competition has occurred in a period where the number of internet users has also increased rapidly.

16 The Herfindahl-Hirschman Index reflects the extent of concentration (the degree a market is dominated by one or a few companies, versus dispersed among many companies). It is calculated by squaring the market shares of all firms in the market. For Nepal, we have calculated it using the FTTH subscriber data per company from the Nepal Telecom Authority.

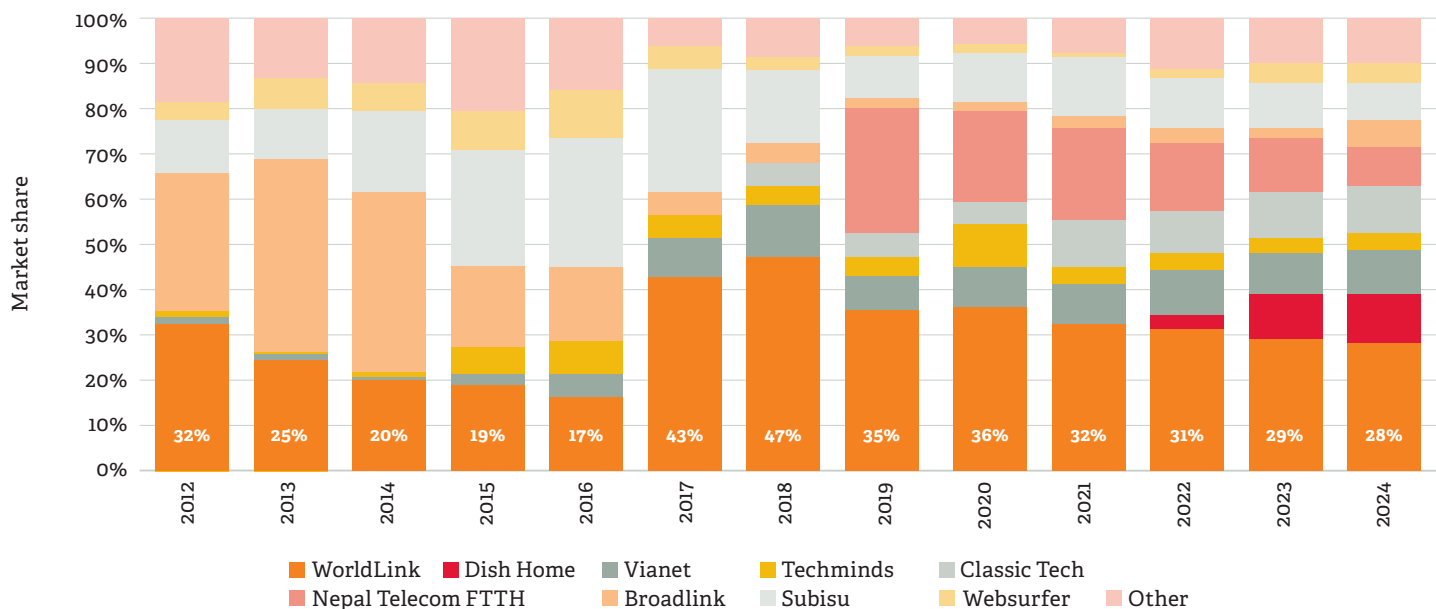


Figure 5: Market share of Nepal's top 10 ISP providers from 2012-2024  
 Source: Greencroft Economics, based on Nepal Telecommunications Authority (2024), "Telecommunication Indicators Chaitra from 2012-2023"

