Good Practices for Subsea Cables Policy

Investing in Digital Inclusion

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Global Digital Inclusion Partnership

Acknowledgements

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About Global Digital Inclusion Partnership
The Global Digital Inclusion Partnership is a coalition of public, private, and civil society organizations working to bring internet connectivity to the global majority and ensure everyone is meaningfully connected by 2030. Founded by a global team of experts who successfully championed affordable and meaningful connectivity around the world, GDIP advances digital opportunities to empower and support people's lives and agency, leading to inclusive digital societies.

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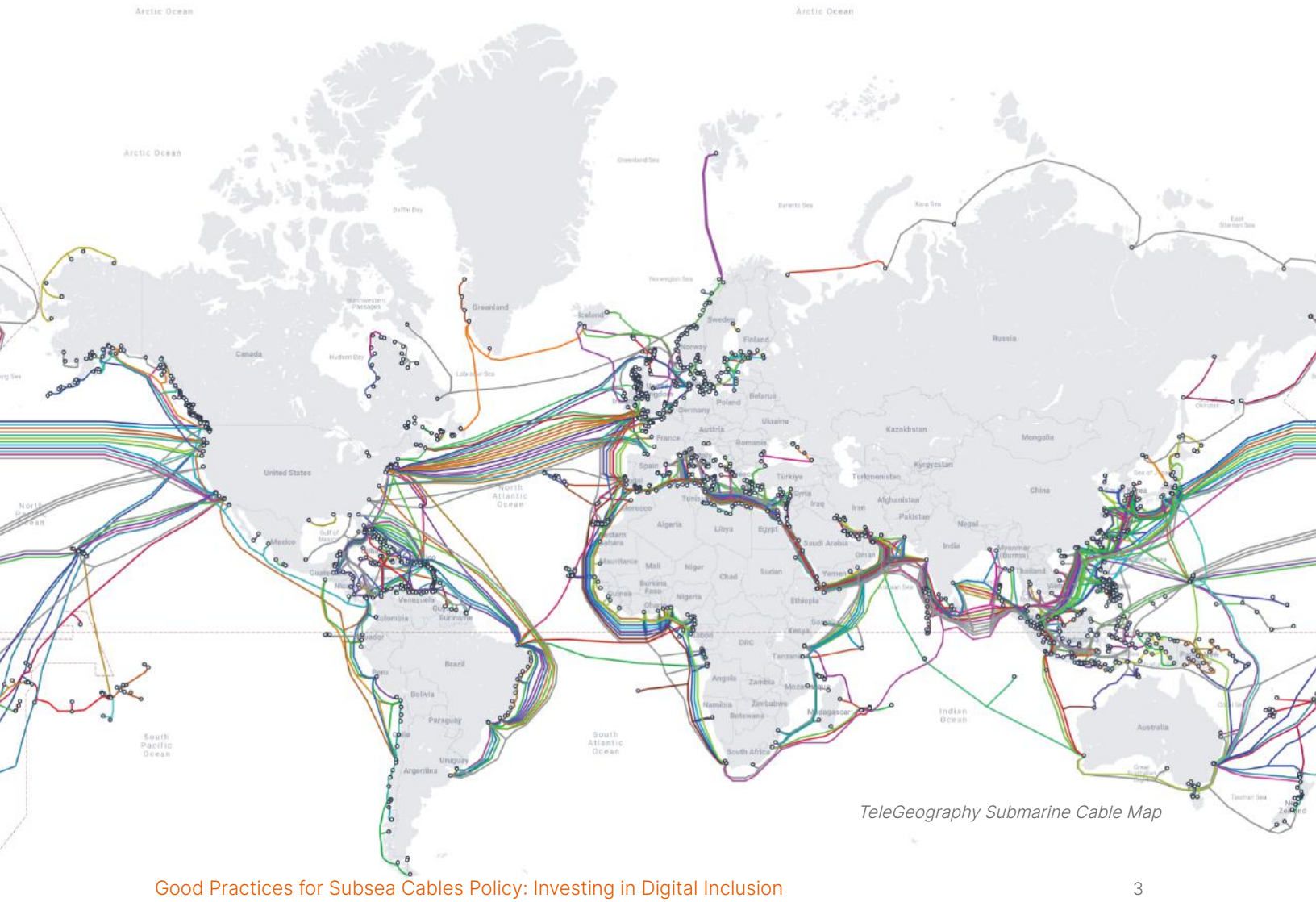


