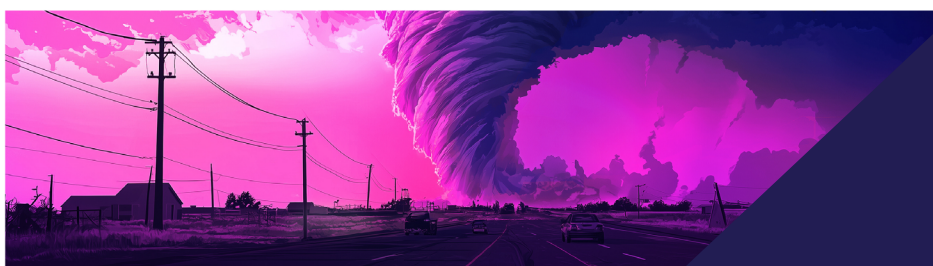
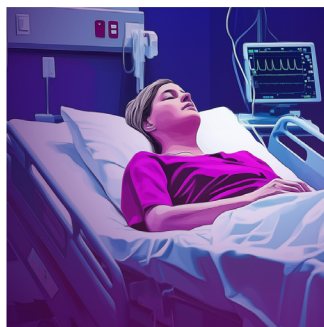
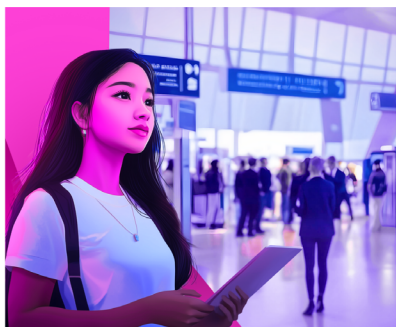
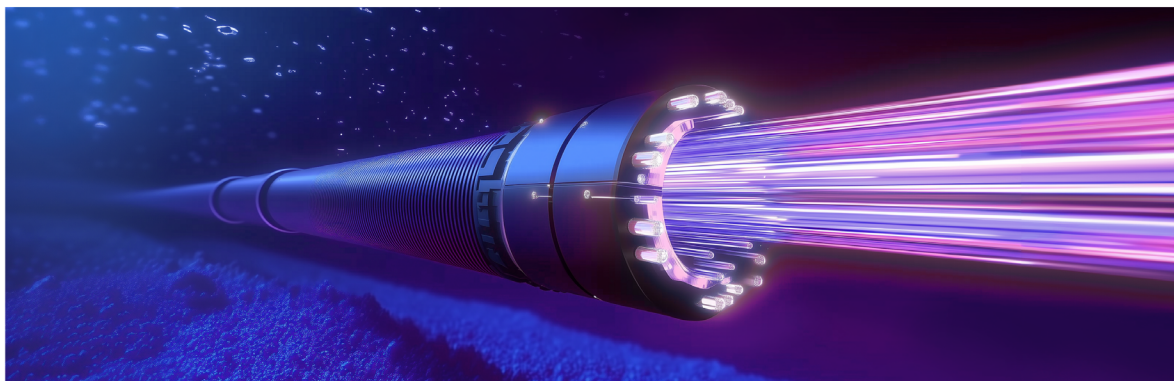


BENEATH THE SURFACE: CRITICAL CONNECTIONS AND REGIONAL FUTURES

The Future of Undersea Cables and
Digital Connectivity in the Indo-Pacific

A Research Report and
Cables Futures Toolkit

OCTOBER 2025



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The Tech Policy Design Institute (TPDi) is an independent, non-partisan think tank committed to advancing best practice technology policy in Australia and globally. Based in Canberra, TPDi is registered as a not-for-profit with the Australian Charities and Not-for-Profit Commission. TPDi collaborates with all stakeholders in the tech ecosystem. Our mission is to shape technology for the benefit of humanity through rigorous research, innovative education, public commentary, and community building.

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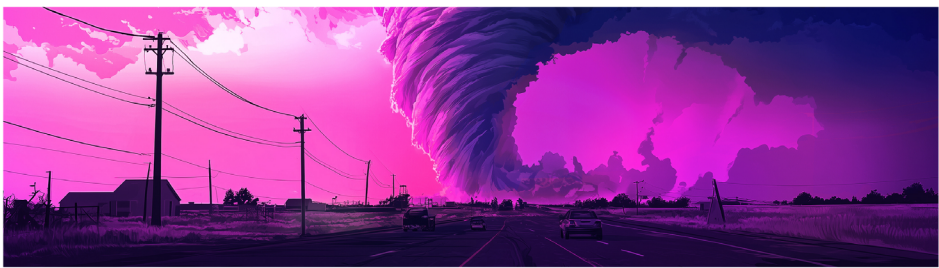
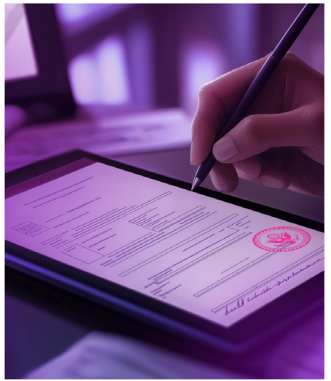
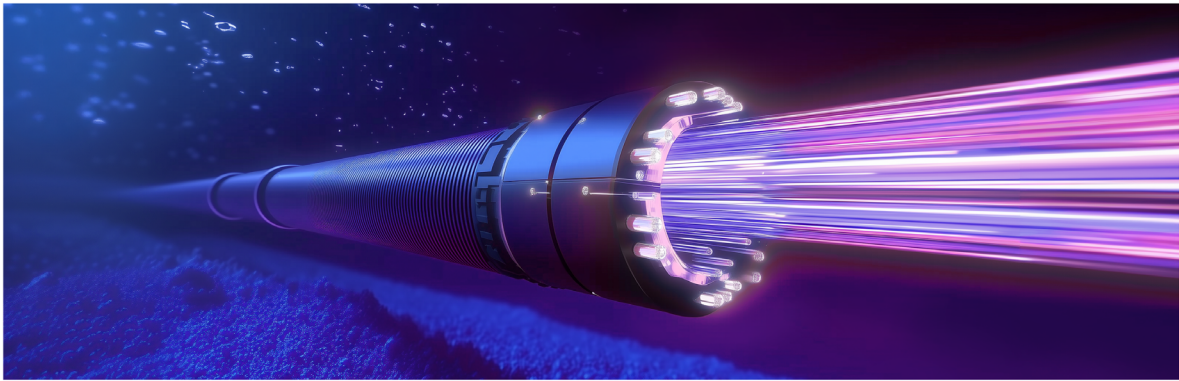
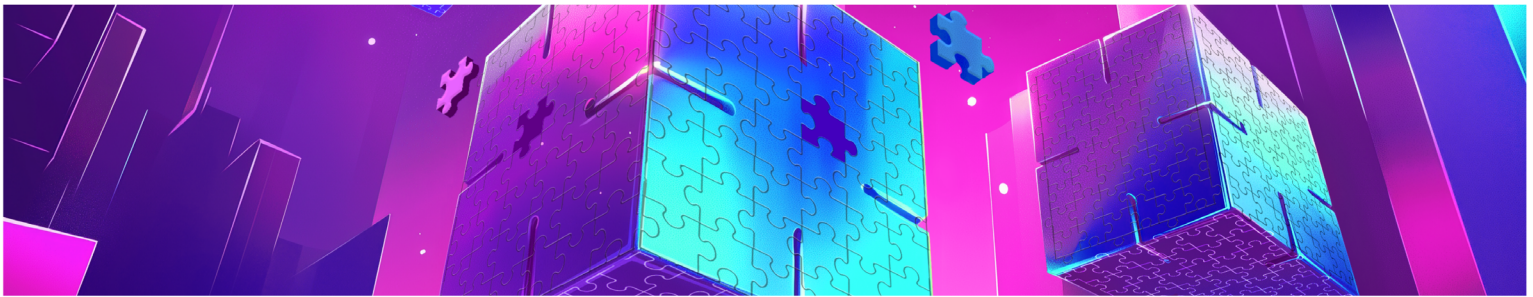
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FOREWORD

The undersea cable network is the invisible hero of the modern digital world, representing one of today's most important pieces of global digital infrastructure. It underpins almost every aspect of our daily lives.

Home to more than half the world's population, with millions still yet to come online, the Indo-Pacific presents untapped opportunities and complex challenges for the future of the undersea cable network.

In this report, we imagine and explore the future, sharing three plausible but fictitious scenarios detailing what digital connectivity in the Indo-Pacific region could look like in 2045. We also make recommendations for action by governments and industry in the Indo-Pacific today.

The future scenarios are intended to be sophisticated conversation starters, designed to explore and challenge the role of governments, industry, and civil society in the governance, maintenance, and provision of digital connectivity by the undersea cable network.

These scenarios are not predictions. The future is not set in stone. Technology shapes humanity, but humanity has the power to shape technology, especially through well-designed policy.

Futures or scenario analysis is a practical tool to think proactively about policy options, rather than just react to events as they happen. Through futures analysis, decision-makers are empowered to think about different future trajectories and the consequences of different choices they could make today. The futures approach encourages design of policy options that take a long view, identifying new options that help us prepare for what could happen, and supporting action to shape the future in a positive direction.

This project was funded by the Australian Government's Cable Connectivity and Resilience Centre and was delivered in collaboration with expert advisors and our regional partner, Tech for Good Institute in Singapore. Over the course of the project, we held three regional roundtables and consulted with more than 70 stakeholders, including technical experts, policymakers, and industry and civil society representatives from across South-East Asia, South Asia, and the Blue Pacific Continent.

Each of the three scenarios provides a description of a challenging but plausible future; identifies a turning point between now and 2045 that creates that future; and outlines the state of connectivity, cooperation, governance, ownership, and resilience in that future.