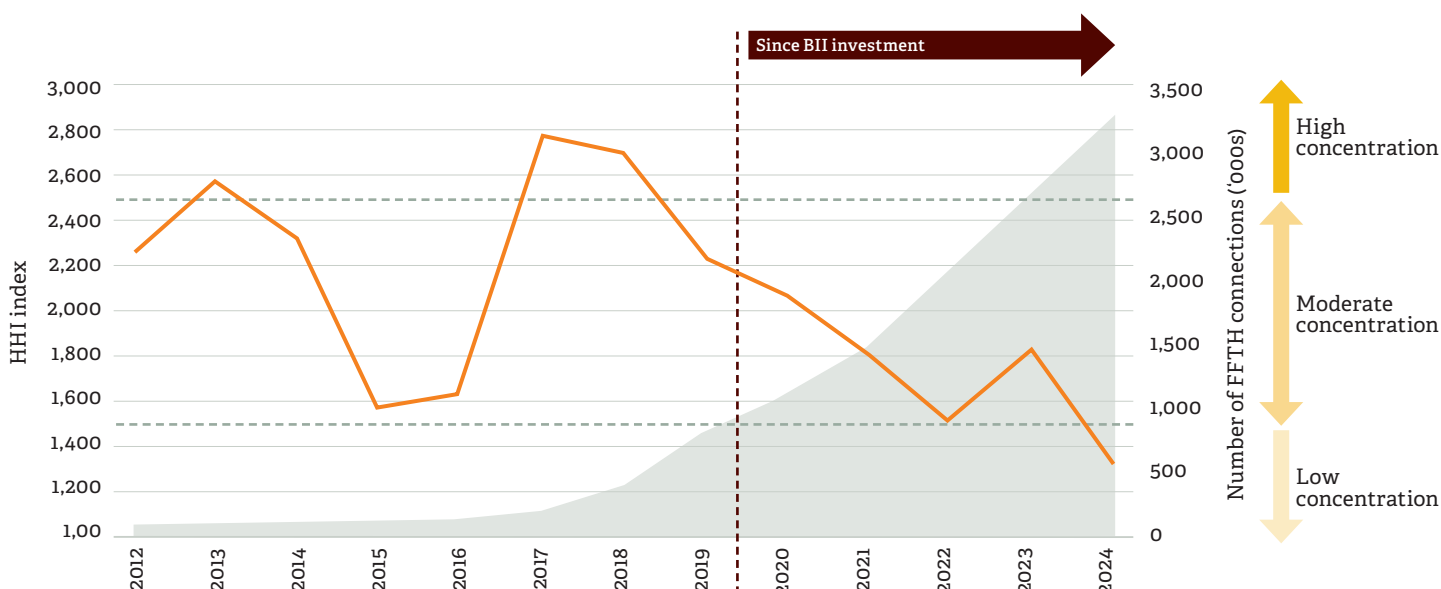


Figure 6: HHI index for Nepal, and the number of FTTH connections, from 2012-2024  
 Source: Greencroft Economics, based on Nepal Telecommunications Authority (2024), "Telecommunication Indicators Chaitra from 2012-2023"

**Affordability of internet services has improved.** One gigabyte (GB) of fixed broadband data cost 9 per cent of gross national income (GNI) per capita in 2015, falling to 1.4 per cent in 2023.<sup>17</sup> This improvement is driven primarily by price changes as a result of competition, falling input costs, and network effects, which account for 85 per cent of the change, and partly by higher GNI per capita, which account for 15 per cent of the change.<sup>18,19</sup> However, this is still higher than neighbouring countries such as Bhutan, where 1GB of fixed broadband data costs around 0.44 per cent of GNI per capita.

17 Alliance for Affordable Internet broadband pricing in 2015, available at: <https://a4ai.org/mobile-broadband-pricing-data/> and International Telecommunications Union data for 2023, available at: <https://www.itu.int/itu-d/reports/statistics/facts-figures-for-ildc/>

18 GNI per capita increased from \$895 in 2015 to \$1,188 in 2023. This implies that 1GB of data cost around \$80 in 2015 and \$16 in 2021 (at constant 2015 US\$ prices), a drop of 80 per cent.

19 Using World Bank data on GNI per capita in constant 2015 US\$, available at: <https://data.worldbank.org/indicator/NY.GNP.PCAP.CD?locations=NP>

**Internet quality in Nepal has increased, but lags behind global averages.** In 2020, Nepal was ranked 112th (out of 176 countries) in fixed broadband speed, with an average speed of 21 megabytes per second (mbps), the global average is 74mbps.<sup>20</sup> In 2025, the average speed increased to 75mbps (with the global average at 100mbps) and the country now ranks 89th.<sup>21</sup> However, press reports indicate that the quality of service provision remains inconsistent and that, in particular, smaller ISPs are not well equipped to meet the increase in demand seen in the country.<sup>22</sup> Nepal is landlocked and ISPs are therefore highly dependent on internet from India, with 90 per cent of international internet bandwidth sourced via Indian providers Airtel and Tata, and only a fraction from China.<sup>23</sup> This increases vulnerability for ISPs in Nepal, which was demonstrated when a dispute over unpaid dues led Indian providers to cut bandwidth to Nepal and led to nationwide internet shutdowns in both 2023 and 2025.<sup>24</sup>

### 3.2. Financing trends

**There has been no significant international equity investment into the ISP sector since BII's investment in WorldLink, with the exception of another DFI investment into WorldLink.** Sandmartin International Holdings, an appliance manufacturer and technology company listed in Hong Kong, is one of the key shareholders of DishHome (a satellite TV and ISP). However, its investment was made in 2011 and predates the first BII investment into WorldLink in 2019. Ncell, the second largest mobile service provider in Nepal, changed majority ownership in 2023, with Malaysian telco company Axiata Group selling an 80 per cent stake to Spectrlite UK (which is owned by the Acharya brothers, who are of Nepali origin). Axiata's investment into Ncell was also made in 2015, again predating BII's first WorldLink investment. The only other international equity investment into the ISP sector since has been a \$10.5 million equity investment by FinnFund in February 2025.

**Some companies interviewed have had discussions with other DFIs and international financial institutions (IFIs), but this has not led to investment, and they have typically financed their growth with loans from local banks.** The smaller size of WorldLink's competitors (especially pure ISPs) and downward pressure on average revenue per user (ARPU) may be contributing factors to not raising equity finance. The broader downturn in the macro-environment since 2022 is also a factor. However, many of WorldLink's smaller competitors may also not have strategic growth plans, such as rapid expansion, that require equity finance, and therefore local bank loans may be appropriate.