TeleGeography Submarine Cable Map

Introduction

A thriving digital economy depends on all people being able to connect to the internet. Achieving global connectivity requires maintaining and growing the vast network of subsea cables that connect most around the world to the internet. This brief provides an introduction to the current policy and regulatory issues relating to subsea internet cables for policymakers in low- and middle-income countries. It adds to the growing body of evidence about the importance of these policy issues by focusing on the significant impact on digital transformation and digital inclusion that these cables represent.

Why are subsea cables important?

Subsea internet cables are the backbone of the internet and the global ambition for universal, meaningful connectivity. The internet is already an integral part of human life — from e-commerce and online streaming to e-services and online education, a person's ability to connect correlates with their ability to participate and engage in society. The availability and quality of connectivity in a country serve as a baseline for that country's capacity to grow a resilient, scalable digital economy.

Subsea cables carry an extraordinary amount of internet traffic — estimates suggest that about 95% of global internet traffic travels through these cables.[1] The role of subsea cables in the infrastructure of the internet makes them a critical element to meet the ever-growing demand for affordable, high-quality broadband services and the efficient, unconstrained flow of data that makes digital economies thrive.

However, there are significant differences in the availability of subsea cable infrastructure around the globe, resulting in wide disparities in user experiences and the scalable benefits of connectivity that can only be achieved where universal, reliable, and affordable connectivity exists.

The introduction of subsea cables into a market can have significant impacts on the domestic economy, as documented recently in both Ghana[2] and Vanuatu.[3] But, given that subsea cables and their landing stations typically represent just a handful of connection points within the whole nationwide network, they in turn pose unique challenges for network operators, policymakers, and regulators.[4] It is critical that informed stakeholders be involved in the deployment and maintenance of these cables[5] and for there to be a clear policy and regulatory framework around their governance.

The need for more international connectivity supplied by subsea cables will only increase in the future: this fact should motivate policymakers to plan for the future and adopt policies that enable investment in the construction and deployment of these cables. Without this, policymakers will falter in the dual mission of universal and meaningful connectivity.

[1] Some prominent examples: Downer, 2022, estimates 95% of internet traffic; Google, 2022, estimates 98% of international internet traffic; and Shankland, 2023, estimates 99% of intercontinental internet traffic to be carried via submarine cables.
[2] Expanding international connectivity, Alliance for Affordable Internet, 2019
[3] Building partnerships for affordable backhaul infrastructure, Alliance for Affordable Internet, 2020
[4] Wall, Colin and Pierre Morcos, Invisible and Vital: Undersea Cables and Transatlantic Security, CSIS, 2021
[5] Gross, Anna et alia, Subsea cables: how the US is pushing China out of the internet's plumbing, Financial Times, 2023

What kind of impact do subsea cables have on digital inclusion?

Regulatory and other impediments slowing or blocking the deployment of subsea cables risk embedding the vast digital inequalities that exist today.

Widespread research has shown the clear macroeconomic and individual- and community-level benefits of subsea internet cables.[6]

Many of these lower-level benefits are influenced by the macroeconomic conditions that affect the affordability and availability of broadband services. A key example of this comes from the commonly accepted proposition that, as subsea cables increase data traffic competition and bandwidth availability, the price for each gigabyte of data decreases.[7] Addressing the affordability barrier may offer key benefits for individuals on lower incomes who are more price sensitive — most of whom are women[8], people living in rural areas,[9] or other marginalized groups (e.g., people with disabilities)[10]. The urgency of addressing this policy issue is not just the bottom-line benefit, but also the potential economic and societal transformation that could come from greater investment in subsea cables.