We present a Cables Futures Toolkit, which includes a Facilitator's Guide (see page 22 this report) and accompanying multimedia materials that bring each scenario to life (available online). We invite governments, industry, and civil society to use this toolkit to exercise the scenarios and plan for the future.

We are excited for the conversations that these scenarios and our recommendations will spark – stimulating creative solutions, identifying new opportunities to work together, and building collaborations between Australia and our regional neighbours to keep people connected for decades to come.

Johanna Weaver

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EXECUTIVE SUMMARY

We live in a digital world. People depend on digital connectivity and the internet for many elements of their day-to-day lives – managing business transactions, accessing essential services, and staying connected to colleagues, family, and friends, to name just a few. All these activities require sending data across borders and around the globe at light speed through a network of cables deep beneath the oceans.

About 99% of intercontinental data traffic runs through undersea data cables,¹ a vast network of fibre-optic cables that lie on the sea floor. Each cable is only about the width of a garden hose.² With 532 cable systems in service globally and another 77 planned,³ the undersea cable network is the backbone of the modern digital world, representing one of today's most important pieces of global digital infrastructure. While undersea cables are unlikely to be front of mind for most everyday smartphone users, they are essential to the way we work and live. Acknowledging this, several countries have now recognised undersea cables as part of their national critical infrastructure.⁴ This infrastructure underpins global connectivity, so ensuring the resiliency of cables, or the ability to sustain performance of services to end-users in the face of unspecific and disruptive events,⁵ is of vital importance.

The complex dynamics currently at play across the Indo-Pacific have been the subject of countless articles,⁶ with many speculating about the potential next steps for major powers and big tech companies. China and the United States are both actively supporting digital development in the Indo-Pacific as part of the superpowers' pursuit for regional influence.⁷ Meanwhile, many smaller countries across the region that are still developing their digital infrastructure often prioritise economic benefits and service provision over geopolitical or security considerations.⁸ In the private sector, major content providers – Meta, Microsoft, Google, and Amazon Web Services (AWS) – have been rapidly ramping up investment in undersea data cables, largely driven by increased demands for AI compute and cloud computing.⁹ In fact, successful delivery of Meta's Project Waterworth would see the world's longest subsea cable project owned and operated by a single private sector entity.¹⁰

Environmentally, expansion of the network means not only laying new cables, but establishing new data centres and landing stations, increasing energy requirements in locations where green, clean power is not necessarily the most viable or available option. Cables simultaneously symbolise the opportunity of the region's digital transformation and nations' dependence on infrastructure vulnerable to natural disasters and sabotage.¹¹

Closer to home, there are over 20 international undersea cables and systems, planned or in service, with landing points in Australia. The Australian Government has demonstrated their interest and commitment to the role of digital connectivity in maintaining a stable Indo-Pacific region by establishing the *Cable Connectivity and Resilience Centre* (the Cable Centre), which contributes to the Quad Partnership for Cable Connectivity and Resilience (2023).¹² Launched in July 2024, the Cable Centre aims 'to help ensure undersea cable networks in the Indo-Pacific are resilient and all countries can benefit from reliable connectivity and the growth of the digital economy'.¹³ Australia also operates as a key regional infrastructure development partner through the Australian Infrastructure Financing Facility for the Pacific. Five new commercial cables coming online in the next five years will further connect Australia with countries in the region.

Maintaining, governing, and expanding infrastructure of this scale has implications across a range of domains including economics, geopolitics, security, maritime law, energy, and the environment at the national, international, and regional level.

So, what is the best way to ensure that the cable network meets the connectivity needs of populations across the Indo-Pacific when an increasingly uncertain future lies ahead? And who should be involved in operating and governing this infrastructure?

Exploring the possible trajectories of current aspirations and risks in the region's digital infrastructure is a highly effective way to understand the next steps that we need to take today. Through a futures approach, we can decouple our conversations from the present-day interests and challenges to focus on identifying long-term goals and practical recommendations that prepare for the worst and plan for the best.

Through this research project, we developed and refined three possible future scenarios for digital connectivity in the Indo-Pacific 20 years from now. We consulted with over 70 key government, industry, and civil society stakeholders about the future of undersea cables across South-East Asia, South Asia, and the Blue Pacific Continent to test the plausibility and desirability of the scenarios. The potential roles for government, industry, and civil society in achieving a desirable and resilient future for connectivity were also investigated. The outcomes of those discussions informed our development of a **Cables Futures Toolkit** – the scenarios, guidance, and policy recommendations – presented in this report, and the accompanying multimedia materials, available online at www.techpolicy.au/cables.

Each scenario is designed to test different priorities and the relative role of different actors as they could be in 2045 by extrapolating them towards extreme fictitious but plausible scenarios:

- **Scenario 1**, called **'the Great Divide'**, seeks to test the limits of a highly securitised cables network driven by geopolitical tensions, where governments have the greatest control over digital infrastructure and the region is divided into connectivity blocs.
- **Scenario 2**, called **'Platform Power'**, tests the limits of a privatised future where only a few big tech companies own and manage the vast majority of digital cable infrastructure, leaving states competing for their services and market forces leading to worsening inequality in an exaggerated world of connectivity haves and have-nots.
- **Scenario 3**, called **'Regional Resilience'**, tests the limits of a world defined by a climate crisis and where regional cooperation is prioritised above individual state and corporate interests to build resilience in shared critical infrastructure.

The clear message from all stakeholders across the region – government, industry, and civil society – was that there is a strong appetite for greater regional, multi-stakeholder collaboration to enhance capabilities and resilience of undersea cables but there are challenges that will need to be addressed to make this happen.

Our Cables Futures Toolkit provides a foundation to continue these cross-sector conversations in a creative and constructive way to inform innovative policy development.

We invite governments, industry, and civil society in the region to use this toolkit in their discussions about planning for the future. By continuing open, multi-stakeholder dialogues, we can build the cooperation that provides the best opportunity for everyone in the region to benefit from the prosperity, resilience, and community that digital connectivity can bring.

RECOMMENDATIONS

Recommendation 1

Governments across the Indo-Pacific should develop regional agreements to build cable connectivity and resilience in consultation with the cables industry, maritime-based industry, civil society, and their citizens. Implementation of agreements should involve a leading role for industry.

Governments across South-East Asia, South Asia, and the Blue Pacific Continent should work towards new or expanded regional agreements to support, maintain, expand, and strengthen resilience of the shared infrastructure for digital connectivity (predominantly the undersea cable network), with implementation of the agreed approaches led by industry. The agreements should be developed by governments in consultation with industry and civil society, and include:

- **Regulatory harmonisation** – enhancing interoperability of regulatory and legislative environments
- **Supply chain resilience** – secure and reliable supply of undersea cable components needed for manufacture and repair
- **Skills development** – building skills in cable maintenance and repair
- **Workforce mobility** – acquiring the right skills where they are needed in the region
- **Research and development** – identifying opportunities for shared investment to advance network technology for more efficient and resilient connectivity.

Recommendation 2

Multi-stakeholder cooperation towards regional agreements can and should start now, by building on existing initiatives.

Governments across South-East Asia, South Asia, and the Blue Pacific Continent should build on existing initiatives to enhance regional cooperation as an immediate priority. A stepwise approach to build regional cooperative agreements should be considered, utilising existing bilateral or small multilateral cooperation and agreements where relevant. For example, discussions can start in existing sub-regional fora and build into broader cross-regional dialogues. New bilateral and small multilateral agreements centring digital connectivity should also be encouraged.

There is an opportunity for the governments of medium to large economies in the region to provide leadership to ensure that neighbouring smaller and more isolated economies are heard and represented in regional agreements.

Recommendation 3

Governments should recognise and raise awareness of the essential role of undersea cables, including by designating cables as critical national infrastructure.

Governments across South-East Asia, South Asia, and the Blue Pacific Continent should elevate public officials' understanding of undersea cables' critical role in national prosperity and security. Raising the profile of cables, and designating them as critical national infrastructure, will facilitate commensurate prioritisation of cables in national policy agendas. Beyond government recognition and cross-portfolio awareness raising, educating populations on the criticality of cables will help build support for investments in undersea cable and associated infrastructure, and help to reduce accidental damage by boats.

Recommendation 4

Opportunities for public-private co-investment in regional connectivity solutions should be explored as a priority, including research and development in new technology.

Governments across South-East Asia, South Asia, and the Blue Pacific Continent should consider public-private partnerships to bridge the digital divide for unconnected or underserved communities in the region. To enhance network resilience, industry and government should also prioritise research and development in advancing technology of undersea cables and in complementary technologies like satellite networks. The opportunity for a regional fund to support this research should be explored.

DESIGNING THE SCENARIOS

Each 2045 connectivity scenario, as provocative as it may be, is based on dynamics that can already be seen today in 2025. The three future scenarios are designed to highlight, extrapolate, and test key trend lines in subsea cable developments and debates.

The scenario narratives are crafted based on substantial desk research and in-depth interviews with experts (see Appendix 1). Each draft scenario was then tested and refined in discussions with over 70 stakeholders from government, industry, and civil society across the Indo-Pacific at three in-region workshops in late 2024.¹

This inductive process was informed by a range of factors, including those laid out in the boxes below:

SCENARIO 1

The Great Divide



This scenario tests the limits of a highly securitised cables network driven by geopolitical tensions, where governments have the greatest control over digital infrastructure and the region is divided into connectivity blocs. You can imagine this future if you focus on:

- Increasing geopolitical tensions in the region including the increased securitisation of cables, apparent cable cutting impacting Finland¹⁴ and Taiwan,¹⁵ and the US's 2024 International Cyberspace and Digital Policy Strategy identifying the need to enhance security and resilience of undersea cables.¹⁶
- The accelerating tech decoupling between the United States and China, involving export controls on critical technologies and directives relating to relying on 'trusted suppliers' and 'clean networks'.¹⁷
- Trends of countries across the Indo-Pacific implementing regulation that requires data localisation.¹⁸

¹ Further information about our research methodology is available in Appendix 1.