20 The Kathmandu Post (2020) "Nepal placed 127th among 140 countries for internet speed", available at: <https://kathmandupost.com/money/2020/02/22/nepal-placed-127th-among-140-countries-for-internet-speed>

21 Speedtest (2025) "Speedtest Global Index", available at: <https://www.speedtest.net/global-index>

22 Nepali Times (2020) "Why Internet speed is slower and slower", available at: <https://nepalitimes.com/news/why-internet-speed-is-slower-and-slower>

23 The Kathmandu Post (2025) "Nationwide internet outage raises concerns over outstanding dues", available at: <https://kathmandupost.com/money/2025/02/04/nationwide-internet-outage-raises-concerns-over-outstanding-dues>

24 The Kathmandu Post (2025) "Nationwide internet outage raises concerns over outstanding dues", available at: <https://kathmandupost.com/money/2025/02/04/nationwide-internet-outage-raises-concerns-over-outstanding-dues>



# 4

## Direct effects

### Impact pathway 1: WorldLink direct effects

Hypothesis: WorldLink scaled up the number of households served by its FTTH internet substantially, enabled by BII's investment.

#### Change in BII investee company

**Substantial change** WorldLink scaled up rapidly from 300,000 customers in 2019 to over 1 million customers in 2025, with large increases both inside and outside Kathmandu Valley.

#### Change in direct outcomes

**Substantial change** This represents significant three-fold growth, reaching 700,000 additional households, bringing the total to 1 million. This amounts to 15 per cent of all Nepalese households, and WorldLink holds a 28 per cent market share.

#### Bii's contribution to these changes

**Substantial contribution** WorldLink's rapid growth since 2019 would not have been possible without BII's equity investment, which provided an initial injection of around \$12 million (with BII as the only international investor) followed by a further \$15.5m in equity from BII and DIF II. BII also provided TA support to develop HSE functions, and Board advisory support to senior management.

**This impact pathway explores the direct effects of BII's investee WorldLink.** WorldLink has scaled up significantly since BII's first investment, especially outside of Kathmandu Valley, achieving a significant market share and reaching a large share of Nepali households. BII's investments played a key role in enabling this expansion.

## 4.1 Change in WorldLink's product offering

WorldLink has scaled up rapidly from 300,000 customers in 2019 (the year of BII's first investment) to over 1 million customers in 2025.<sup>25</sup> This increase includes a 70 per cent increase in customers in Kathmandu Valley from 180,000 to 300,000, but is mostly driven by a 350 per cent expansion in customer numbers outside of Kathmandu Valley, from 130,000 to 600,000 connections (Figure 7). This effect is large, both in absolute terms, with 1 million connections representing 15 per cent of all Nepalese households, and in relative terms as WorldLink still holds almost 30 per cent market share.<sup>26</sup> WorldLink has also expanded into the construction of industrial-scale data centres, in part to support the rapid expansion of its FTTH business.

