

Bridging the digital divide

From Evidence to Practice: Innovative Public–Private Collaboration Models for School Connectivity

Prepared by **Thomaz Teodorovicz**,
Nina Zachlod and **Sheerin Azhari**
Khameneh, members of the Geneva
Research Lab for Digital Impact





ABOUT THE GENEVA RESEARCH LAB FOR DIGITAL IMPACT (GRL)

The Geneva Research Lab for Digital Impact (GRL) is a joint initiative of the Geneva School of Economics and Management at the University of Geneva and UNICEF's Digital Impact Division (DID). GRL advances evidence-informed digital transformation by connecting rigorous academic research with the practical needs of policymakers, practitioners and development partners. Through interdisciplinary research, learning, capacity strengthening, and cross-sector collaboration, GRL develops the knowledge, tools and collaborative frameworks that support more effective, equitable and sustainable digital impact worldwide.

GRL delivers its mission through an integrated evidence-to-action model organized around three mutually reinforcing pillars:



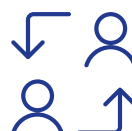
Research for Impact

Conducting fundamental and applied research to generate robust evidence on the enablers, pathways, and outcomes of connectivity and digital transformation, laying the foundations for smarter strategies and measurable progress.



Learning for Change

Translating evidence into clear, actionable insights and learning resources that strengthen capabilities, inform leadership, and support better decision-making across government and partner organizations.



Ecosystem Activation

Bringing stakeholders together across sectors to exchange perspectives, challenge assumptions, and turn shared evidence into coordinated action that accelerates collective progress on digital impact.



Table of contents

About the Geneva Research Lab for Digital Impact (GRL)	2
1. Advancing School Connectivity Through Collaboration	4
2. Understanding the Connectivity Challenge	6
3. A Practical Framework for Understanding Public–Private Collaboration	8
4. Case Examples	10
5. Key Insights	13
6. Acknowledgements	15
About UNICEF’s Digital Impact Division (DID)	16
About the Geneva Innovation Movement	16



1. Advancing School Connectivity Through Collaboration

- 1 UNICEF & ITU. (2020). *How many children and young people have internet access at home? Estimating digital connectivity during the COVID-19 pandemic.*
- 2 ITU. (2025). *Building skills for the digital economy.*
- 3 ITU. (2020). *The digital transformation of education: Connecting schools, empowering learners.*
- 4 OECD. (2024). *Closing broadband connectivity divides for all.*
- 5 See for example: Broadband Commission for Sustainable Development. (2025). *The state of broadband in Africa 2025.* ITU and UNESCO.

Reliable and affordable internet access remains out of reach for millions of learners worldwide¹. While significant progress has been made in expanding digital infrastructure, many schools—particularly in low- and middle-income countries—continue to face persistent barriers to connectivity.

Closing the connectivity gap across schools is a critical societal challenge. Connectivity is increasingly recognized as an essential enabler of education, skills development, economic opportunity, and participation in the digital economy.^{2,3} As a result, as governments and development partners seek to accelerate progress, identifying sustainable pathways to connect schools has become an increasingly urgent global priority.

In addition to its substantial technical challenges, connecting schools also involves critical organizational challenges. Delivering connectivity requires coordination across a complex value chain involving governments, regulators, private telecommunications operators, development partners, investors, and local communities⁴. To achieve lasting impact, infrastructure investments, service provision, financing arrangements, and regulatory frameworks must be effectively aligned. Yet the ways in which public and private actors work together to achieve this alignment differ substantially across countries⁵, shaping both implementation processes and outcomes. Understanding these collaborative models has therefore become a central priority for organizations and governments seeking to expand connectivity at scale.