SCENARIO 2

Platform Power



This scenario tests the limits of a privatised future where only a few big tech companies own and manage the vast majority of digital cable infrastructure, leaving states competing for their services and market forces leading to worsening inequality in an exaggerated world of connectivity haves and have-nots. You can imagine this future if you focus on:

- Consortium and private cable models being challenged by independent infrastructure providers and hyperscale content providers such as Amazon, Facebook, Google, and Microsoft, which represent more than two-thirds of the subsea fibre cable bandwidth capacity growth.¹⁹
- Meta announcing its plans to single-handedly develop the world's longest cable project in Project Waterworth.²⁰
- Double-digit annual growth in data traffic, driven by demand for cloud computing and AI compute, which is only expected to increase.²¹

SCENARIO 3

Regional Resilience



This scenario tests the limits of a world defined by a climate crisis and where regional cooperation is prioritised above individual state and corporate interests to build resilience in shared critical infrastructure. You can imagine this future if you focus on:

- Countries in the Indo-Pacific having experienced, on average, six natural disasters per year over the past three decades (twice as many as countries in Latin America and the Caribbean), with climate change posing an 'existential threat'²²
- Absence of international cable protection laws, though some international mandates address cables (but are non-binding and sometimes not applicable to the Indo-Pacific)²³
- Unintentional physical risks (such as cables being cut by fishing boats or natural disasters) being the most likely and frequent type of damage to cables.²⁴

REGIONAL WORKSHOP INSIGHTS

This section of the report presents key findings from three regional workshops with over 70 stakeholders from government, industry, and civil society.

Workshop participants from across the region were asked to score the three scenarios based on how *desirable* they consider them to be as a future for 2045, and how *likely* it is that these scenarios would occur as written. Figure 1 (see page 17) summarises the scores. For further details about the scoring used by workshop participants to assess desirability and plausibility, see Appendix 2.

All participating stakeholders – including technical experts, government policymakers, and industry and civil society representatives – supported enhanced multi-stakeholder regional cooperation to expand digital infrastructure, improve connectivity, and build resilience in the region, while acknowledging that doing so is not without its challenges.

International, multi-stakeholder cooperation is necessary to meet digital connectivity needs and build resilience

The strongest message from stakeholders at the regional workshops was that a multi-stakeholder, international cooperative approach is necessary to build resilience and support connectivity across the Indo-Pacific.

The ‘Regional Resilience’ (Scenario 3) – centred on regional cooperation on cables – was scored by stakeholders as the most *desirable* of the three future scenarios by a clear margin, with an average score of 7 (out of 10), demonstrating that across stakeholder groups there is a clear appetite for international cooperation. This scenario was also deemed the most *plausible* (Figure 1 and Appendix 3, Table 3). The most common score for this scenario given by participants was ‘Likely’, where participant discussions highlighted the essential roles for each sector – governments, industry, and civil society – noting that cables are part of a large, complex digital ecosystem and touch many areas of industry and government policy, requiring all actors to work together.

Scenarios of extreme government or private sector control are less desirable than a multi-stakeholder approach with public-private partnerships

When discussing Scenario 1 and Scenario 2, stakeholders at the workshops oversaw that both scenarios confronted and reflected the reality that no stakeholder in the undersea cables ecosystem can single-handedly sustain network infrastructure or build resilience.

The lowest plausibility scores were given to ‘The Great Divide’ (Scenario 1), with stakeholders reasoning that this situation would be far less likely to develop, especially on this timeline, because governments could not support this infrastructure without cooperation and a more prominent role for industry. Stakeholders also noted that the incentive to trade with foreign markets makes the extreme bifurcation seen in this scenario both less desirable and less likely.

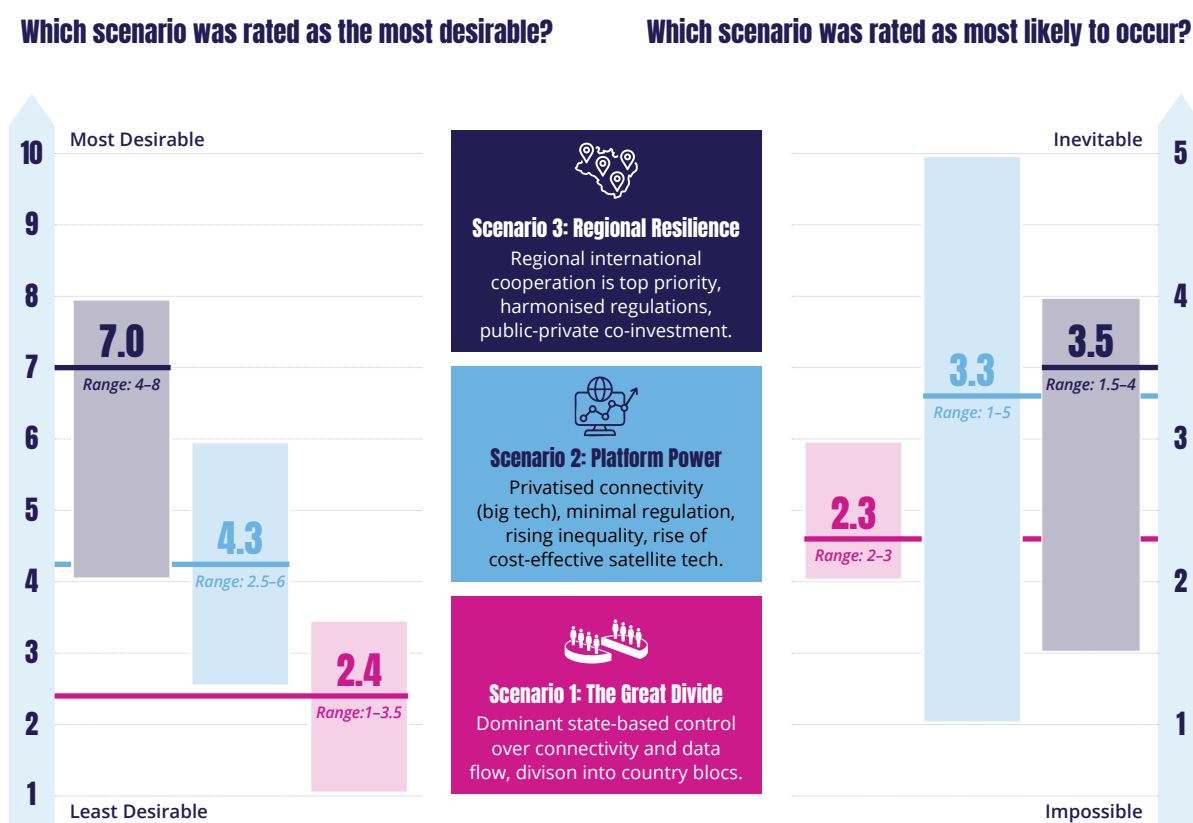
Stakeholders reflected that the trigger issue for countries dividing into blocs in Scenario 1 could be based on intensified geoeconomics collapsing inter-state trade and connectivity, as opposed to an espionage incident (as reflected in the scenario). Moreover, stakeholders with technical knowledge of undersea cables commented that while espionage is currently occurring, adversary acts against undersea cables would more likely be sabotage aimed at causing physical damage and disruption rather than data taps (which would more likely occur at landing stations). Regardless, stakeholders commented that the resulting separation between blocs might incentivise the creation of a new independent, non-government organisation to facilitate some interaction between blocs. Even so, stakeholders raised concerns that the drastic

reduction in cross-bloc communication in this scenario would increase the risk of damage to cables, both intentional and accidental.

Meanwhile, Scenario 2, 'Platform Power', was also deemed as unfavourable by stakeholders. Concerns were raised regarding the erosion of state sovereignty in the face of extreme corporate power and subsequent difficulty of governments enforcing national regulations relating to privacy and security. Stakeholders noted that in Scenario 2, despite the primacy of the private sector, different states would still end up with inequitable influence – those with jurisdictional leverage over the corporations and those with the largest commercial market size more likely to receive favourable compliance or connectivity outcomes, while states without leverage would be dismissed or left behind by the 'Cable Kings'. Additionally, stakeholders suggested that the market concentration in Scenario 2 would likely disincentivise innovation in the cables ecosystem, hindering necessary improvements in coverage and resilience.

Viewing these scenarios side by side, stakeholders observed that government and industry have a shared interest in providing quality, reliable, resilient, and future-proofed connectivity to users across the region, and that greater multi-stakeholder cooperation will assist in achieving that goal. The contrast in the scenarios underlined the collective preference for multi-stakeholder collaboration among private companies, international organisations, and governments as the best way of building cables resilience (i.e. the consortium model). Stakeholders noted this collaboration is particularly important in relation to determining the location of cable endpoints and the construction of data centres.

Figure 1. Summary of scores for plausibility and desirability of three scenarios depicting possible futures for the undersea cable network in 2045, as determined by stakeholders from across the Indo-Pacific region.²



² Further information is provided in Appendix 2: Methodology about how scores were determined at the regional workshops, and in Appendix 3: Data Tables about the analysis presented in Figure 1.