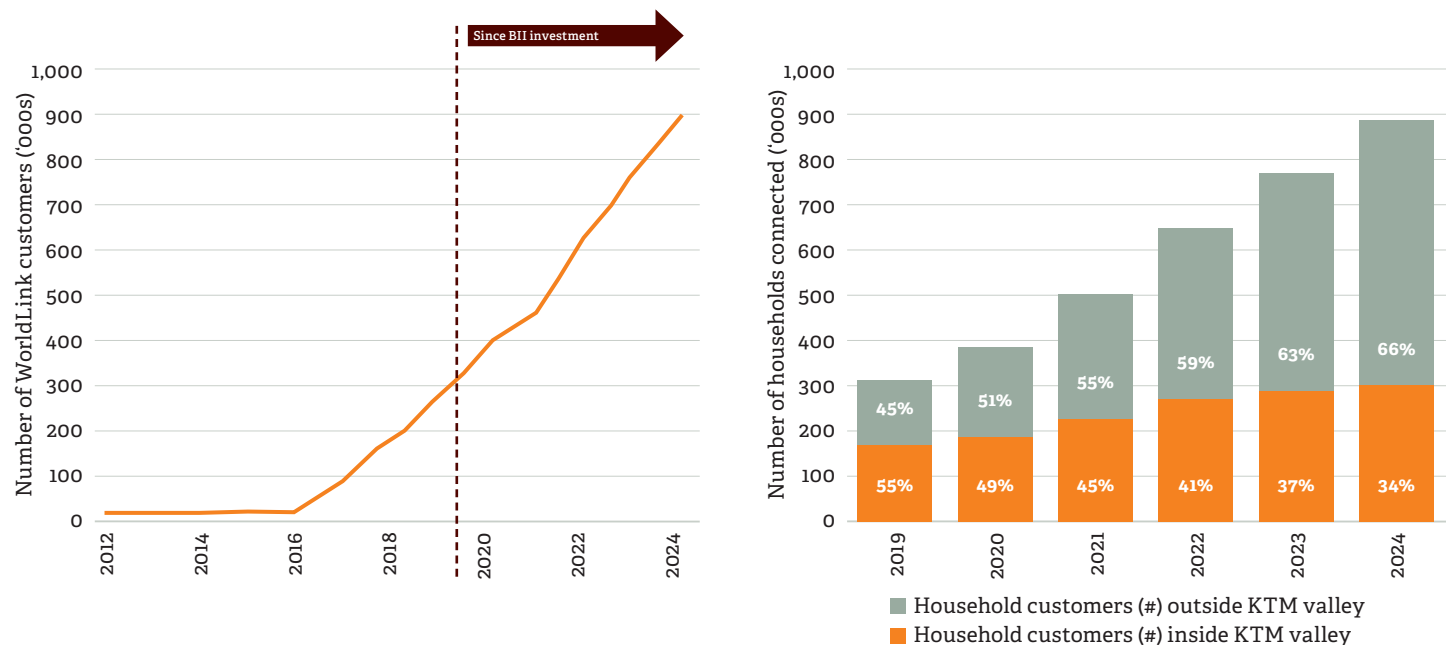


Figure 7: WorldLink's customer base from 2012 to 2024, and its customer base inside and outside Kathmandu Valley

Source: Greencroft Economics, based on Nepal Telecommunications Authority (2024), "Telecommunication Indicators Chaitra from 2012–2023"

## 4.2 Change in direct outcomes

WorldLink is still Nepal's leading FTTH provider, although its market share has declined. WorldLink reached over 1 million households by mid-2025, and in 2024 (the last full year of data), was the market leader with a 28 per cent market share. While WorldLink grew its customer reach three-fold between 2019 and 2024, the fixed broadband market in Nepal grew four-fold over the same period, outstripping WorldLink's growth. This underlines that: (1) WorldLink has made a major direct contribution to improving access to internet services in Nepal, and (2) other ISPs in the market have grown even more, suggesting that any catalysing market effects could potentially be larger than WorldLink's direct effects.

## 4.3 BII's contribution to these changes

Without BII's equity investment, WorldLink's rapid growth since 2019 would not have been possible. WorldLink's scale-up has been capital intensive, as it required significant infrastructure investment to lay fibre networks. BII was the first and only external equity investor to provide the capital needed to finance this growth. WorldLink confirmed that this capital was not available from other sources at the time, and without BII's investment, the company's growth would have been delayed by several years. BII's equity investment also enabled WorldLink to leverage additional debt, which has also been essential for the company's expansion.

25 MEA Tech Watch (2025) "WorldLink Communications Becomes First ISP in Nepal to Reach 1 Million Users", available at: <https://meatechwatch.com/2025/03/03/worldlink-communications-becomes-first-isp-in-nepal-to-reach-1-million-users/>

26 Government of Nepal (2021) "National Population and Housing Census 2021", available at: <https://censusnepal.cbs.gov.np/results>

**BII's non-financial support complemented its investments and contributed to WorldLink's growth.** WorldLink was highly appreciative of BII's non-financial support, especially board representation and TA on Health, Safety, and Environment. WorldLink's management noted that having BII board representation brought an investor mindset that has helped with challenging and sense-checking their growth plans and strategy. The HSE technical assistance provided by BII, via a consultant, helped WorldLink identify areas for improvement in its employee safety standards and processes, implement changes, and strengthen reporting. WorldLink's management noted that these improvements in Health and Safety also supported the company during subsequent investor due diligence processes.

**BII's investments helped unlock co-finance and subsequent investments into WorldLink.** This included a co-investment from the BII-supported DIF in 2022 (alongside a second investment from BII's Growth portfolio). WorldLink has since raised funds from other investors, including a \$10.5 million equity investment by FinnFund in February 2025 and a \$29 million local currency debt facility from the IFC and Standard Chartered Bank Nepal in July 2025, in part to finance the construction of data centres.<sup>27</sup> Interviews with DIF II and FinnFund confirmed that BII's earlier investment helped WorldLink grow large enough to attract their finance, and that BII's involvement offered reassurance that a strong investor was already onboard.

<sup>27</sup> NepaliTelecom "Worldlink secures \$29 million investment deal with IFC, SCBNL (2025), available at: <https://www.nepalitelecom.com/2025/07/worldlink-secures-29-million-investment-deal-with-ifc-scbnl.html>



# 5

## Catalysing market effects

### 5.1 Company demonstration effects

#### Impact pathway 2: WorldLink demonstration effects

Hypothesis: WorldLink demonstrated the commercial viability of its business model to other ISPs in Nepal, resulting in replication.