BRIDGING THE DIGITAL DIVIDE

From Evidence to Practice: Innovative Public–Private Collaboration Models for School Connectivity

5



Prof. Dr. Tina Ambos
(University of Geneva)



Marija Novkovic Gosic
(UNICEF Digital Impact Division)

Against this backdrop, the Geneva Research Lab for Digital Impact (GRL) at the University of Geneva, UNICEF's Digital Impact Division, and the Geneva Innovation Movement Association convened the latest event in the *Bridging the Digital Divide* series, bringing together policymakers, practitioners, researchers and private sector representatives to explore public–private collaboration models for school connectivity. By grounding discussions in both evidence and practical experience, the event examined how different partnership arrangements can support diverse connectivity goals, while creating a platform for exchanging insights, challenging assumptions, and identifying approaches to accelerate progress toward universal school connectivity.

This white paper captures the key insights emerging from these discussions. It presents a practical framework for understanding alternative sourcing models for connectivity, examines examples from different national contexts, and highlights lessons for designing effective public–private collaborations. It also reflects on broader themes that emerged throughout the event, including extending the consideration of stakeholders when assessing partnerships for enacting school connectivity, the role of mapping connectivity gaps, and the importance of aligning goals with partners. By bringing together evidence, practitioner perspectives, and actionable lessons, the report aims to support governments, development organizations, and private–sector partners working to expand meaningful and sustainable connectivity for schools and communities worldwide.



We bring together research insights and lived experience (...) to identify pathways for translating evidence into action.

– Dr. Nina Zachlod (University of Geneva)



Panel (left to right): Prof. Dr. Thomaz Teodorovicz (Copenhagen Business School), Dr. Nina Zachlod (University of Geneva), Hon. Neema K. Lugangira (Secretary General of the Women Political Leaders and former member of the Parliament of Tanzania), Mr. Zoran Bunčić (Chief Information Officer of m:tel, Bosnia and Herzegovina)



2. Understanding the Connectivity Challenge



Dr. Nina Zachlod
(University of Geneva)

Dr. Nina Zachlod (University of Geneva) and Prof. Dr. Thomaz Teodorovicz (Copenhagen Business School) kicked off the event by highlighting that school connectivity should not be viewed as a single infrastructure project, but rather as the outcome of a complex and interconnected system. Before a school can be connected, connectivity must travel through multiple layers of infrastructure and service provision, ranging from international and national backbone networks to regional distribution systems and last-mile connections. Each layer involves different actors, technologies, incentives, and operational requirements. As a result, expanding connectivity requires coordination across a value chain in which decisions made at one stage can influence costs, quality, and access throughout the entire system.