This policy brief focuses on what policymakers can do to facilitate subsea cable systems to improve national internet infrastructure and digital inclusion.

[6] See Anderson and O'Connor, 2020 Analysis of the Economic Impact of Subsea Internet Cables in Sub-Saharan Africa | RTI; Narayan et alia, 2020 The economic impact of subsea cables in Africa; Abecassis et alia, 2021 Economic impact of Google's submarine cable network in Latin America and the Caribbean; Simon and Li, 2021 The Macroeconomic Impacts of Digitalization in Sub-Saharan Africa: Evidence from Submarine Cables, WP/21/110, April 2021; Abecassis et alia, 2022 Economic and social impact of Meta's submarine cable investments in APAC

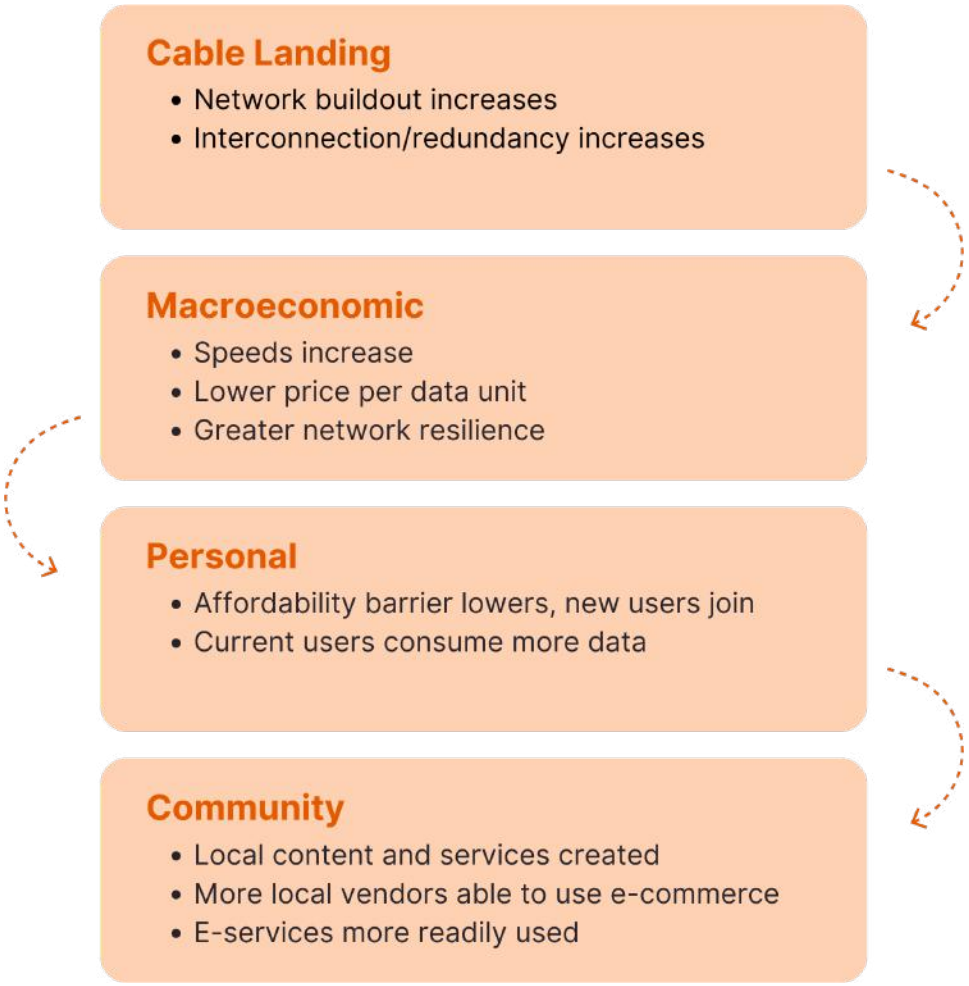
[7] Please see Analysys Mason reports: Economic and social impact of Meta's submarine cable investments in APAC, 2022; Economic impact of Google's submarine cable network in Latin America and the Caribbean, 2023