##### Change in BII investee company

Substantial change	WorldLink pioneered a FTTH model outside of Kathmandu Valley and increased its customer reach outside Kathmandu Valley more than four-fold, from 130,000 to 600,000 between 2019 and 2024, while maintaining profitability.
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##### Change in other market actors' behaviour

Substantial change	Other ISPs have replicated WorldLink's FTTH model outside of Kathmandu Valley, with several entering cities such as Biratnagar and Nepalgunj after observing WorldLink's success there. Nepal's top ten ISPs by market share all now provide FTTH outside of Kathmandu Valley.
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##### Bii's contribution to these changes

Substantial contribution	Bii's investment helped WorldLink to expand and demonstrate the viability of the FTTH model beyond Kathmandu Valley. Addressing the "high demand-supply gap in internet access" outside of Kathmandu Valley was a key part of Bii's investment thesis.
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**This impact pathway explores the extent to which other businesses have replicated WorldLink's FTTH model outside of Kathmandu Valley.** There is good evidence that other leading ISPs have followed WorldLink into Tier 2 and Tier 3 cities and rural areas outside of Kathmandu Valley, and that Bii has been a leading contributor, as it enabled WorldLink to scale up in these areas more quickly than it otherwise would have.

**Internet connectivity is lower outside of Kathmandu Valley due to a lower density of customers with ability to pay for broadband internet and therefore a higher cost per connection for ISPs.** Section 3.1 demonstrated that the level of broadband internet connections in Kathmandu Valley is almost double that of other urban regions and more than four times higher than rural regions. According to the 2021 Census, Kathmandu District had the highest population density at 5,169 people per square km. This is more than 30 times greater than the nationwide density of 198 people per square km, and 50 times greater than rural municipalities (105 people per square km).<sup>28</sup> WorldLink's management highlighted that lower population density in smaller cities and rural areas results in a longer payback period on investment of seven to ten years, compared with two to three years in Tier 1 cities, contributing to lower broadband coverage outside of Kathmandu Valley.

**Despite these challenges, WorldLink successfully scaled up outside of Kathmandu Valley after BII's first investment, while maintaining overall company profitability.** As highlighted in Section 4.1, WorldLink's expansion since BII's 2019 investment has seen a 3.5x increase (from 130,000 to 600,000) in subscribers outside of Kathmandu Valley up to 2024. The company's EBITDA (earnings before income tax, depreciation and amortisation) margin has remained stable over the same period, indicating the company has been able to expand to smaller cities and rural areas while maintaining profits.



*We decided to shift to a fibre model after observing what was happening in other countries like China, but [we] only expanded to provide fibre outside of Kathmandu a few years after WorldLink after observing that they had some success*

*Managing Director – Nepal ISP*

**There is good evidence to indicate that other ISPs have replicated WorldLink's FTTH model outside of Kathmandu Valley.** First, there was consensus across all interviewees, including companies, investors, government stakeholders, and sector experts, that WorldLink is the market leader in the ISP sector and pioneered FTTH outside of Kathmandu Valley, particularly in Tier 2 and Tier 3 cities and some rural areas. Several ISPs stated they only decided to roll out FTTH outside of Kathmandu Valley after observing WorldLink's success. One ISP managing director noted that his company entered Tier 2 cities such as Biratnagar and Nepalgunj two to three years after WorldLink. Another CEO highlighted that his company followed WorldLink into several cities in Nepal, and that his leadership team had consulted with WorldLink's management for advice during their expansion. All the ten largest ISPs in Nepal now provide FTTH outside of Kathmandu Valley, compared with only two or three at the time of WorldLink's expansion.



*We follow WorldLink as a new entrant [into new cities in Nepal] ... and sometimes directly look to them for advice*

*CEO – Nepal ISP*

**It is unlikely WorldLink would have been able to expand at the same pace outside of Kathmandu Valley without BII's investment in 2019.** This indicates BII was a substantial contributor to this demonstration effect. As highlighted in Section 4.2, the rapid expansion of WorldLink's FTTH model was relatively capital intensive and BII was the only equity investor willing to provide equity investment in 2019. With BII's capital, WorldLink reached 900,000 subscribers in 2024, exceeding the 718,000 subscribers projected in the business plan at the time of BII's investment. Without it, WorldLink's growth outside of Kathmandu Valley would have been slower. BII's 2019 investment and subsequent investment in 2022 were also critical in providing other investors, such as DIF and FinnFund, with the confidence to provide financing which was also integral to the company's continued growth.

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<sup>28</sup> National Population and Housing Census 2021, available at: [https://censusnepal.cbs.gov.np/results/files/result-folder/National%20Report\\_English.pdf](https://censusnepal.cbs.gov.np/results/files/result-folder/National%20Report_English.pdf)

## 5.2 Competition effects

### Impact pathway 3: WorldLink competition effects

Hypothesis: WorldLink encouraged competition in the market by influencing other ISPs, which responded by reducing their prices or improving service quality.

#### Change in BII investee company

##### Substantial change

WorldLink grew its FTTH customer base three-fold from 300,000 to over 1,000,000 between 2019 and 2025, and was the first ISP to provide FTTH at scale outside the Kathmandu Valley.

#### Change in other market actors' behaviour

##### Substantial change

Other ISPs attempted to win market by competing on price, speed and reliability, leading to 30-50 per cent lower prices and up to 10x faster fixed broadband connections in the last five years.

#### Bii's contribution to these changes

##### Moderate contribution

WorldLink, enabled by BII's investment, was one of several ISPs contributing to more competitive dynamics where others lowered prices to try to gain market share.