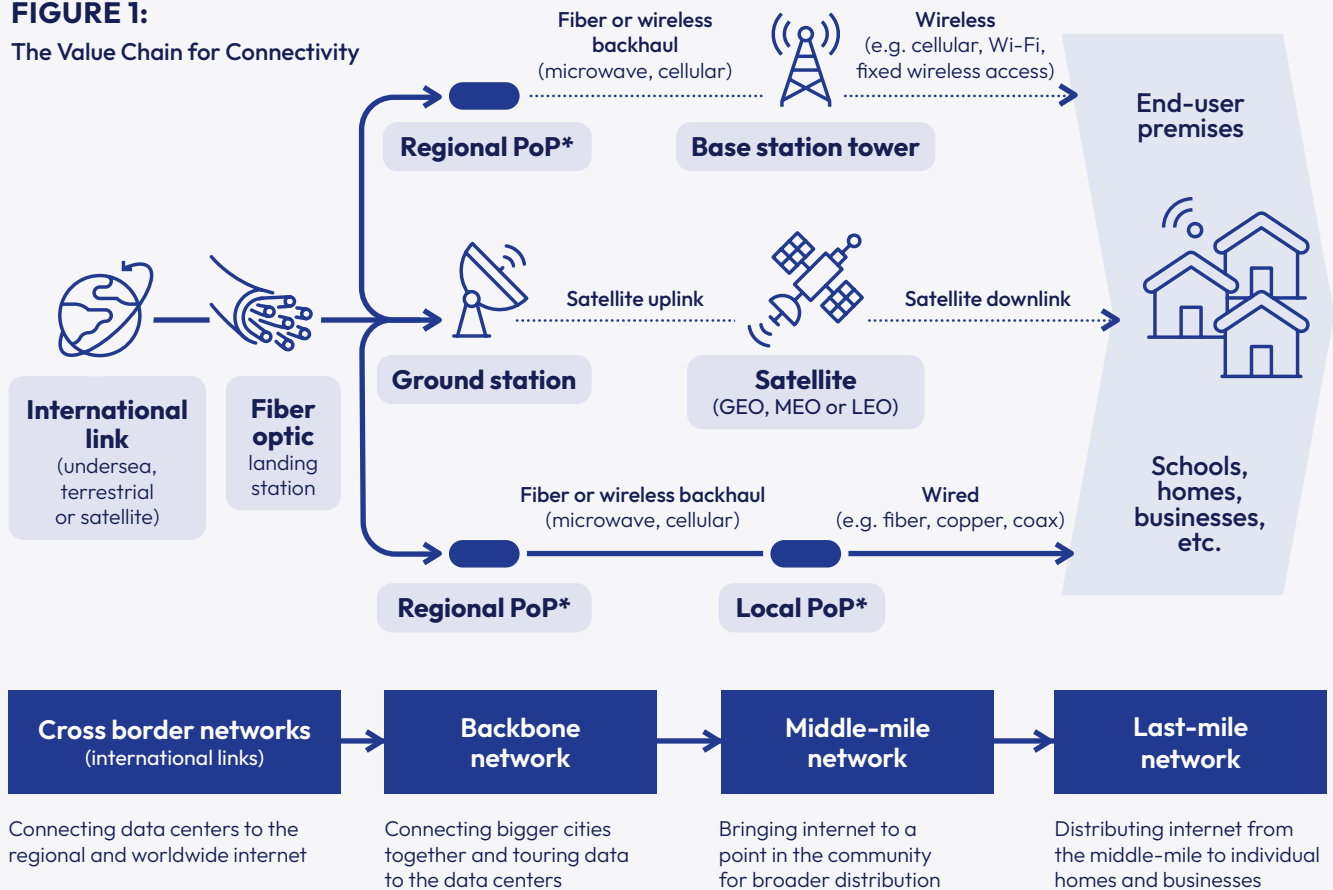


Prof. Dr. Thomaz Teodorovicz
(Copenhagen Business School)

To illustrate these complexities, the speakers emphasized that connectivity projects typically involve two distinct categories of investment. The first consists of infrastructure investments such as fiber networks, towers and other physical assets, which require substantial upfront capital, long planning horizons and commitments that are difficult to reverse once deployed. The second consists of service provision investments, which focus on delivering reliable connectivity to end users through active equipment, network management, and ongoing operations. While infrastructure investments are characterized by high fixed costs and long-term returns, service provision investments require continuous attention to affordability, quality, maintenance, and user needs. These distinct investment profiles create different challenges and risk considerations, making collaboration among multiple stakeholders essential for achieving sustainable connectivity outcomes.

**FIGURE 1:**

The Value Chain for Connectivity



*Point of Presence

Building on this foundation, the speakers noted that connectivity projects may pursue very different objectives depending on the needs and circumstances of a country or region. In some contexts, the primary goal is scale – connecting all schools in the country as quickly as possible. In others, the focus may be on reaching remote and underserved communities in areas where commercial incentives are limited. Additional goals may include improving affordability, ensuring long-term sustainability, increasing service quality, or strengthening resilience. Because these objectives are not always aligned, decisions about how connectivity projects are structured inevitably involve trade-offs. The choice of financing mechanisms, governance arrangements, and public-private partnership models therefore depends not only on available resources, but also on which goals stakeholders choose to prioritize. Understanding these trade-offs is critical for designing collaboration models that can effectively respond to diverse connectivity challenges across different goals and contexts.



Prof. Dr. Thomaz Teodorovicz (Copenhagen Business School)

3. A Practical Framework for Understanding Public–Private Collaboration

Having outlined the complexities of connectivity, Prof. Dr. Teodorovicz took the lead in introducing a practical framework to help participants consider how connectivity partnerships are designed and managed. While connectivity projects differ across countries and contexts, many of the underlying design choices can be understood through three interconnected dimensions: the type of service provider, the role of government influence, and the opportunities for iteration and adaptation throughout implementation. Together, these dimensions shape how public and private actors work together to achieve connectivity goals.