Stakeholders see a role for regional cables agreements

Stakeholders at the workshops noted that regional agreements on subsea cables cooperation present opportunities to strengthen digital connectivity, resilience, and cooperation across economies. Stakeholders identified the following potential benefits of such region agreements:

- **Bridging fragmented regulatory environments:** Regional agreements could provide a means for harmonising the legislative and regulatory environment surrounding this critical infrastructure. In several workshop discussions, stakeholders were in favour of government regulations and policies that streamline the regulatory environment for undersea cables and serve the interests of their populations but cautioned against regulation that limits the cables ecosystem too greatly. Harmonised regulation in the region could lead to more efficient and streamlined cable laying and maintenance in the region while helping to keep large private companies accountable.
- **Building a skilled and mobile workforce:** The specialised workforce required for cable deployment and repair is currently small and highly niche. Regional agreements could facilitate workforce development through training programs, increased mobility, and coordinated investment in skills pipelines. Stakeholders in the Pacific region noted that building capacity across a range of related areas such as education in finance, regulation, technical matters, cybersecurity, and maritime law could greatly assist with increasing the resilience of the cable network. Agreements could coordinate and build on existing skills initiatives being run across the region.
- **Coordinated investments and public-private partnerships:** Regional agreements would assist in coordinating consortium investments in regional connectivity. Larger economies could support smaller ones on infrastructure development, particularly where commercial incentives are limited. Agreements could also foster public-private co-investments in strategic connectivity projects. Investment in research and development (in areas such as automated repair technologies) was highlighted as critical to building resilience, and technology breakthroughs were deemed more likely as part of a holistic regional resilience plan.
- **Promoting equitable digital access and inclusion:** Stakeholders at all workshops, particularly those from smaller economies, highlighted the opportunity to advance principles of equity of access through regional agreements. Integrating strategies to close the digital divide – within and between countries – into region-wide strategies would help build resilience in a range of areas, including an increased likelihood of maintaining connectivity through times of national and international crisis (e.g. extreme weather and climate impacts). Stakeholders suggested that giving smaller economies a greater role in the development of regional agreements would increase the likelihood of an equitable approach.
- **Benefits of broad framing:** While centred on cables, stakeholders suggested that regional agreements could serve as a means for driving forward broader cooperation on closely interconnected challenges such as secure and reliable supply chains, clean energy, climate resilience, and maritime security. Integrating these considerations could encourage greater regional buy-in.

Workshop discussions underscored the importance of any regional agreements recognising the essential role of industry, and the value of cooperation across sectors as well as across international borders. As such, stakeholders suggested that while regional agreements would be developed by governments, their implementation should include leading roles for industry.

Recommendation 1: Governments across the region should develop regional agreements to build cable connectivity and resilience in consultation with industry, civil society, and their citizens. The implementation of agreements should involve a leading role for industry.

Building on existing efforts, governments across South-East Asia, South Asia, and the Blue Pacific Continent should work towards regional agreements to support, maintain, expand, and strengthen resilience of the shared infrastructure for digital connectivity (predominantly the undersea cable network), with implementation of agreed approaches led by industry. Agreements should be developed by governments in consultation with the cable industry, maritime-based industries, and civil society, and include:

- **Regulatory harmonisation** – enhancing interoperability of regulatory and legislative environments
- **Supply chain resilience** – robust supply of undersea cable components needed for manufacture and repair
- **Workforce mobility** – acquiring the right skills where they are needed in the region
- **Skills development** – building skills in cable maintenance and repair
- **Research and development** – identifying priorities for investment to advance network technology for better connectivity, maintenance, and repair.

Achieving regional agreements will present challenges and is unlikely to look like the future painted in the Regional Resilience scenario

Stakeholders at the workshops identified a range of legal, political, and structural challenges to regional agreements that would need to be overcome to achieve progress:

- **Complex and fragmented regulatory environments:** Across the region, each jurisdiction has distinct regulatory requirements and approval processes for new cable builds; additionally, the repair and maintenance of existing cables present a complex starting point.
- **Tension between regional and national interests:** Participants at the South-East Asia workshop noted that ASEAN discussions already require significant compromises by states to reach agreement and that this would be even harder at an Indo-Pacific-wide level. Trust levels, security regulations, and competing national interests vary widely across the region, making consensus difficult. Pacific workshop participants were particularly sceptical about the viability of an Indo-Pacific-wide arrangement, instead proposing smaller, sub-regional progress, starting with bilateral agreements.
- **Varying levels of trust and political will for regional cooperation:** Discussions at the South Asian workshop highlighted concerns that the value of regional agreements would be limited unless all countries, including China, were willing to collaborate openly in international fora. The varying levels of optimism about the feasibility of any agreements largely corresponded to stakeholders' perceptions of current multilateral arrangements in the stakeholders' respective sub-regions.
 - South Asia-based participants were generally optimistic about collaboration and reaching regional agreements, which seemed to be largely informed by India as the regional leader for smaller nations such as Maldives and Sri Lanka on international infrastructure issues such as cables.
 - South-East Asia-based participants were interested in regional cooperation but more sceptical of its success which, for many participants, was informed by their perceptions of cooperative efforts in South-East Asia through the Association of Southeast Asian Nations (ASEAN) on a range of matters.

- Participants from Pacific Island countries were optimistic about cooperation within the Pacific, driven by their confidence in existing organisations like the Pacific Islands Forum and the Pacific Regional Infrastructure Facility (PRIF). In contrast, there were lower levels of optimism expressed about cooperation between the Pacific Island countries and other countries across the Indo-Pacific.
- **Concern an agreement would produce ‘winners’ and ‘losers’:** Even with regional or sub-regional collaboration, some participants noted that the role of market power in determining connectivity outcomes would mean that economically dominant countries might still enjoy disproportionate influence over agreement outcomes. Regardless of regional collaboration, the private sector would still be motivated by commercial incentives. Stakeholders expressed concern that financially powerful countries could dictate the terms of cable connectivity priorities in regional forums, creating considerations as to which countries would have more influence, and if their priorities would supersede smaller or less connected countries.

In response to the hypothetical dynamics of Scenario 3, which imagines an evolved role for the International Cable Protection Committee (ICPC), stakeholders noted:

- **Disagreement over the role of the ICPC:** Stakeholders commented that the ICPC, as it currently operates, is unlikely to serve as a regional regulator due to differing views among its members. While some participants in the South-East Asian workshop supported expanding ICPC membership across the Indo-Pacific region, others noted that its current structure favours a convening role rather than a regulatory one. Any increase in ICPC’s powers was considered to require a fundamental restructuring of the organisation’s governance and decision-making model. Industry stakeholders were particularly resistant to the idea of ICPC holding more power than private sector actors, instead favouring retention of the consortium model. Meanwhile, one table in the Pacific workshop rejected the idea that the ICPC would be the best channel for regional cables collaboration – suggesting instead that an entirely new body would be required.
- **Tension between regional versus national decision-making power:** A core question raised by Scenario 3 was: *Who should be responsible* for ensuring connectivity needs are met – regional bodies or national governments? Stakeholders noted that government, industry, and citizens may not be comfortable with decision-making power being delegated to a regional body as described in Scenario 3. Aside from its impact on state sovereignty, some stakeholders noted that top-down control by a regional body may create bureaucratic chokepoints that stifle innovation and slow down approvals for new cable projects.
- **Concerns about consolidated government-government coordination:** While increased government collaboration could improve risk management and disaster response, some stakeholders noted that strong cooperation between governments over the establishment and management of digital infrastructure as depicted in Scenario 3 would likely cause discomfort amongst civil society regarding security, privacy, and surveillance.

The region should not wait for a major trigger event to drive enhanced multi-stakeholder regional cooperation on digital connectivity

Despite recognising the obstacles to pursuing regional agreements, stakeholders at the workshops maintained that energetic progress towards enhanced regional cooperation should not be delayed.

The urgency to act was felt and communicated across the three workshops. Several stakeholders from government and industry noted that there was no need to wait for a major crisis or triggering event to enhance work towards more resilient digital connectivity in the region.

Stakeholders noted that the pace of climate change, the rapid expansion of private sector infrastructure plans across the region, and the time required to progress regional agreements meant that proactive regional action to enhance digital infrastructure cooperation and resilience is essential.

Historically, crisis situations – such as natural disasters or the COVID-19 global pandemic – have exacerbated inequity across a range of social and economic domains. Waiting for a crisis, like the respective turning points depicted in each of the three future scenarios, risks a response that embeds inequities in digital access rather than strategically seeking to address them.

Workshop stakeholders suggested that:

- Repair and maintenance present the best opportunity for immediate cooperative action; however, any agreements should also cover construction, maintenance, and regulatory frameworks.
- Establishing a consistent understanding and approach to planning and building new service infrastructure should be a priority, particularly by governments to streamline the regulatory environment for digital connectivity (cables and satellites) – this would help ensure equity of access in new ventures by private sector providers seeking to rapidly expand their reach across the countries in the Blue Pacific Continent.
- The development of shared infrastructure, such as cables, across countries, is a key foundation for building broader diplomatic relationships and could promote regional stability and trust.

Cooperation should build on existing agreements and organisations

Stakeholders at the workshops emphasised that a ‘stepwise approach’ should be adopted, leveraging existing bilateral and multilateral organisations and relationships within the region and sub-regions, and/or expand existing agreements related to information and communications technology that are already in place. Recent efforts that offer strong foundations for progressing regional cooperation include the Working Group process to update the 2019 *ASEAN Guidelines for Strengthening Resilience and Repair of Submarine Cables*,²⁵ and the establishment of the *International Advisory Body for Submarine Cable Resilience* (by the International Telecommunications Union, the United Nations Agency for Digital Technologies, and International Cable Protection Committee).²⁶

Pacific stakeholders suggested that bringing in organisations like the Pacific Islands Forum, Pacific Islands Telecommunications Association, and the Pacific Regional Infrastructure Facility could greatly assist in cooperation in the countries across the Blue Pacific Continent, and in bringing the key priorities to a regional conversation.

Recommendation 2: Enhancing regional multi-stakeholder cooperation by building on existing initiatives should be an immediate priority.

Governments across South-East Asia, South Asia, and the Blue Pacific Continent should build on existing organisations and agreements to enhance regional cooperation on resilient digital infrastructure as an immediate priority. A stepwise approach to build regional agreements should be considered, utilising existing bilateral or small multi-lateral cooperation and agreements where relevant. For example, discussions can start in existing sub-regional fora and build into broader cross-regional dialogues. New bilateral and small multilateral agreements centring digital connectivity should also be encouraged.