**This impact pathway explores the extent to which WorldLink's expansion has driven competition effects in the ISP sector in Nepal.** There is strong evidence of competition between ISPs leading to lower prices and faster fixed broadband connections for consumers. BII is a supporting contributor, as WorldLink (supported by BII's investment) is only one of several players which have contributed to these competitive dynamics, with ISPs like CG Net also playing a key role.

**Households and enterprises in Nepal are highly sensitive to price, connection speed, and reliability when making decisions around purchasing internet services.** Customer sensitivity to price, connection speed, and quality is demonstrated by a relatively high churn rate in the sector,<sup>29</sup> with WorldLink's management highlighting that their churn rate is between 15 per cent and 20 per cent per year. There is also substantial academic literature on the high levels of sensitivity to price and quality and subsequent churn rates in the telecommunications sector (including FTTH).<sup>30</sup>

**As WorldLink grew its customer base inside and outside Kathmandu Valley, competitors sought to win market share by providing cheaper, faster, and more reliable broadband services.** As shown in Section 3.1, the price of FTTH internet in Nepal has decreased and connection speeds have increased since BII's 2019 investment into WorldLink. The ISPs interviewed noted that monthly ARPU has decreased by 30-50 per cent and connection speeds have increased by as much as 10x over the past five years as the sector has become more competitive.

**Other ISPs have been key contributors to the 'price and speed wars', with CG Net specifically identified by several interviewees.** Established in 2021, CG Net was a late entrant to the ISP market. Several ISPs highlighted that CG Net had employed an aggressive market entry strategy, offering a package 30 per cent cheaper than the market average, with triple the bandwidth. News reports confirm this, noting that CG Net triggered an 'internet speed war' in 2021 after entering the market with a 120Mbps package for only Rs.999.<sup>31</sup>

**Along with other ISPs, WorldLink reacted to these competitive pressures by increasing the speed of its fibre offering and lowering prices.** Before the pandemic, WorldLink customers paid Rs.1300 for 20Mbps plans; by 2025 customers can get 200Mbps for Rs.1100, with the CG Net 'price and speed war' having contributed significantly to this change. WorldLink's management noted that staying competitive was critical in continuing to grow subscriber numbers, and that the investment from BII, Finnfund, Dolma, and IFC enabled the company to continue to expand to new regions while competitors were unable to due to shrinking margins.

**Although the aggressive competition in the ISP sector in recent years has helped households and enterprises in Nepal benefit from affordable and fast broadband internet, current ARPU may not be sustainable for many ISPs.** All companies interviewed highlighted they do not view the current price competition, and resulting reduction in margins, as sustainable, and that the sector is poised for consolidation, especially if the government relaxes regulation on merger and acquisition (M&A) activity. This highlights the potential trade-off between competition that benefits the consumer and commercial sustainability for businesses, especially in a market with many relatively small ISPs.

29 A churn rate is a business metric which measures the percentage of customers who stop using a product or service within a given period of time.

30 Ribeiro, et al. (2024) *Determinants of churn in telecommunication services: a systematic literature review*. *Management Review Quarterly*.

31 <https://www.nepalitelecom.com/internet-speed-war-in-nepal>



## 6

### The impact of improved access to internet in Nepal

**Academic research shows a positive and statistically significant relationship between internet access and economic outcomes in South Asia.** A 1 per cent change increase in the internet use in South Asian countries has been associated with a 0.181 per cent increase in GDP per capita.<sup>32</sup> In India, two different studies find that the adoption of information and communication technology (ICT) has increased GDP per capita by 0.028 per cent to 0.039 per cent.<sup>33</sup>

**Globally, there is a wide body of research on the positive impact of internet access.** Research from Ghana suggests internet access can have a positive impact on household income, with internet use increasing farm income and household income by 20 per cent and 15 per cent, respectively.<sup>34</sup> Several studies show the impact on other indicators, such as food security, fuel use, employment and educational outcomes. Annex 1 lists a range of studies in this area.

**WorldLink has scaled up its reach in disadvantaged areas outside of Kathmandu Valley.** BII's investment was intended to primarily support WorldLink's expansion to new regions outside of Kathmandu Valley. Since BII's first investment in 2019, WorldLink's growth in FTTH connections has been concentrated outside of Kathmandu Valley and it now operates in 73 out of 77 districts. Customers outside of Kathmandu Valley have much lower income, with nationwide per capita income of \$1,000, compared with \$1,715 per capita inside Kathmandu Valley.<sup>35</sup> Given this, the development outcomes supported by WorldLink's investments are likely to be particularly pronounced.

**WorldLink has also increased employment and delivered community-based initiatives.** For example, its Internet Awareness Program provided free internet to internet hubs in remote villages in 2023 and reached 10,000 students in 2024.<sup>36</sup> WorldLink has hired 2,000 more contractors since BII's investment and youth employment has increased from 1,413 in 2019 to 2,348 employees in 2022.