The first dimension focuses on the provider. Connectivity projects can involve different types of organizations, each bringing distinct capabilities, incentives and strengths. Public organizations may be particularly well positioned to pursue broad social objectives, while private firms often contribute operational expertise, innovation, and efficiency. Non-profit organizations and community-based entities can play an important role in contexts where commercial incentives are limited and local engagement is essential. As Prof. Dr. Teodorovicz emphasized during the event, no single type of provider is best suited for every situation. Rather, the effectiveness of a partnership depends on how well the capabilities of the chosen provider align with the project's goals.

The second dimension concerns the level of government influence within the partnership. Governments may choose to retain substantial control over project activities or delegate significant responsibilities to private partners. They may also support providers directly through incentives and subsidies, or support



beneficiaries through mechanisms such as vouchers and demand-side financing. These decisions influence how responsibilities, risks and decision-making authority are distributed across partners. The appropriate level of government involvement often depends on the project's objectives, the maturity of the market, and the broader institutional environment in which the collaboration operates.

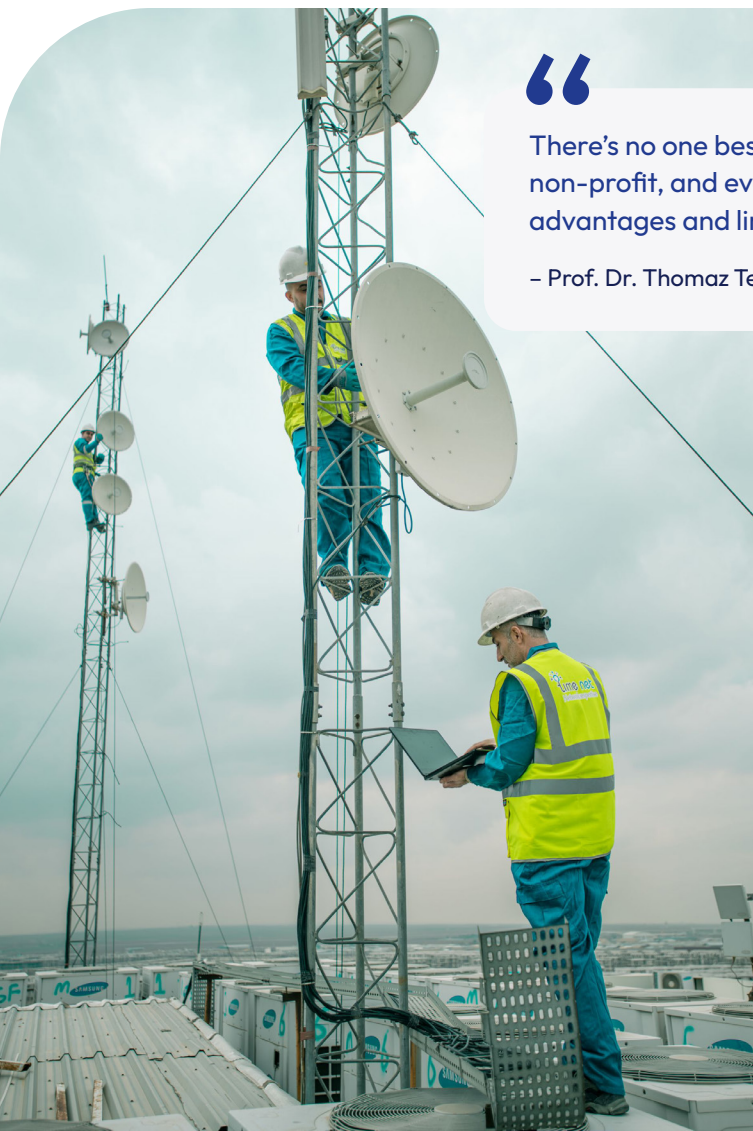
The third dimension focuses on iteration – the ability of partners to learn, adapt, and refine their collaboration over time. Connectivity projects frequently operate in dynamic environments characterized by technological change, evolving user needs, and implementation challenges. Partnerships that create opportunities for continuous dialogue, shared learning, and collaborative problem-solving are often better positioned to respond to these changes. Examples include performance-based incentives, stakeholder co-design processes, shared information systems, and structured feedback mechanisms that allow partners to adjust their approaches as new information emerges.