There is an opportunity for the governments of medium to large countries in the region to provide leadership to ensure that neighbouring smaller and more isolated economies are heard and represented in a region-wide agreement.

Governments should recognise subsea cables as critical national infrastructure, to facilitate commensurate prioritisation of subsea cable issues in national policy agendas

Cables are essential enablers of countries' prosperity and security, underpinning everything from financial transactions to government communications. Formally recognising their vital role, by classifying subsea cables as critical national infrastructure, enables governments to prioritise them accordingly. Given the competing demands on all governments' budgets, official designation as critical national infrastructure helps unlock the required regulatory attention, investment incentives, and protection from physical and cyber threats. This designation also facilitates cross-agency coordination, ensuring that telecommunication, security, and maritime authorities align their efforts to safeguard this essential infrastructure. Beyond the formal designation, proactively raising awareness of the importance of cables is necessary to translate this high-level national policy into everyday operational reality. Without such recognition, undersea cables risk being overlooked in national infrastructure planning, leaving countries vulnerable to disruptions that could have severe economic and security consequences.

There is also value in awareness-raising efforts for the general public. Any national, regional, or international initiatives by governments to invest in cable infrastructure – crisis or not – will require public buy-in for expenditure and policy decisions, particularly when large parts of this infrastructure are shared with other countries. Most citizens are largely unaware that their lives could very quickly grind to a halt without a highly resilient undersea cable network. Lack of awareness about the role of undersea cables in their daily connectivity activities could lead many citizens to push back against significant public spending on something that is perceived to be unimportant in their day-to-day life. Raising public awareness about the nature and importance of cables in an environment without the context of a major disaster or crisis is one way to build public trust in supporting the cable network and any associated government investments of public money.

Raising public awareness through education and capacity building about the presence and importance of undersea cables could also assist with reducing incidents of accidental damage to cables, such as damage from sea vessels like fishing boats.

Recommendation 3: Governments should recognise and raise awareness of the essential role of undersea cables, including by designating cables as critical national infrastructure.

Governments across the region should elevate public officials' understanding of undersea cables and raise awareness of their critical role for national prosperity and security. Raising the profile of cables as critical national infrastructure will facilitate commensurate prioritisation of cables in national policy agendas. Beyond government recognition and cross-portfolio awareness raising, educating the population helps build trust in decision-making about investments in undersea cable and associated infrastructure, and helps to reduce accidental damage from boats.

Cooperation and investment by both governments and the private sector is needed to fill connectivity gaps across the region and advance development of technologies that build resilience in the infrastructure.

Stakeholders at the workshops recognised that persistent gaps in connectivity across the region, where market opportunity is insufficient to attract private sector investment, could be addressed through new public-private cooperation on investment in new subsea cable infrastructure. Stakeholders encouraged governments and industry to look for opportunities

to collaborate to extend connectivity to previously unconnected or underserved parts of the region. This was identified as an important element of closing the digital divide and increasing regional resilience.

Ensuring all new cables have redundancy options through spurs and rerouting arrangements was also highlighted by some stakeholders as a way to build a more resilient cables eco-system for the future.

At the same time, stakeholders highlighted that placing dependence on a single technology – such as the undersea cable network – is a significant risk to a critical service like digital connectivity. It was clear from discussions with stakeholders across all sectors that building resilience requires complementary communication technology networks, such as satellites. While current low earth orbit satellites are not seen as a viable alternative for cables given their comparatively lower bandwidth, they are an important element of resilience and extending the reach of connectivity, particularly for remote populations. Participants deemed it as in national, regional, and commercial interest to advance both cable and satellite technologies in parallel. By incentivising industry research and development through co-investment in both cables and satellite technologies, stakeholders suggested that larger economies could assist the region by driving advances in technologies for smaller economies that might otherwise be de-prioritised due to small markets or other commercial reasons.

Technological innovation should be a part of building resilience in the region.

Participants found that alternative tech solutions (such as the use of dark fibres or spurs) were missing in the draft scenarios. Stakeholders also suggested that government should help incentivise advances in repair technology, noting that this would be in the interests of both governments and the private sector. Likewise, some stakeholders recognised the need for governments to support good industry practice, including fostering best practice safe routes for power and data cables, which may be bundled together in the future.

Several technologies currently under development were mentioned by stakeholders as examples of immediate opportunities for research and development investment. Examples provided were ‘Sensor cables’ like Science Monitoring and Reliable Telecommunications (SMART) cables and Fibresense technology, which would help with monitoring of undersea cables but also provide invaluable, difficult-to-obtain, scientific data from the sea floor.

Recommendation 4: Opportunities for public-private co-investment in complementary regional connectivity solutions should be explored as a priority, including research and development in new technology

Governments across South-East Asia, South Asia, and the Blue Pacific Continent should consider public-private partnerships to bridge the digital divide for unconnected or underserved communities in the region. To enhance network resilience, industry and government should also prioritise research and development in advancing technology of undersea cables, including their repair, and in complementary technologies, like satellite networks. The opportunity for a regional fund to support this research should be explored.

CABLES FUTURES TOOLKIT

Facilitator's Guide to the Future Scenarios

Here we present a ready-to-go guide for using the scenarios in your own discussions about the future of digital connectivity and the undersea cable network across the Indo-Pacific.

When introducing the scenarios, remember to emphasise that they are not predictions. The three scenarios are intended to be sophisticated conversation starters, designed to explore and challenge the role of governments, industry and civil society in the governance, maintenance and provision of digital connectivity by the undersea cable network.

The three future scenarios can be used to identify possible practical policy interventions, engagement, and collaboration for government and industry in the development of undersea data cable infrastructure across the Indo-Pacific to meet the region's future connectivity needs.

These scenarios are designed as a focal point for future-focused discussion in small (five to eight people), multi-stakeholder groups with a facilitator, guiding the discussion through the four steps provided below. One key advantage of the futures approach is that it provides a lot of flexibility in how it can be used and can be tailored to the size and composition of your audience.

For a small group of less than 10 people, it may be more effective to work through all three in a focused way. For larger workshops, breaking into multiple small groups and examining only one or two of the three scenarios for each table (with the whole room covering all three) could be a more informative approach.

Whatever approach is chosen, the scenarios are designed to provoke discussion and push situations to the extreme to enable a wide-ranging and creative discussion among a diverse group of stakeholders, hopefully find some common ground, and, most importantly, to have some fun.

Facilitators should guide participants through each of the four steps, pausing for reflections and group feedback between each step. Multimedia material have been created to introduce each scenario. They can be incorporated into Step 1 and are available at www.techpolicy.au/cables.

1. Explore

Ask your stakeholders to **watch** the scenario videos, **read** the descriptions, and take some time to situate themselves in the world of each scenario, considering:

- Infrastructure
- Connectivity
- Patterns of data flow or usage

2. Challenge

Ask your stakeholders to **consider** how plausible the scenario is:

- What is likely and **unlikely** about it?
- **What else** would have to happen for it to play out this way?
- What could happen **instead**?
- What do you think the key actors would do **differently**?
- Who would and would not **benefit** in this scenario?

3. React

Ask your stakeholders to **react** to the scenario:

- What do you **like** and dislike about the scenario?
- What do you want to **avoid**?
- What do you **want** to happen?
- How **desirable** is this scenario?

4 Define Actions

Ask your stakeholders what could be done to **avoid** the negative elements and **encourage** the positive elements of the scenario:

- What could be **done today** to shift the future towards or away from elements of this scenario?
- What could be done to **prepare** if it does happen?
- **Who** should be taking action?

SCENARIO 1: THE GREAT DIVIDE

One morning in July of 2038, the world witnessed a moment that would forever change the course of global connectivity. One country called for immediate restriction of data flow through all undersea cables that connect both directly or indirectly to two other countries. The decision was spurred by the discovery of a major espionage operation mediated via undersea cable landing stations, which sent shock waves across governments and industry alike. By 2045, this discovery led to the creation of separate and isolated information spheres, or connectivity 'blocs'. The global internet as the world had known it is dead.

TURNING POINT

2038 – "Cable Conflict".

TECHNOLOGY BREAKTHROUGH

Industrial-scale quantum computing technology.

CONNECTIVITY PROFILE

- Fractured network, with each country in one of three major blocs
- Dominant, state-based control over connectivity and data flow
- Regional instability
- Onerous regulatory environment

Turning Point: 'Cable Conflict' of 2038

Governments were initially baffled at the drastic action by one country to immediately restrict data flows through all undersea cables that connected both directly or indirectly to two other countries. This set off a cascade of frantic calls and negotiations as leaders sought to understand the full impact on international connectivity.

Investigations uncovered an espionage operation powered by a new breakthrough technology – an industrial-scale quantum computer. The discovery raised alarms as countries throughout the region began considering the implications. Serious questions were asked about potential foreign interference in recent national events, including elections. Accusations were made on all sides due to the lack of information available, while tensions and fears continued to rise. The dramatic shift in international connectivity caused by the unilateral restrictions on dataflows led to multi-national businesses and financial institutions reprioritising their regional presences. The 2038 cable conflict led to the formation of three 'blocs' of countries across the region, each led by a major power.

'What do I think? It's a nightmare!

Now, my business can't operate in over half of the countries in the region because of these different connectivity blocs. Half the countries, half the business, half the income! I've been in this business a long time and there's always been new regulations and laws to navigate, but unless I want to operate multiple companies in multiple different blocs using different IT systems, software, privacy and security requirements, and a ton of other things, too, I can only sell within our bloc. Our profit has plummeted, and I'm barely hanging on – I'm worried that I'll go under in a few years.'