**Almost half of Nepal still lacks internet access, so there is high impact potential from further rollout of internet access.** Expanding services to the remaining 44 per cent of the population without internet access could be highly beneficial for rural livelihoods and wellbeing, and contribute to economic development. However, WorldLink has indicated that it may not be commercially viable to connect customers in mountainous and sparsely populated rural areas with FTTH. Worldlink believes these areas will depend on government procurement and subsidies, for example the government's Rural Telecommunications Development Fund or the World Bank's Digital Nepal Acceleration project.

32 Islam (2015), "Impact of ICT on women empowerment in South Asia", available at: [https://www.researchgate.net/profile/Md-Shamimul-Islam/publication/282969586\\_Impact\\_of\\_ICT\\_on\\_women\\_empowerment\\_in\\_South\\_Asia/links/57b5190408ae19a365fafc6a/Impact-of-ICT-on-women-empowerment-in-South-Asia.pdf?origin=journalDetail&\\_tp=eyJwYWdlIjoiam91cm5hbERldGFpbCJ9](https://www.researchgate.net/profile/Md-Shamimul-Islam/publication/282969586_Impact_of_ICT_on_women_empowerment_in_South_Asia/links/57b5190408ae19a365fafc6a/Impact-of-ICT-on-women-empowerment-in-South-Asia.pdf?origin=journalDetail&_tp=eyJwYWdlIjoiam91cm5hbERldGFpbCJ9)

33 Tripathi & Inani (2020), "Does information and communications technology affect economic growth? Empirical evidence from SAARC countries", available at: <https://www.tandfonline.com/doi/full/10.1080/02681102.2020.1785827> or Usman, et al. (2021), "The effect of ICT on energy consumption and economic growth in South Asian economies: An empirical analysis", available at: <https://www.sciencedirect.com/science/article/abs/pii/S0736585320301969?via%3Dihub>

34 Siaw, et al. (2020), "The Impact of Internet Use on Income: The Case of Rural Ghana", available at: <https://www.mdpi.com/2071-1050/12/8/3255>

35 Government of Nepal (2024), "Nepal Living Standards Survey IV 2022/23", available at: [https://giwmscdnone.gov.np/media/app/public/36/posts/1719375782\\_27.pdf](https://giwmscdnone.gov.np/media/app/public/36/posts/1719375782_27.pdf)

36 WorldLink (2024), "Newsletter 3", available at: <https://worldlink.com.np/wp-content/uploads/2024/04/vol-3-new.pdf> and WorldLink (2023) "Newsletter 2", available at: <https://worldlink.com.np/wp-content/uploads/2024/04/NewsLetter-Vol-2.pdf>



# 7

## Implications and lessons

Three key findings cut across the assessment of the impact pathways:

- 1. Investing in an established market leader was effective given the structure of the sector.** When BII first invested in WorldLink, the ISP sector in Nepal was relatively immature, and WorldLink was already a well-recognised market leader. This, combined with low regulatory barriers to entry, a relatively homogeneous product using a well-established technology (FTTH was already demonstrated beyond Nepal), and a large unserved market to expand into, afforded the right conditions for a strategy focused on supporting a single dominant firm to catalyse the market.
- 2. Patient capital was critical for direct effects and catalysing market effects, while TA was important to support direct impact.** The main driver of WorldLink's scale up, and its replication effect on other ISPs, was the availability of patient equity capital. This allowed WorldLink to leverage more debt and to expand outside Kathmandu Valley where the payback period was longer. TA has helped WorldLink grow, particular by increasing managerial capacity.
- 3. Commercial viability has been essential in catalysing others.** The signal from WorldLink that rolling out FTTH can be done profitably has been key to underpinning replication by other ISPs.

The evaluation draws five lessons for how investors can deliver catalysing market effects in general (across sectors):

- 1. Where established market leaders with pioneering technologies or business models exist, supporting their scale up can be an effective route to catalysing others.** WorldLink had a dominant market share in Nepal before BII's investment, which enabled the company to scale up its FTTH offering rapidly into new regions. This encouraged other ISPs to follow suit, resulting in all of the top 10 ISPs in Nepal now offering FTTH outside of Kathmandu Valley and WorldLink's market share declining over time. While this approach has worked in Nepal's ISP sector, finding established market leaders with credible management teams and strong financials in other nascent markets may be challenging. In these cases, spreading impact and investment risk across multiple opportunities may be the more pragmatic approach.
- 2. Investing in vertically integrated pioneer firms in nascent markets may increase the likelihood of driving catalysing markets effects, as the ecosystem of upstream and downstream service providers, such as technology suppliers and distributors, may not yet be sufficiently developed.** WorldLink has a high degree of control over its success, as it operates the full supply chain from research and development through to customer sales. This increases the likelihood of commercial success in a market with a nascent ecosystem of supporting service providers, creating a positive signal that other can replicate. Investment strategies focused on driving catalysing market effects through pioneer firms should consider the extent to which these firms rely on other supply chain actors for commercial success in nascent markets.