The framework encourages stakeholders to think carefully about which combination of providers, governance arrangements, and iterative processes best supports their desired outcomes. By making these choices explicit, governments and partners can design collaborations that are better aligned with the realities of connectivity delivery and the goals they seek to achieve.

“

There's no one best partner that works across any goals. For-profit, non-profit, and even state-owned providers have their unique advantages and limitations when partnering with the public sector.

– Prof. Dr. Thomaz Teodorovicz (Copenhagen Business School)



Left: ©Dextar Studio / Right: ©Matheus Bertelli



CHILE



ETHIOPIA



INDIA



KENYA



NEW-JERSEY



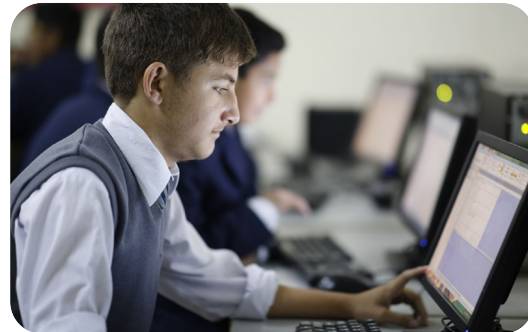
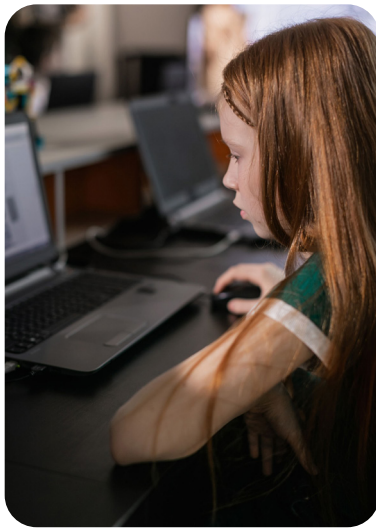
NIGERIA



TANZANIA



UGANDA



Photos clockwise: UNICEF, Ron Lach, UNICEF, Roman Odintsov, Gustavo Fring, Alena Darmel and Elements Interactive (Pexels).

4. Case Examples

Having introduced the conceptual framework, the discussion shifted from theory to practice through two case examples. Panelists Hon. Neema K. Lugangira (Secretary General of the Women Political Leaders and former member of the Parliament of Tanzania) and Mr. Zoran Bunčić (Chief Information Officer of m:tel, Bosnia and Herzegovina) reflected on their experiences with public-private collaboration models for school connectivity, illustrating how different partnership models operate in practice and the opportunities and challenges they present.

UCSAF and Giga in Tanzania



As an example of a connectivity initiative focused on expanding access in underserved areas, the event featured the collaboration between Tanzania's **Universal Communications Service Access Fund (UCSAF)** and Giga. UCSAF in Tanzania originated from the goal of connecting underserved, difficult-to-reach areas. Established in 2007 under the Universal Communications Service Access Act, UCSAF operates as a financing and procurement authority, establishing an internally financed redistribution mechanism within the telecommunications sector to expand connectivity by contracting private service providers. Enabled through mandatory levies on licensed communication operators, UCSAF designs subsidy schemes and procures connectivity outcomes to incentivize service provision in hard-to-reach areas.

The UCSAF-Giga partnership emerged from a shared objective: to identify and connect schools located in areas where commercial incentives for connectivity



The advantages are clear because on one hand, we have the government providing **policy direction and legitimacy, or legislation**. And then, on the other hand, we have the private sector that brings in innovation and infrastructure. But then we also have **development partners** who bring in the **technical skill set and funding**, and not forgetting the community.

