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Supporting sustainable development through investments in broadband availability and affordability (Broadband Commission's Targets 2 and 3)

The confluence of the Broadband Commission's ten-year anniversary and the ongoing devastation of the COVID-19 pandemic provides a key opportunity to evaluate the world's progress towards reaching the Commission's 2025 Targets. The work of the Commission has taken on new significance as billions of people around the world have come to rely upon broadband connectivity like never before to work, attend school, access health resources, and stay connected to people they care about.

Advancing connectivity has always been at the heart of Facebook's mission to give people the power to build community and bring the world closer together. In pursuit of this mission we have invested in communications infrastructure and in developing new technologies to make internet connectivity more accessible, reliable, and affordable, particularly in historically underserved regions of the world.

For example, the countries of Association of Southeast Asian Nations (ASEAN), Sub-Saharan Africa (SSA), and Latin America have some of the lowest rates of broadband availability and usage in the world. While local conditions vary from country to country, the biggest barriers to connectivity are lack of coverage, expense of service for low-income people, lack of digital skills, and absence of meaningful content. According to the [Inclusive Internet Index](#), 43% of ASEAN's population and more than 80% in SSA did not use the Internet at the start of 2020, and only 44.2% of households use the Internet in Latin America.

Facebook has sought to advance connectivity in these regions through a variety of approaches, including improvements in its own network facilities, and through partnerships in connectivity projects with other actors in the digital industry. Collectively, these programs generate economic value by improving the quality of access networks and the performance of service delivery, helping network operators to extend coverage and reduce their costs, enabling them to provide more affordable services. The bulk of the economic developmental value is generated through Facebook investments in submarine cables, edge network investments, and backhaul fiber investments through Open Transport Networks (OTNx).

These investments support progress towards Broadband Commission Targets 2 (Affordability) and 3 (Connectivity), and just as important, to the Commission's overall purpose of sustainable development in regions of the world where it is needed the most. This case study highlights how Facebook's investments in connectivity contribute to economic development in SSA, the countries of ASEAN, and Latin America.

According to new research from [Analysys Mason](#), Facebook investments in connectivity in SSA are enabling millions of people to get online earlier than they would have otherwise, and will deliver economic benefits of over USD50 billion over the next five years (2020–2024) in nominal current GDP. Analysys Mason also estimates that the economic impact in ASEAN to reach USD 70 billion over the same time period. Using a different analytical framework, [NERA Economic Consulting](#) has estimated that Facebook's investments in Latin America will generate an estimated USD 27 billion per year in economic growth, create an additional 178,000 new jobs in the region's economy, and bring 30 million new people online.

Submarine cables

International network capacity is often scarce and expensive in developing regions of the world. To address this challenge Facebook has become a major purchaser of capacity on submarine cables, and increasingly a direct investor in submarine cables as part of consortia.

By acting as a major customer for international capacity, Facebook supports other players' investments in new cables. When Facebook invests as part of consortia, the new submarine cables carry traffic not only for Facebook and its consortium partners, but also for other parties that purchase or lease capacity on the resulting infrastructure. These investments increase the supply of submarine capacity available at multiple landing points, which help reduce the price of submarine capacity for ISPs. This in turn results in a combination of better connectivity and lower prices for end users, increasing the quality and affordability of broadband services over time.

Facebook's investments in capacity to carry content to its regional points-of-presence (PoPs) means that Internet Service Providers (ISPs) are able to interconnect with Facebook within the region. This reduces the cost of international capacity for ISPs, allows them to free up bandwidth on links to other regions for other content and improve the quality of their service. The increased supply of capacity through the introduction of new systems also can drive down the capacity cost and the price of Internet services to the end users as a result.

In Latin America, Facebook is deploying the Malbec cable between Brazil and Argentina along with infrastructure operator GlobeNet. This new cable will double current international capacity to Argentina, and it has prompted the deployment of another cable between Argentina and Uruguay to extend the benefits of this increased capacity. NERA has estimated that international capacity prices would go down by 50 percent after the cable landing and that operators would pass on 50 percent of their cost savings to their customers through lower

prices. They estimate that the cable would increase Internet penetration in Argentina and Uruguay by 6%, and another 3% in Brazil.

Facebook's first investment in the ASEAN region was as part of the consortium for the APG cable (which was ready for service in 2016), and it is now investing in another large intra-Asia link (Southeast Asia Japan Cable 2, or SJC2) as well as all three of the new trans-Pacific cables connecting to ASEAN planned to go live in 2020-21.

Edge network investments

Facebook invests in edge network elements, including PoPs and caches, to allow ISPs and mobile network operators (MNOs) to access content on Facebook's platform at locations closer to their own networks, at much lower costs.

Facebook's investments in international capacity support its ability to transport the content from its major data centers to its PoPs throughout the world, where it exchanges traffic with the local networks. PoPs are locations where ISPs can interconnect with the Facebook internal network and access all of its content, with reduced cost and latency compared to accessing this content in other, often distant, regions. This allows ISPs and MNOs to reduce their international connectivity and transit costs, because they no longer have to pay to bring the content into the region.