[8] The Costs of Exclusion: Economic Consequences of the Digital Gender Gap, Alliance for Affordable Internet, 2021

[9] Meaningful Connectivity for Rural Communities, Alliance for Affordable Internet, 2022

[10] Access to ICT services by persons with disabilities, ITU, 2022

What potential do subsea cables represent?



Source: GDIP, 2023, based on Anderson and O'Connor, 2020

What can we learn from experiences across the globe?

Policymakers have access to key levers that can incentivize or discourage investment in subsea cables. The deployment of subsea cables requires a significant capital investment and years of planning. When making decisions on whether and where to invest, investors will look to the regulatory environment of the countries in which a cable may potentially land. Investors are less likely to land a cable in a country whose regulatory environment is unsettled, anti-competitive, and/or overly burdensome. Countries with a poor regulatory landscape would thus be deprived of the economic benefits that subsea cables would otherwise bring.

Recent examples from around the globe offer instructive examples for policymakers and reinforce both the urgency of the issue and the potential impact that successful investment can have.

What can we learn from experiences across the globe?

AUSTRALIA

Cable protection zones offer effective protection from potential cable damage

The Australian Communications and Media Authority has declared three submarine cable protection zones in Australian waters on the east coast and west coast. These protection zones mean that limited activities can occur in the area to ensure the cable is secure and reliable (e.g. no trawling, dredging, or any other activities likely to damage cables). It is a criminal offense to wilfully or negligently damage subsea cables in these zones, including up to ten years imprisonment. While cables can land in Australia outside these cable protection zones, most choose to land in these three zones to avail themselves of this protection.[11]

SINGAPORE

Regulatory certainty, predictability, and efficiency with a nationally coordinated policy

Singapore has become a model when it comes to creating processes designed to attract investment,[12] demonstrating regulatory ease, stability, and flexibility.[13] Significantly, Singapore does not have any direct or indirect foreign equity limits for entities seeking telecommunications licenses, and also supports private use licensing exemptions (meant for entities not looking to run a telecoms business to serve other customers), making Singapore a very attractive place to invest in telecommunications. Moreover, Singapore has become a technology hub because it promotes open and cost-effective landing stations. As noted above, cable landing stations that provide cost-based open access to competing backhaul providers and cost-based interconnection are critical to a robust connectivity ecosystem.

TONGA

Diversity of landings can reduce vulnerability

Tonga's near-total digital isolation from the world in 2022 following a volcanic eruption demonstrates the unique vulnerability that small island states face for international connectivity. Given their comparative isolation and small market size, island states may struggle to obtain the redundancies in connectivity that reduce this vulnerability, but stress the importance of allowing for the diversity of landings that can reduce potential disruptions to service.

[11] See Guide – declaring a submarine cable protection zone
[12] Guidelines on Deployment of Submarine Cables into Singapore, Singapore
[13] Japan also has a regulatory framework and permitting process conducive to subsea cable investment.

What can we learn from experiences across the globe?

CABO VERDE

Open access policy guided by ECOWAS supports competition and lower prices

In Cabo Verde, the regulator's implementation of pro-competition access policies helps drive down wholesale internet service prices in the country. The country adopted an ECOWAS decree that helped set the conditions for accessing landing stations on fair, competitive terms. This policy helped drive down wholesale prices to just one-eighth of what they were before the policy interventions.

GHANA

Critical information infrastructure policy further protects subsea cables

The vulnerability and importance of subsea cables justify specific policy and regulatory tools to protect them. Ghana's critical information infrastructure policy offers an example of this. This policy integrates subsea cables into the country's cybersecurity framework and brings in cable operators to contribute to the network's resilience and defense against potential cyberattacks. Policymakers looking to implement similar policies should look to comparative practice to reduce potential regulatory burdens that impede investment.