Exporter, 56, based in Australia, giving up on working across blocs

The World in 2045: A Digitally Divided Indo-Pacific

By 2045, international cooperation has plummeted with the region fractured into three isolated information blocs. Small and medium countries were forced to choose their alignment to one of the three blocs.

Within some connectivity blocs, quantum cables with superior security and bandwidth are now standard and offer near-zero latency, increased resilience, and enhanced protection against natural disasters and cyberattacks. Satellite networks offer a secure connection for limited and restricted traffic between blocs.

However, countries outside the quantum-enabled zones have fewer new cables being installed and, in some cases, installation and maintenance has slowed almost to a complete stop. Many citizens are becoming frustrated by connection issues, increasing migration to more connected countries. This communication divide and limited information-sharing between the blocs is causing significant instability within the region, splintering economies, heightening geopolitical tensions, and making it harder to coordinate responses to international crises. Societal unrest is mounting due to highly restricted connections between blocs making it difficult for citizens to communicate between friends and family in the other blocs. Meanwhile, the digital economy is thriving between connected countries, but almost non-existent between blocs.

Harsh data localisation laws are now widespread, leading over-the-top (OTT) providers to be highly selective about where they build data centres, favouring countries with larger markets. In countries where cable services have become limited, governments have incentivised satellite network coverage, building the local network and growing their domestic economy.

All governments across the Indo-Pacific now classify undersea cable infrastructure as critical infrastructure, wielding direct sovereign control and heavy regulation of undersea cable networks. The need to protect national critical infrastructure means new cables are predominantly funded by national defence budgets and government-led investments. Regulations that govern cable protection mechanisms continue to be strengthened all around the region, leading to increasingly onerous permitting requirements for installation, repair, and maintenance of cable infrastructure.

The stricter regulatory environment reflects the heightened focus on security including in response to increased maritime activity in areas such as the South China Sea. It is now standard practice for governments to withhold information about the locations of cable assets, causing a rise in accidental damage.

Responding to sky-high expectations for uninterrupted connectivity within quantum-enabled blocs, cable operators have installed new undersea dark cables to increase redundancies and to be activated to provide a back-up when network outages occur from intra-bloc cable damage – further exacerbating the digital divide which, in turn, is entrenching economic, social, and security divides between blocs.

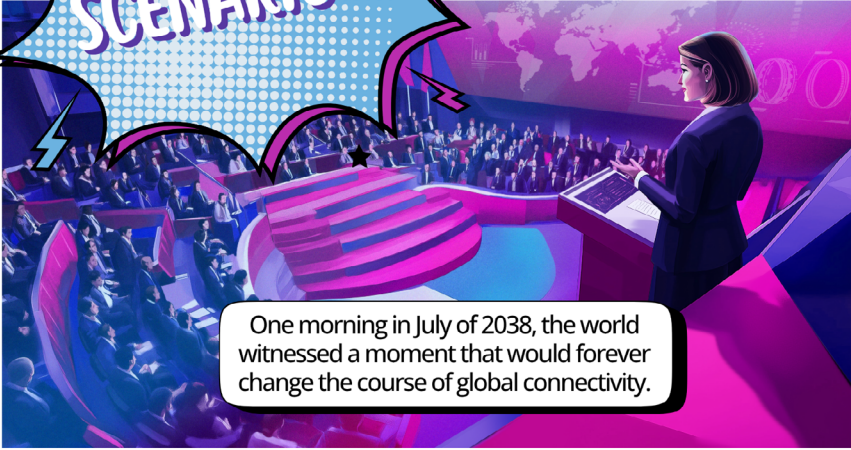
'It's strange—on one hand, we've never had better internet.

In my classroom, everything's online: instant translations, real-time simulations, AI-assisted tutoring. The students love it, and I can do so much more than I could even five years ago. Within our bloc, the connectivity is amazing – fast, stable, secure. But outside? It's a different story. My sister lives just across the border in another bloc, and we can barely stay in touch. Our calls drop constantly, messages don't get through, and half the apps we used to use are restricted now. It's hard to explain to the kids how we're living in this hyper-connected world, yet I can't even reliably talk to my own family. That part hurts. The tech is incredible – but the divisions feel deeper than ever.'

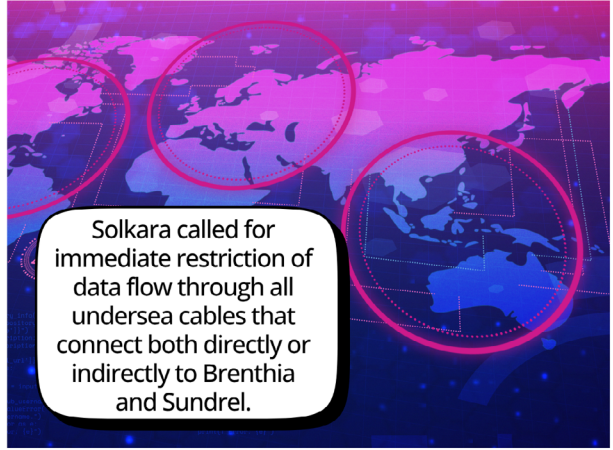
Teacher, 43, thriving at work but cut off from family across blocs

THE GREAT DIVIDE

SCENARIO 1



One morning in July of 2038, the world witnessed a moment that would forever change the course of global connectivity.



Solkara called for immediate restriction of data flow through all undersea cables that connect both directly or indirectly to Brenthia and Sundrel.



Solkara's decision was spurred by the discovery of a major espionage operation mediated via undersea cable landing stations, which sent shockwaves across governments and industry alike.



Governments were initially baffled at the drastic action by Solkara to immediately restrict data flows through undersea cables that connected directly or indirectly, to Brenthia and Sundrel.



Investigations uncovered an espionage operation powered by a new breakthrough technology, an industrial scale quantum computer.



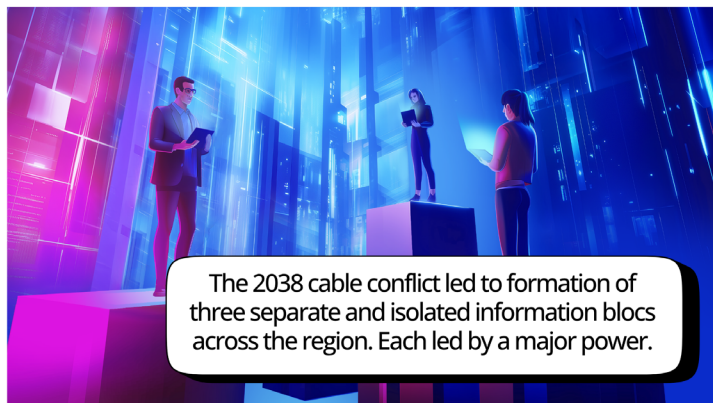
Serious questions were asked about potential foreign interference in recent national events, including elections.



Accusations were made on all sides due to the lack of information available.



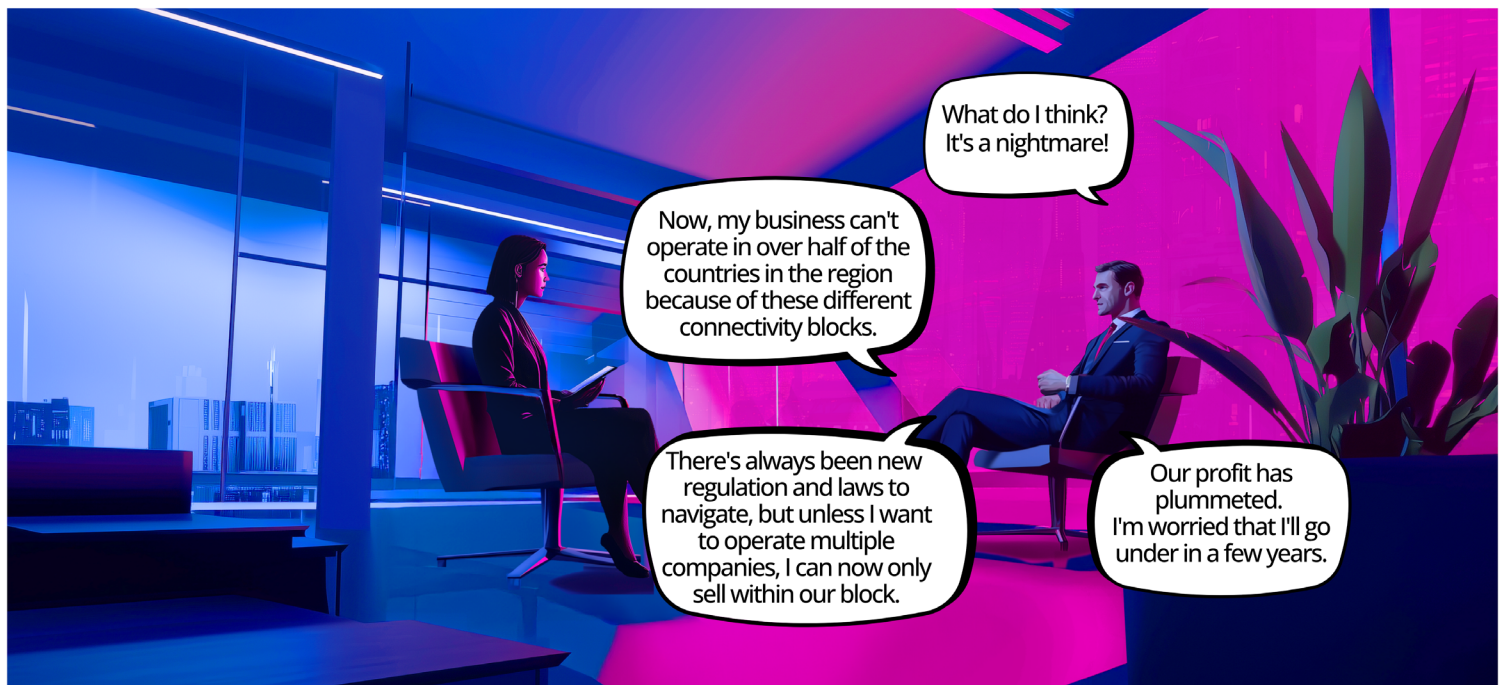
While tensions and fears continue to rise.