In addition, Facebook provides cache storage facilities collocated with ISP networks in order to improve user experience and reduce its own international connectivity costs. These caches store copies of the most popular content. End users that wish to access Facebook content download it from the cache copy instead of sending a request to Facebook's data centers every time a user asks for it. This lowers the use of (or optimizes) international capacity, cuts costs and improves user experience by reducing latency. Caches yield significant savings for ISPs, because once the content is in the cache the ISP does not have to pay for the traffic when other users try to access the same content.

To date, Facebook has deployed four PoPs in the ASEAN region, three PoPs in sub-Saharan Africa (located in Johannesburg, South Africa; Mombasa, Kenya; and Lagos, Nigeria), and several more in Latin America. Facebook's caches are installed in ISPs' networks in every country of ASEAN, 44 countries in SSA, and ten countries in Latin America.

Analysys Mason has estimated that across the ASEAN countries, Facebook's investments in edge network and international capacity will enable total Internet traffic to increase by 9% by 2024, increasing the rate of growth in GDP per capita by 0.11 percentage points in each of the next five years (2020-2024). Looking at the cumulative impact over 2020-2024, these annual increases equate to an overall GDP contribution of approximately USD64 billion across the region over the five-year period.

Using the same analytical construct, Analysys Mason has estimated that across sub-Saharan Africa, Facebook's investments in edge network and international capacity will enable total Internet traffic to increase by 9% by 2024, and increase the GDP-per-capita growth rate by 0.12 percentage points in each of the next five years, equivalent to a cumulative GDP contribution of more than USD53 billion across sub-Saharan Africa over the next five years. According to Analysys Mason, Facebook apps are estimated to account for approximately 20% of total Internet traffic in SSA, and due to these investments, 70% of Facebook traffic is now served from within the region.

NERA estimates that due to Facebook's edge investments that Latin American operators' international connectivity costs would decrease by about USD 440 million. Assuming they pass 50 percent of those savings on to customers through lower prices, customers may benefit from discounts between USD 0.50 and USD 1.50 per year to each customer. In addition to those direct cost savings, caches and PoPs contribute to increase the average speeds and quality of end-user Internet connections. Higher speeds and lower latency drive higher usage of current services (net browsing, e-commerce, messaging) and give users the ability to use more demanding services such as video streaming, videoconferencing or VoIP, which also have substantial economic impact.

Open Transport Networks (OTNx)

Facebook has also made significant investments in Open Transport Networks (OTNx), which deploy fiber infrastructure for the purpose of establishing backhaul, particularly to MNO cell sites, in developing countries. The primary aim of OTNx projects is to enable operators to improve the performance of mobile Internet services through introducing and upgrading to 3G/4G mobile broadband in areas where only 2G was available or where currently deployed wireless microwave backhaul is a constraint on providing additional capacity.

These projects are carried out in partnership with local operators, who deploy and maintain fiberoptic cable and equipment providing high-capacity backhaul connections to core networks.

Facebook's model for OTNx has been to co-fund deployments, with local operator partners having ownership of the infrastructure deployed. The resulting infrastructure operates on an open-access basis, which means that the delivery of Facebook's traffic is not prioritized over delivery of other content.

Facebook is currently supporting fibre deployment through OTNx in Indonesia. Within SSA, Facebook has implemented OTNx projects in partnership with local operators in Uganda, the DRC, Nigeria, and South Africa. The two live OTNx deployments in Uganda and Nigeria have enabled a significant extension of 3G/4G coverage in the regions they serve, to over 4 million people.

OTNx initiatives generate economic impact by allowing more users to get online and increasing traffic by improving the quality and affordability of services. Analysys Mason has estimated

that in Indonesia, the OTNx investment results in 0.9 million people getting online up to two years earlier than they would have otherwise and have a corresponding GDP impact of over USD6 billion between 2020 and 2024. For SSA, they estimate that 0.7 million people in Uganda and 0.3 million in Nigeria got online earlier than they would have without the OTNx investments, producing an economic impact of almost USD4 billion between 2020 and 2024.

Looking forward

Facebook is proud of its efforts to advance progress towards the Broadband Commission's Targets 2 and 3. As this paper has noted, our investments have had a tangible impact on the lives and livelihoods of people in areas that need economic development the most. At the same time, we understand that the world still has a long way to go, and we will continue our efforts until all of the Targets are met.

To that end, Facebook announced in May that it had partnered with leading African and global operators to build 2Africa, the most comprehensive subsea cable to serve the African continent and Middle East region. 2Africa will interconnect 23 countries in Africa, the Middle East, and Europe and will provide nearly three times the total network capacity of all the subsea cables serving Africa today. When completed, this new route will deliver much-needed internet capacity, redundancy, and reliability across Africa; supplement a rapidly increasing demand for capacity in the Middle East; and support further growth of 4G, 5G, and broadband access for hundreds of millions of people. The economic impact of this project has not been accounted for in this paper.

To learn more about Facebook's connectivity investments please visit:

<https://connectivity.fb.com/>

To learn more about the how the economic impact of our investments was conducted, please read these reports on [Sub-Saharan Africa](#), [ASEAN](#), and [Latin America](#).