SOUTH AFRICA

Diversity of landings are key to secure redundancy during potential breaks

In 2020, South Africa faced breaks in two major subsea internet cables that run along the continent's western coast.[14] This experience demonstrates the vulnerability of subsea cables and the benefits of redundancy within the network. Despite the line breakages, users were still able to access the internet — albeit at throttled or limited capacity — because of alternative routing of data through the network. This stresses the benefits of diversity of routing and diversity of landings for subsea systems, enabling international connectivity.

[14] South Africa faced a similar situation again in 2023, when the West African Cable System (WACS) and the South Atlantic 3 (SAT–3) undersea cables broke due to a rock fall in the Congo Canyon. See https://subtelforum.com/south-africa-undersea-cables-break/

What can we learn from experiences across the globe?

FRANCE

Municipal authorities play a key role in supporting infrastructure deployment

Marseille's emergence as a European connectivity hub comes in no small part due to the proactive role of the Port of Marseille. The Port planned for new infrastructure and built out integrated pile bores protected from passing ships, manholes for easy maintenance access, and neutral landing infrastructure that encourages competition. This illustrates the positive role that municipal and national-level authorities can play in supporting infrastructure deployment and long-term, strategic planning.[15] France also boasts a stable regulatory framework, a straightforward permitting process, and a friendly environmental approach.[16]

ITALY

Open access cable landing options support healthy competition

Open access cable landing stations that provide cost-based open access to competing backhaul providers and cost-based interconnection are critical to a robust connectivity ecosystem,[17] as they spur competition and consequently help bring down bandwidth costs. The Genoa Lagaccio Open Landing Station "provides open interconnection capabilities and gives cable projects access to the numerous backhaul options from Genoa into northern Italy and beyond," and is a good example of this good practice in action.[18]

EUROPEAN UNION

Recognizing different types of networks supports digital transformation

EU countries do not require private networks to comply with the same authorization conditions as public electronic communications network operators. This makes it easier for private network operators to invest in local and international infrastructure, which benefits the EU countries as these operators can contribute and support the transition to a digital world.

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[15] Virginia Beach in the United States is another illustrative example of how a municipality can attract subsea investment and spur local digital economies when the proper incentives are in place. See https://www.yesvirginiabeach.com/key-industries/digital-port

[16] The UK offers another straightforward framework for subsea cable installation and repair. The Marine Management Organisation (MMO) published a desk note in 2018 setting forth a clear summary of regulatory requirements to install and maintain subsea cables. See MMO and ESCA Develop Desk Note for Subsea Cable Sector - Offshore Energy. It explains what activities they deem to be licensable, where, and for what types of cables. The UK position is deemed fully consistent with UNCLOS. In addition, the UK ensures that its staff are adequately trained by providing annual training. Finally, Australia is a model for timely action: the regulator must either grant or refuse an application for a submarine cable installation permit within mandated timeframes (not more than 90 days for a non-protection zone permit).

[17] See also "Access to Submarine Cables: ECOWAS Regulations" (West African stakeholders recognizing the importance of adopting regulatory frameworks that support open access cables to create competition and lower costs).

[18] GCAs 2022: Where are they now? Sparkle | Capacity Media.

What can we learn from experiences across the globe?

COLOMBIA

Cable protection zones offer effective infrastructure protection

Colombia's regulatory environment models an example found in a number of jurisdictions of cable protection zones (CPZs) that restrict certain activities, such as fishing or trawling, that may prove dangerous to the underlying cable infrastructure and confines this restriction to a certain geographic area. CPZs offer a high degree of protection against potential human-caused damages, but require development in consultation with other stakeholders, such as local fishers and port authorities, for effective and measured implementation.[19]

PERU

Removing barriers to foreign investment and ownership increases investment opportunities

Peru's experience in appealing for foreign investment in its telecommunications sector offers an example of its potential benefits. For Peru, foreign investment enabled an acceleration in the deployment of mobile broadband networks throughout the country.[20] This logic also applies to subsea cables, particularly those that offer international connectivity. Where policymakers and regulators can remove barriers to foreign investment and ownership, this can enable greater capital contributions to expand the available infrastructure in that country.