– Hon. Neema K. Lugangira (Secretary General of the Women Political Leaders and former member of the Parliament of Tanzania)

investment were limited. A critical first step in this effort was generating reliable information on where connectivity gaps existed. After the approval of the GIGA Work Plan for the 2025/2026 fiscal year to digitize more than 25,000 Tanzanian schools, Giga worked with Tanzanian partners to create a comprehensive picture of school connectivity across the country, enabling policymakers to identify unconnected schools and prioritize future investments. By 2026, 95% of the schools were mapped. According to Leo Magomba, Director of ICT Infrastructure at the ICT Ministry of Tanzania, about 4000 schools are currently connected^{6,7} and the ministry is working closely with Giga to connect the remaining schools in the country.

Hon. Neema K. Lugangira (Secretary General of the Women Political Leaders and former member of the Parliament of Tanzania), participating in the event as a panel member and a lead figure supporting the partnership from within UCSAF, provided her expertise on the impact of private–public partnerships for connectivity outcomes in Tanzania. Discussing the case, she highlighted the importance of collaboration among government agencies, private-sector providers, development partners, and local communities. The mapping exercise was an initial – but necessary – effort to enable broader connectivity endeavors. Once unconnected schools could be identified with greater precision, UCSAF and its partners were better positioned to mobilize financing, design subsidy mechanisms, engage service providers, and coordinate implementation efforts across a wide range of actors.

m:tel and Safe Net Service in the Republic of Srpska, Bosnia



As an example of a connectivity initiative focused on service quality and sustainability, Mr. Zoran Bunčić (Chief Information Officer of m:tel, Bosnia and Herzegovina) – a private service provider – presented the company's partnership with the Ministry of Education and Culture of the Republic of Srpska. Since 2024, the company has collaborated with the Ministry to provide **Safe Internet** services to all primary and secondary schools in the region. The initiative aims to create a safer digital learning environment by combining school connectivity with network-level protection mechanisms that help prevent access to harmful online content while preserving access to educational resources.

Mr. Bunčić emphasized that the success of the initiative depended on establishing a shared vision among all stakeholders from the outset. The partnership combines the strengths of both sectors: the Ministry provides policy direction, oversight, and access to the schools, while m:tel contributes technological expertise and operational capabilities. By jointly financing and implementing the initiative, the partners have created a model to promote the safe, reliable, and long-term use of digital technologies in schools. The case illustrates how public–private collaborations can be tailored to different connectivity goals, demonstrating that improving the quality and safety of existing services may require a different partnership design than is required for projects primarily focused on expanding access.

6 Takwa, E. (2025).
Giga launches work
plan to digitalise all
Tanzanian schools.
Daily News Tanzania.

7 Giga. (2025).
ConnectivityCase (Ep. 3):
Connecting Every
School in Tanzania.



Illustrative Examples from Around the World

8. Additional details on each case are available through GRL's selection of [mini-cases](#) and [learning resources](#).

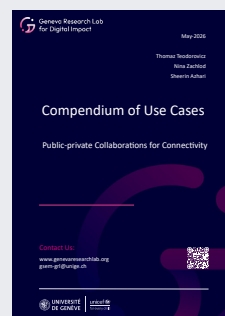
To complement the featured cases presented during the event, Dr. Zachlod and Prof. Dr. Teodorovicz briefly introduced a series of mini-cases developed by GRL.⁸ These cases illustrate how different countries have approached the challenge of expanding connectivity through distinct combinations of public and private sector involvement. Together, they demonstrate that there is no single blueprint for successful connectivity initiatives. Examples range from Uganda's Universal Service Funds, which use public financing mechanisms to incentivize private deployment in underserved areas, to India's BharatNet initiative, which relies on publicly financed backbone infrastructure combined with private-sector service delivery.