- 3. Markets with low barriers to entry are more likely to result in replication of business models or technologies.**  
There were very low regulatory barriers to entry for other Nepalese ISPs, so they responded quickly to the demonstration effects generated by WorldLink as a successful first mover. Investors seeking to drive replication of business models or technologies should consider barriers to market entry as an important enabling factor.
- 4. Being a lead investor in a nascent financing ecosystem enhances impact for the investee, but catalysing other financiers into the sector may be challenging.** In the case of Nepal, there is little to no international equity or debt in the telecommunications sector. This means BII's investment was of high value to WorldLink and helped crowd in DIF II and Finnfund. But it has not yet resulted in international investment in other Nepalese ISPs. Investors seeking to deliver investor demonstration effects in markets with nascent financing ecosystems should recognise these effects are likely to take time to result in new investments being mobilised.
- 5. To demonstrate the viability of serving lower-income or last-mile consumers, it is important for investors to support companies which can do this from a base of higher-margin customers.** This will increase the likelihood that expansion to lower-income or last mile-consumers is commercially sustainable. WorldLink was able to expand to smaller cities and rural areas because of a profitable core customer base in larger cities.

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## Annex 1: Research on impact of internet access

Study	Outcome
Tripathi & Inani (2020), "Does information and communications technology affect economic growth? Empirical evidence from SAARC countries", <a href="#">Link</a>	Positive and statistically significant effect of ICT on economic growth in South Asia, especially in India: a 1 per cent increase in adoption of teledensity enhances GDP per capita by 0.028 per cent.
Usman, et al. (2021), "The effect of ICT on energy consumption and economic growth in South Asian economies: An empirical analysis", <a href="#">Link</a>	In the long-run, ICT significantly and positively contributed to the economic growth of India only, with a 1 per cent increase in ICT use increasing Indian GDP per capita by 0.039 per cent (no significant results in Bangladesh, Pakistan and Sri Lanka).
Lyons, et al. (2020), "Impacts of Financial and Digital Inclusion on Poverty in South Asia and Sub-Saharan Africa", <a href="#">Link</a>	Financial and digital inclusion are associated with significant reductions in poverty, including food insecurity. The most significant reduction in poverty relates to bank account ownership, with 5.5 percentage points. Owning a phone reduced the likelihood of living in poverty by five percentage points.
Islam (2015), "Impact of ICT on women empowerment in South Asia", <a href="#">Link</a>	ICT has a positive impact on women empowerment, through impact on labour force participation. The paper also finds that a 1 per cent increase in internet use in the SAARC countries can lead to 0.181 per cent increase in GDP per capita.
Panichsombat (2016), "Impact of Internet Penetration on Income Inequality in Developing Asia: an Econometric Analysis", <a href="#">Link</a>	Internet penetration in the Asia Pacific region did not improve inequality, although internet use in developed Asia harmed income equality less than in developing Asia.

Table 1: Research on impact of internet access in South Asia  
Source: Greencroft Economics

Study	Outcome
Hjort & Tian (2021), “The economic impact of internet connectivity in developing countries”, <a href="#">Link</a>	Meta research showing that overall, the literature points towards sizeable economic impacts in many, though not all, settings.
Siaw, et al. (2020), “The Impact of Internet Use on Income: The Case of Rural Ghana”, <a href="#">Link</a>	Internet use increased farm income and household income by 20.1 per cent and 15.47 per cent, respectively.
Zhang, et al. (2023), “Examining how internet use and non-farm employment affect rural households’ income gap? Evidence from China”, <a href="#">Link</a>	Internet use significantly but slightly reduces the income gap of farm households.
Cui, et al. (2024), “The impact of Internet access on household dietary quality: Evidence from rural China”, <a href="#">Link</a>	Internet access has significantly increased rural household dietary quality and food consumption, mainly through increasing household income by 9.5 per cent.
Gao, et al. (2023), “The impact of internet use on rural household energy transition: moderating effect based on social interaction”, <a href="#">Link</a>	Internet usage increases the probability of rural households using advanced fuels.
Hjort & Poulsen (2019), “The Arrival of Fast Internet and Employment in Africa”, <a href="#">Link</a>	Internet significantly increases employment in higher-skill occupations, firm entry, productivity and average income.
Poliquin (2021), “The Wage and Inequality Impacts of Broadband Internet”, <a href="#">Link</a>	Wages increase 2.2 per cent following broadband adoption, and this increase is highest for upper-level employees.
Okyere (2020), “The effect of internet services on child education outcomes: evidence from <i>poa!</i> Internet in Kenya”, <a href="#">Link</a>	Improving internet access in schools increases child computer and internet skills, but did not increase school attendance
Wainer, et al. (2015), “The association between having access to computers and Internet and educational achievement for primary students in Brazil”, <a href="#">Link</a>	Significant impact of owning a computer on test scores.
Bessone, et al. (2023), “Mobile Internet Has No Impact on Educational Outcomes: Evidence from Brazil”, <a href="#">Link</a>	No effect of internet access on test scores for 5th or 9th graders.

Table 2: Research on impact of internet access  
Source: Greencroft Economics

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