UNITED STATES

Cooperation between local fishermen and cable companies increases the protection of infrastructure

The Oregon Fishermen's Cable Committee (OFCC) offers an illustrative example of stakeholder engagement and conflict resolution that preserves the long-term resilience of subsea cable infrastructure in the region. The OFCC, a cooperation between local fishermen and cable companies, reduces the potential financial risks of fishermen entangling their equipment with the cable infrastructure, while also negotiating clear terms and responsibilities for cable companies to reduce potential damage.

[19] While CPZs can be effective, they must not be too narrowly defined so as to create single points of failure. The International Cable Protection Committee ("ICPC") has defined best practices that include recommendations on this point. See https://www.iscpc.org/publications/icpc-best-practices/.

[20] See, for example, Internet Para Todos https://www.ipt.pe

Together, these case studies provide core principles for policymakers to consider in the context of their market conditions. While no single policy — or selection of policies — provides a universal solution to all conditions, policymakers can benefit from the lessons learned in other countries to accelerate the development of internet infrastructure in their market and embed good principles at earlier stages in the policy design process.

Marea cable landing on shore (RUN Studios)

Policy recommendations

The selected case studies outlined in this policy brief, as well as input from a broad cross-section of industry stakeholders, suggest that policymakers should:

Support competition and innovation in and through subsea internet cables.

A number of case studies demonstrate the impact that subsea internet cables can have on competition as a market principle that lowers prices for consumers and increases network resilience. For example, policies and regulations that encourage open access and interconnection with this infrastructure on fair and neutral terms, such as in Cabo Verde, can further drive down wholesale prices for internet services.

- **Encourage open-access cable landing stations (CLS) and enforce against monopolistic behavior.** Where control over CLS and co-location facilities resides with very few players, the costs will inevitably be higher and the service levels lower due to lack of competition — consequences which are ultimately passed on to consumers. Furthermore, these players are unlikely to invest in innovative new technology if they face no threat of competition. Regulators can help avoid monopoly situations and other abuse at CLS and co-location facilities by:
    - Opening CLS and co-location facilities to private investment.
    - Where an incumbent operator controls a CLS or co-location facility, imposing conditions on that operator to provide access to the facilities in an open, reasonable, transparent, and non-discriminatory manner; and
    - Ensuring active regulatory oversight of incumbents and policing against other monopolistic practices, e.g., ensuring that cross-connect fees are nominal and that any other terms are transparent, fair, and non-discriminatory.

- **Do not treat private networks as a telecoms operator.** A private network[21] operator does not provide transmission capacity or services to customers but instead uses the private network for its own purposes, such as to reduce latency of its services, which in turn improves the user experience for consumers and enables more efficient delivery of traffic by local telecom operators to consumers. Because these networks are not providing traditional telecommunication services to any companies or consumers, or participating in any market for these services, regulations applicable to public networks are not appropriate for private networks. Private network operators should be able to own and operate their own fiber under an exemption to telecoms licensing requirements, both within the country and even for terminating a subsea cable in a country, provided it is always for private use, as is the current practice under EU law. Private network operators are unlikely to land in countries where they are regulated like a traditional telecom company selling telecom services to third parties or consumers.

- **Adapt to accommodate new technologies.** Policymakers should update and revise regulations as new technologies in the subsea cable industry emerge, such as the development of the disaggregated CLS model[22], where the power feed equipment and supporting equipment are located at the CLS and the submarine line terminal equipment is extended optically to a co-location facility.The ITU issued Recommendations on Open Access Cables on 20 October 2021,[23] however many policymakers are still not aware of these developments, and have not amended their regulations to cater for these advances. Strategies such as regulatory sandboxes can provide leniency for both industry and policymakers to develop principles in coordination.