The mini-cases also illustrate variation in the role of providers and government influence. Kenya's DigiSchool initiative demonstrates how governments can leverage the technical capabilities of private-sector partners to connect schools in underserved regions, while Ethiopia's telecom liberalization highlights how introducing competition can mobilize large-scale private investment and expand access. Chile's Conectividad para la Educación 2030 initiative offers a different model, combining centralized public financing and procurement with private-sector service provision under nationally standardized quality requirements. Meanwhile, New Jersey's cooperative purchasing model shows how governments can aggregate demand and redesign procurement processes to reduce costs and improve service quality without directly investing in infrastructure.

Finally, the cases demonstrate the importance of iteration and adaptation over time. Nigeria's Project BRIDGE incorporates extensive consultation and phased implementation to support large-scale infrastructure deployment, while Uganda's UCUSAF has evolved across multiple strategic cycles, gradually expanding from basic access initiatives toward broader digital inclusion objectives. These examples reinforce a central message of the framework presented during the event: effective public-private collaboration depends on a government's ability to align partners, incentives and learning mechanisms with the specific connectivity goals they seek to achieve.



Hon. Neema K. Lugangira (Secretary General of the Women Political Leaders and former member of the Parliament of Tanzania) and Mr. Zoran Bunčić (Chief Information Officer of m:tel, Bosnia and Herzegovina)



Download the
Compendium
of Use Cases ▾





5. Key Insights

There Is No Single Best Partnership Model for Connectivity

A recurring theme throughout the event was that connectivity initiatives must be designed with clear goals in mind. Some projects prioritize expanding access to underserved and remote areas, while others focus on improving service quality, increasing affordability, strengthening resilience, or accelerating deployment at scale. These different objectives require different combinations of partners, governance arrangements, financing mechanisms, and procurement approaches. As illustrated by the cases discussed during the event, successful initiatives range from government-led infrastructure investments to private-sector driven models and hybrid public-private collaborations. Rather than searching for a universal solution, stakeholders should focus on identifying which partnership structure is best aligned with the specific challenges and objectives they seek to address. Effective collaboration begins with clarity about goals and an understanding of how different organizational arrangements support different outcomes.



We can talk about concessions, we can talk about shared investments, leads and operation contracts, and each one of those choices may come up with different priorities in terms of which goals you can reach.

– Prof. Dr. Thomaz Teodorovicz
(Copenhagen Business School)



Prof. Dr. Thomaz Teodorovicz (Copenhagen Business School), Dr. Nina Zachlod (University of Geneva)



Effective Connectivity Partnerships Extend Beyond a Government Agency and a Private Partner

The event also highlighted that successful public-private collaborations rarely involve only the government agency and the private service provider. Connectivity initiatives often depend on a much broader ecosystem of stakeholders, including local communities, schools, development banks, multilateral organizations, philanthropic actors, regulators, and multiple governmental departments and ministries. These actors each contribute different forms of value. Some provide

financing and investment capital, while others contribute technical expertise, implementation capabilities, local knowledge, or political legitimacy. Given the involvement of several ministries, authorities and partners, each with different goals, the objectives of connectivity projects might range from maximizing quality to achieving last-mile connectivity in remote areas. Aligning these priorities and goals might prove inherently difficult, requiring deliberate and continuous negotiation of project targets and KPIs.

“

[...] it doesn't just involve the ministry of ICT. You're involving the Ministry of Education. You're involving the Ministry of Planning. In the case of Tanzania, you're also involving your President. So, there's a number of moving stakeholders that have to be involved.

– Hon. Neema K. Lugangira (Secretary General of the Women Political Leaders and former member of the Parliament of Tanzania)



Visibility is a Necessary, but not Sufficient, Step for Connectivity Action

Lastly, expanding connectivity often begins long before infrastructure is deployed. Governments and partners first require a joint understanding of where connectivity gaps exist, which schools and communities remain underserved, and what barriers prevent access. Even this initial process of mapping connectivity is a collaborative effort. It frequently involves governments, regulators, schools, telecommunications operators, development organizations, and technology providers. Accurate and shared information is crucial

to enable stakeholders to prioritize investments, design targeted interventions, mobilize resources, and monitor progress over time. The experience of initiatives such as Giga demonstrates that making connectivity gaps visible can be a powerful catalyst for action, transforming connectivity from a broad aspiration into a concrete and measurable agenda for implementation.