The 2038 cable conflict led to formation of three separate and isolated information blocs across the region. Each led by a major power.



By 2040, the global internet, as the world had known it, is dead.

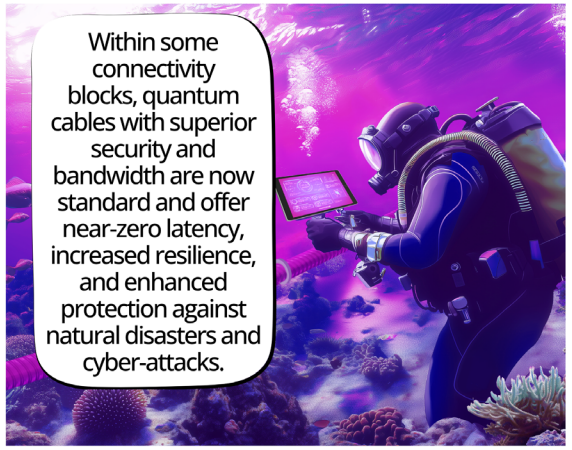


What do I think?
It's a nightmare!

Now, my business can't operate in over half of the countries in the region because of these different connectivity blocks.

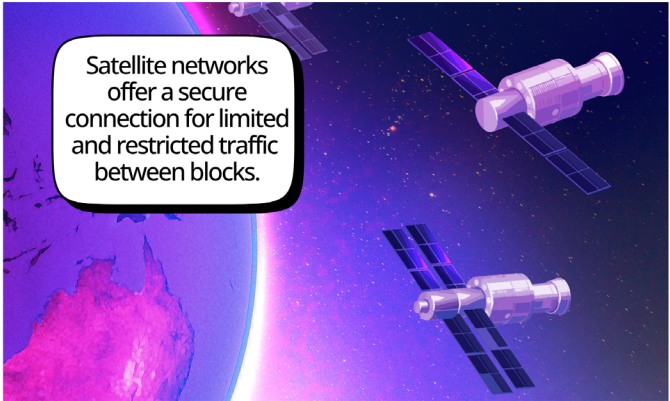
There's always been new regulation and laws to navigate, but unless I want to operate multiple companies, I can now only sell within our block.

Our profit has plummeted. I'm worried that I'll go under in a few years.

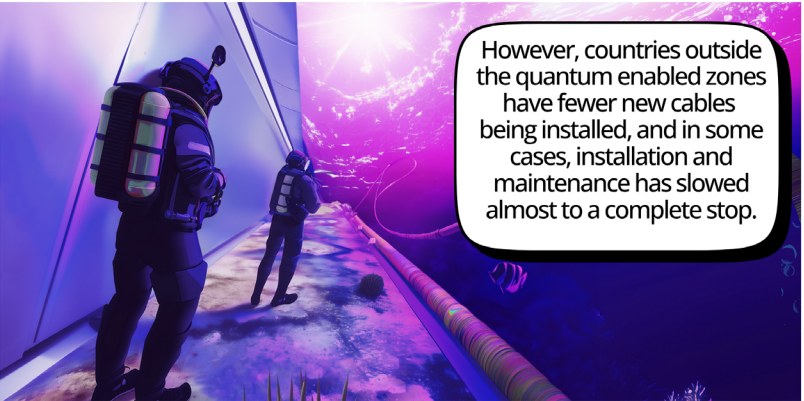


Within some connectivity blocks, quantum cables with superior security and bandwidth are now standard and offer near-zero latency, increased resilience, and enhanced protection against natural disasters and cyber-attacks.

By 2045, international cooperation had plummeted, with small and medium countries were forced to choose their alignment to one of the three blocks.



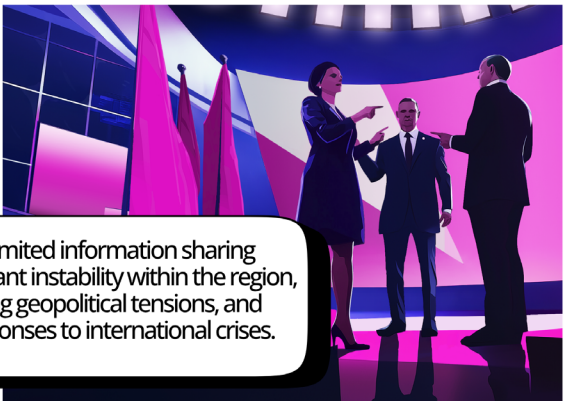
Satellite networks offer a secure connection for limited traffic and restricted traffic between blocks.



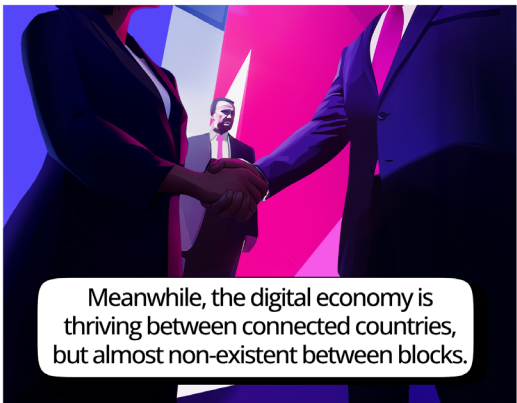
However, countries outside the quantum enabled zones have fewer new cables being installed, and in some cases, installation and maintenance has slowed almost to a complete stop.



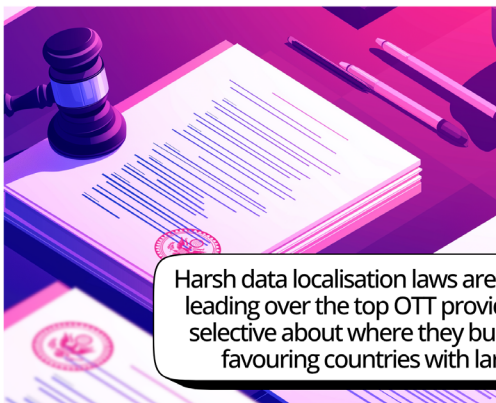
This communication divide and limited information sharing between the blocks is causing significant instability within the region, splintering economies, heightening geopolitical tensions, and making it harder to coordinate responses to international crises.



Societal unrest is mounting due to highly restricted connections between blocks, making it difficult for citizens to communicate between friends and family.

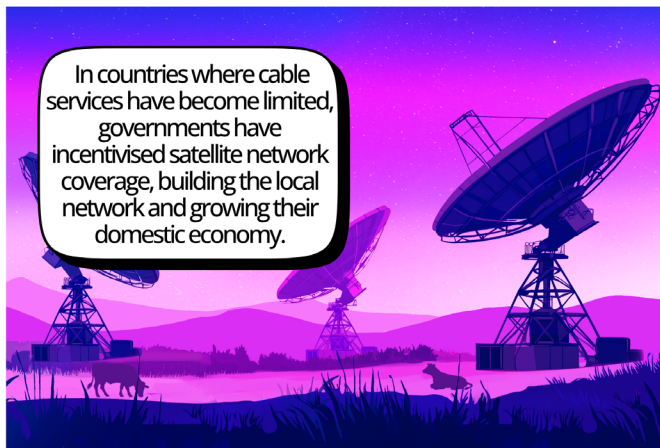


Meanwhile, the digital economy is thriving between connected countries, but almost non-existent between blocks.

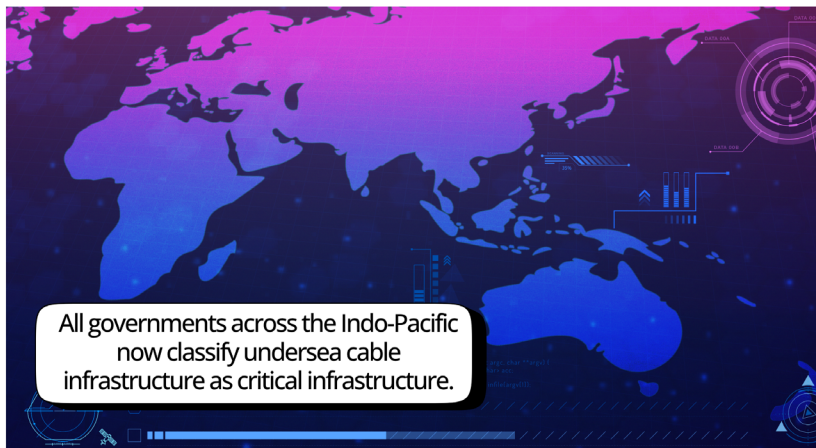


Harsh data localisation laws are now widespread, leading over the top OTT providers to be highly selective about where they build data centres, favouring countries with larger markets.