[21] A private network is typically built and operated by a company exclusively for use by and between its own subsidiaries. The private network transports data between company locations for the purpose of its internal tools, machines and processes. Cloud computing providers, for example, use private networks to connect their data centers. Content providers also use private networks to bring content closer to local telecommunications companies so it is faster and more cost effective for the telecommunications companies to deliver this content to their customers at their homes and businesses.
[22] See, for example, EXA Infrastructure prepares for subsea cable growth in Mazara Del Valli, Italy
[23] See ITU-T G.977.1 (10/2020)

Provide regulatory certainty and streamline the permitting and maintenance of subsea internet cables.

Policies and regulatory frameworks that govern cable deployment in a market can influence the availability of financial capital and also the private sector's willingness to invest in new infrastructure. As seen in the cases presented in this brief, policymakers can change the conditions that will affect the available financing for development in their markets.

- **Create and maintain a transparent and stable regulatory framework and make permitting predictable (not discretionary or case-by-case); if there are permitting fees, ensure they are reasonable and cost-based.** Unpredictable or opaque regulations can make a country less attractive for cable landings. Because of the length of time it takes to plan and install a cable, regulatory stability and predictability (including processing timelines) is critical (e.g., shifting regulatory goalposts can materially jeopardize a subsea investment).

- **Adequately staff agencies and ensure employees have the requisite expertise in subsea cables.** Having an insufficient number of qualified staff available to process permits efficiently can create delays and backlogs, compromising subsea cable installations.

- **Create policies and processes that reflect the environmentally benign nature of subsea cables.** It is well established that subsea internet cables are environmentally benign. One-size-fits-all environmental restrictions can impede cable deployment where policies fail to account for the minimal environmental impact that cables represent. In addition to formal policy change, policymakers and industry stakeholders should work together to inform others in the marine economy about the benefits of subsea internet infrastructure, the low environmental impact of new cable deployment, and respective stakeholder responsibilities.

- **Respect jurisdictional limits of exclusive economic zones (EEZ), in recognition of the United Nations Convention on the Law of the Sea (UNCLOS).** UNCLOS 1982, which permits the laying, repair and maintenance of subsea cables in a coastal state's EEZ, is subject to the coastal state's right to impose reasonable conditions (typically as to environmental protection). As subsea cables are environmentally benign, any regulations or requirements (to the extent they are adopted at all) should be light-touch and not discretionary.

- **Coordinate permitting within/among various levels of government to avoid duplication, inconsistencies, and unnecessary churn.** Policies that affect subsea internet infrastructure can operate at a variety of different levels, from local municipalities and zoning up through to international agreements on territorial waters. Policymakers, as they look to encourage investment in subsea infrastructure, should engage their relevant peers at different levels of government to align interests and policy actions to create a positive investment environment.[24]

- **Practice regulatory humility and flexibility.** Requirements such as port entry or visa requirements, passport clearance, and requiring representative presence onboard ships (military or other) can increase costs, dampen investment, and compromise connectivity. Allowing for flexible alternative measures where traditional processes create unnecessary roadblocks will allow for investments to stay on time and on budget.

    - Cable landings are becoming increasingly cluttered with old, abandoned cables, which creates challenges when new cables want to land. Often, the owners of the abandoned cables cannot be identified. Regulators should consider allowing new cable operators to remove abandoned cables with indemnity if the new cable operator can demonstrate it has taken reasonable measures to identify the owner of the abandoned cable.

    - In addition, as recommended by the International Cable Protection Committee (ICPC),[25] countries should waive any cabotage requirements and allow foreign vessels to install and repair undersea cables in territorial waters and beyond, as local flagged vessels may not be technically capable of handling such work.