“

First of all, it was necessary to create a shared vision of the project, to be the ideas and to communicate what do we want to achieve by this. So when the vision was shared and communicated with all the participants in this project, then everything went, so let's say, more smoothly.

– Mr. Zoran Bunčić (Chief Information Officer of m:tel, Bosnia and Herzegovina)



6. Acknowledgements

The authors would like to express their gratitude to all the individuals and organizations who contributed to the success of the March 2026 *Bridging the Digital Divide* event. Special thanks go to UNICEF’s Digital Impact Division, the Geneva Innovation Movement Association, and the Geneva School of Economics and Management at the University of Geneva.

We extend our appreciation to the panelists who enriched the event with their expertise and insights: Neema K. Lugangira (Secretary General of Women Political Leaders, former Member of the Tanzanian Parliament) and Zoran Bunčić (Chief Information Officer m:tel, Bosnia and Herzegovina). Our thanks also go to Marija Novkovic Gosic (UNICEF Digital Impact Division), Iris Dieleman (Geneva Innovation Movement Association), and Prof. Dr. Tina Ambos (University of Geneva) for introducing the event. We also extend our gratitude to Jaime Archundia (UNICEF Digital Impact Division), Christopher Alagna (UNICEF Digital Impact Division), and Ayat Alkurdi (UNICEF Digital Impact Division) for their support of the research workstream underlying this event.

Digital
Impact
Division

UNICEF's Digital Impact Division (DID) drives the organization's digital agenda, harnessing technology, data, connectivity and artificial intelligence to improve outcomes for children at scale. The division works with governments, partners and communities to strengthen the systems children depend on, while building the digital capabilities, safeguards and infrastructure that underpin UNICEF's operations and programmes worldwide. By advancing digital inclusion and responsible innovation, DID helps shape a digital future that is safe, equitable, and centred on children's rights. Through this work, UNICEF is helping ensure that every child, regardless of gender, ability, or geography, can thrive in a digital world.

UNICEF's Digital Inclusion team advises, advocates and acts so that children are neither excluded from nor left behind in the digital world. Together with governments, technology partners, development finance institutions and the private sector, we work to accelerate access to affordable, sustainable, safe and resilient digital infrastructure for every child. This strengthens the public services children rely on across education, health, protection and emergency response, while creating opportunity in the digital economy. As artificial intelligence reshapes economies, public services and opportunity, ensuring equitable access to connectivity, computing capacity and digital infrastructure becomes increasingly important so that children can participate safely and benefit from these transformations.

Giga, a joint initiative by UNICEF and the International Telecommunication Union (ITU), helps governments connect every school to the Internet and every young person to information, opportunity and choice. To date, Giga has mapped 2.3 million school locations. As of end 2025, UNICEF estimates that 20 million children in 44,000 schools benefited from new or improved connectivity, with more than 37 million children attending schools that reported real-time connectivity data.

**GENEVA
INNOVATION
MOVEMENT**

The Geneva Innovation Movement (GIM) is a Geneva-based non-profit founded in November 2020 by a small group of senior decision-makers across academia, international organizations, NGOs, and the private sector. It was created to address a simple but persistent gap: organizations talk about innovation, but struggle to make it happen in practice—within and across sectors.

GIM empowers individuals to spark meaningful innovation from within, transforming themselves and their organizations so Geneva can collaborate more effectively and tackle complex challenges faster. Its global community of members brings together changemakers committed to rethinking how organizations work and evolve.

GIM is built on three pillars:

1. **Network building** connecting actors across silos to enable real collaboration
2. **Up-skilling** equipping leaders with the tools and mindsets to drive innovation
3. **Knowledge Translating** turning academic insights into practical, actionable use.

As Ecosystem Building Partner of the Geneva Research Lab for Digital Impact, GIM bridges research and practice—ensuring that ideas do not stay in journals but translate into action and real-world impact.



CONTACT US

 genevaresearchlab.org/en

 gsem-grl@unige.ch

 Visit our LinkedIn