- **Allow private and foreign investments.** Imposing restrictions on types of ownership, including capping foreign ownership or imposing onerous local partner requirements, could discourage investment in new internet infrastructure. Allowing private investors (including foreign investors) to land cables, and to invest in, own, and operate cable landing stations and carrier-neutral colocation facilities will attract investment.[26]

[24] Nigeria offers a good example. See Maritime Safety: NIMASA, NCC Close Ranks on Submarine Cable Regulation in Nigeria
[25] See ICPC Best Practices at 9. https://www.iscpc.org/publications/icpc-best-practices/
[26] See Peru case study.

Ensure adequate protection and timely repair of subsea cables.

Subsea cables are large investments and have an average useful life of 20 years. Thus, it is critical that other maritime users are made aware of their existence so they can be adequately protected, and policies enacted that promote their longevity.

- **Engage a wide range of stakeholders.** Subsea internet cables, due to their physical location, involve new stakeholders not traditionally active in broadband planning, such as fishermen, ship operators, wind farm operators, and other stakeholders in the maritime economy. Policymakers should encourage early and regular engagement, through forward planning, like in France, and clear protective policies, like in Colombia, both of which demonstrate models of inclusive stakeholdership that reduce potential negative impacts in cable deployment.

- **Allow diverse routes/landings.** Subsea cables are vulnerable to natural disasters (e.g., earthquakes, tsunamis), as well as human risks (e.g., fishing vessels).[27] While establishing cable corridors can help lower risks of disruption due to certain types of maritime activities, forcing multiple cables to follow the same route can lower stability and reduce reliability by inadvertently creating a potential single point of failure.[28] Where possible, policymakers should allow for industry stakeholders to develop properly charted, non-anchoring, non-trawling corridors and cable routes in a way that sustainably responds to all interests and reduces potential risks.

- **Streamline repair processes.** Policymakers should ensure that regulatory frameworks allow for efficient and effective subsea cable repairs, and streamline/minimize permitting requirements and waive laws that may otherwise cause undue delay and increase costs. Over time, cable owners have developed an efficient, environmentally conscious, cost-effective system of repairing cables.[29] This system is based on a small number of ships being able to repair multiple cables in multiple jurisdictions. Forcing owners to fund a ship in each country would break this efficient system and increase costs for consumers. It would likely also result in lower-quality repairs as the incentive would be to invest in older, less capable vessels. Likewise, the repair work would be spread over more ships, resulting in each ship carrying out fewer repairs, resulting in less experienced crews.

[27] The most common incidents affecting subsea cables are accidental or unintentional. See https://www.enisa.europa.eu/publications/undersea-cables/@@download/fullReport.
[28] As seen in the South Africa case study, above.
[29] Read about Orange's pan-African work at https://marine.orange.com/en/fleet/leon-thevenin/.

Conclusion: What do policymakers need to do?

Policymakers and regulators need to use evidence-based approaches to review and revise their subsea cable strategies.

This policy brief outlines the importance of subsea internet cables in facilitating accessible, affordable, and meaningful broadband. The consequences of this are not limited to the macroeconomic level: adequate investment in subsea cables offers the potential to start a chain reaction of digital transformation for our economies and societies. As policymakers and regulators take up this issue, this policy brief presents indicative examples of positive policy interventions that can encourage investment in subsea internet cables. The responsibility then falls to policymakers to take action.

The Sustainable Development Goals set by the United Nations include target 9.c for universal and affordable internet access by 2020 (UN, 2023). Although we have fallen short of the original goal of 2020, millions of people continue to use the internet for the first time each year, with the Covid-19 pandemic having an accelerating effect on global internet use (ITU, 2022). As more people come online, infrastructure rollout has to keep pace with demand — and the policy and regulatory framework that influences subsea cable deployment affects this.

The policy decisions made today will influence the investment choices made tomorrow. These investment choices will, in turn, influence the availability of reliable and affordable broadband services around the world. Policymakers and regulators need to step up their leadership roles to eliminate investment barriers and guide market development that will enable digital inclusion at a global scale and will result in global economic growth and development.



Meaningful Connectivity for the Global Majority

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