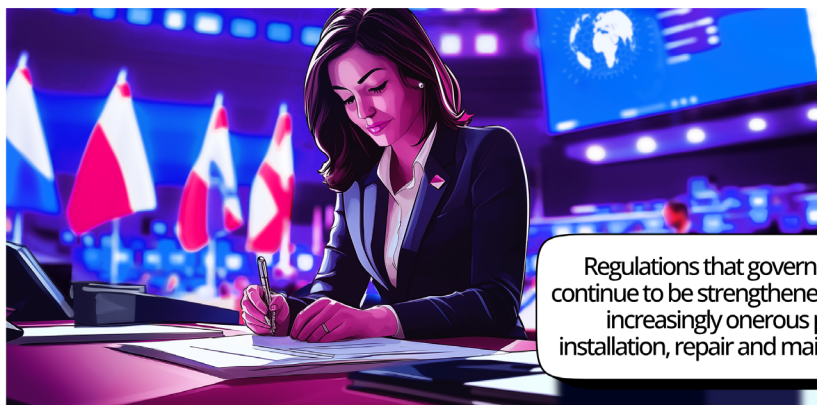




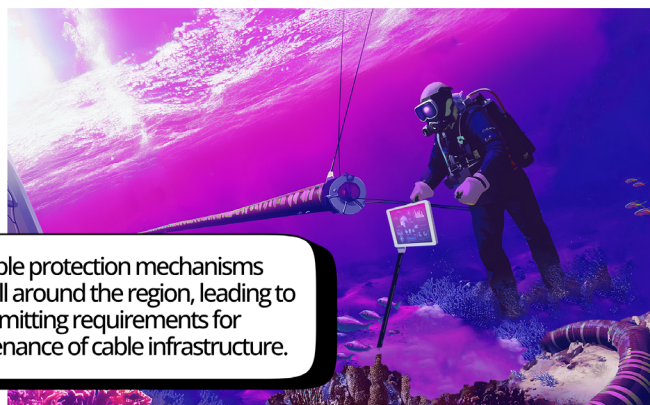
In countries where cable services have become limited, governments have incentivised satellite network coverage, building the local network and growing their domestic economy.



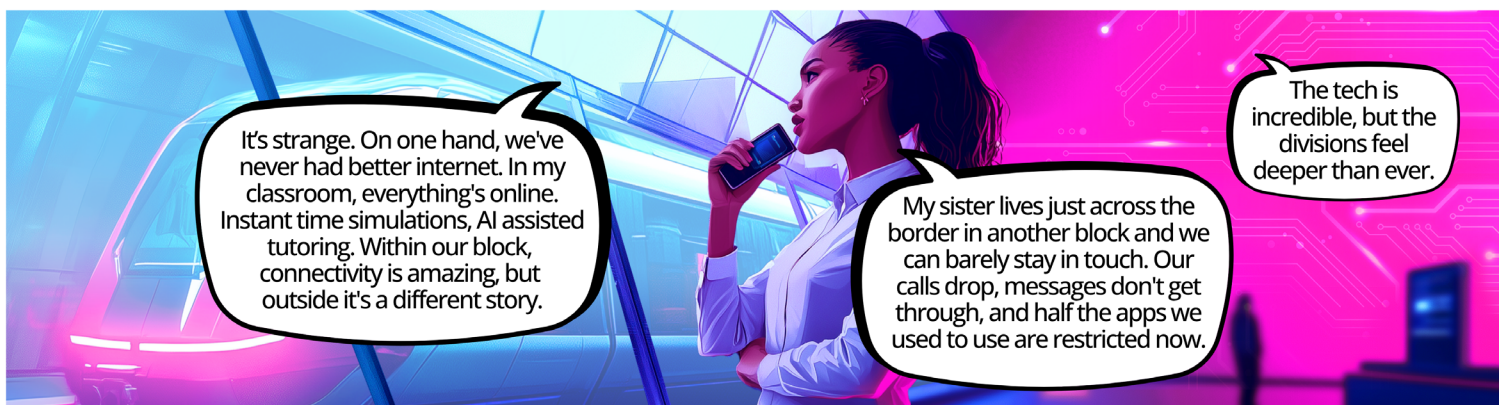
All governments across the Indo-Pacific now classify undersea cable infrastructure as critical infrastructure.



Regulations that govern cable protection mechanisms continue to be strengthened all around the region, leading to increasingly onerous permitting requirements for installation, repair and maintenance of cable infrastructure.



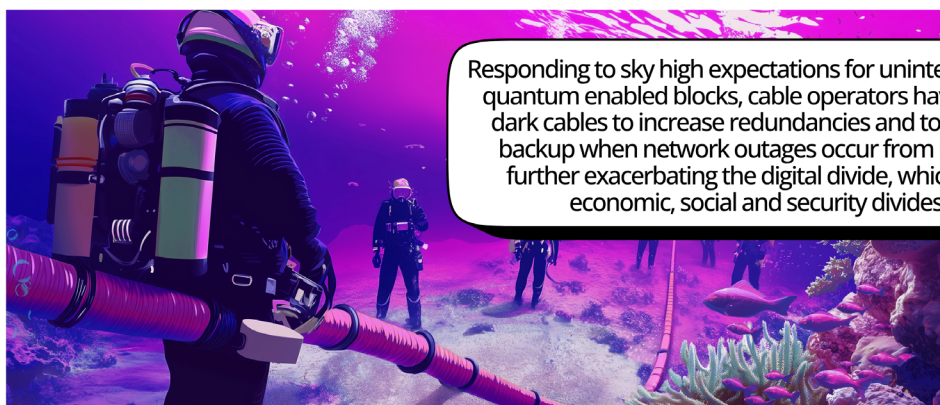
The stricter regulatory environment reflects the heightened focus on security. It is now standard practice for governments to withhold information about the locations of cable assets, causing a rise in accidental damage.



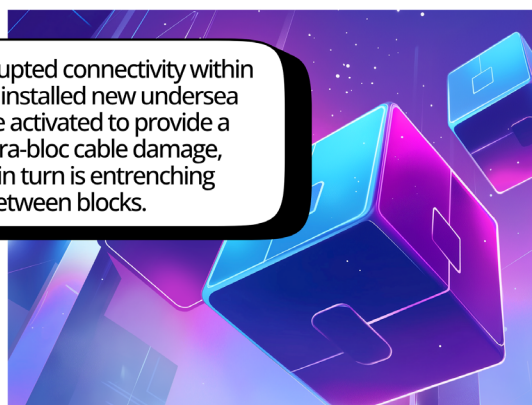
It's strange. On one hand, we've never had better internet. In my classroom, everything's online. Instant time simulations, AI assisted tutoring. Within our block, connectivity is amazing, but outside it's a different story.

My sister lives just across the border in another block and we can barely stay in touch. Our calls drop, messages don't get through, and half the apps we used to use are restricted now.

The tech is incredible, but the divisions feel deeper than ever.



Responding to sky high expectations for uninterrupted connectivity within quantum enabled blocks, cable operators have installed new undersea dark cables to increase redundancies and to be activated to provide a backup when network outages occur from intra-bloc cable damage, further exacerbating the digital divide, which in turn is entrenching economic, social and security divides between blocks.



SCENARIO 2: PLATFORM POWER

Through the 2030s, undersea cable ownership gradually moved into the hands of only a few over-the-top (OTT) providers, which have now become cable operators. Control of this essential infrastructure shifted away from telecom carriers to a small group of companies in the private sector, the 'Cable Kings'. By the 2040s, decisions about establishing and maintaining international cable connections are driven primarily by private sector interests – a country's connection quality, access, and speeds are now determined almost completely by its commercial attractiveness to cable owners.

TURNING POINT	CONNECTIVITY PROFILE
2037 – Influence of the “Cable Kings” exposed.	▪ Excellent cable connections between commercially attractive jurisdictions – “hotspots”.
TECHNOLOGY BREAKTHROUGH Cost-effective and sustainable satellite technology.	▪ Privatised connectivity (big tech) ▪ Minimal regulation ▪ Rising inequality

Turning Point: Influence of the 'Cable Kings' Exposed

Through the 2020s, the integration of cloud computing and artificial intelligence rapidly increased consumer demand for higher bandwidth and faster connection. In the 2031 annual market reports, analysts were shocked to learn that four OTT service providers had consolidated ownership and now controlled more than 60% of the global cable market – traditional consortia models had been largely replaced by single company ownership. As legacy cables were retired, governments had become increasingly reliant on OTT providers (now cable operators) to build and maintain new cable infrastructure, giving them significant influence in international diplomacy. They became known informally as the 'Cable Kings'.

In 2037, two countries were vying for a significant cable bid to establish direct connectivity with multiple surrounding jurisdictions, essentially becoming a new data hub in the region. Surprisingly, the bid was won by the country that was a less favourable location for cable end points. Strict cabotage laws, or the law that a country's domestically owned vessels must carry out repairs and maintenance within their maritime zones, were widely blamed for losing the bid, as well as lack of readily available, affordable green energy. This undersea cable deal in 2037 exposed to the world how much power had shifted to the 'Cable Kings', who could favour countries that they viewed as having 'business-friendly' cable permit laws.

Several countries in the region were left behind in the cable network boom. They were forced to rely on foreign aid from economically advanced allies, who invested in advancing satellite technology to build it as a capability that was a competitive and viable alternative to undersea cable networks. The funding boost drove significant advancements in reusable rocket technology and mass production of micro-satellite components, which led to a more cost-effective launch and maintenance of low earth orbit (LEO) satellites. New companies began to invest in research and development of satellite technology in the 2020s, which increased significantly by the 2030s as countries wanted to supplement cables connectivity with satellite connectivity for greater coverage.

The World in 2045: Commercially Driven Network Growth

'I love being part of a satellite nation!

I can do all my schoolwork, play games, video chat with my friends from school really easily. It just sucks when I try to do metaverse meet-ups with my friends overseas who have that quantum cable connection. It's so slow at our end by comparison that they just get annoyed and hang up! But it's still pretty cool to be able to see all the satellites in the sky. At night, they look like giant stars, which makes for an amazing selfie background!

School student, 15, in satellite network connected, geographically remote jurisdiction

In 2045, excellent high speed undersea cable network services are available to countries with strong markets, favourable regulatory environments, and ready access to low-cost renewable energy sources. Seventy percent of the global undersea cable infrastructure is owned by tech giants, resulting in 80% of new investments directed towards routes connecting strong economies across Asia and the United States. Across the region, operators concentrate their cable endpoints in a few countries – the United States, Indonesia, Singapore, and Australia – to reduce the cost of maintenance and energy requirements, turning them into central data hubs.

The rise of satellite networks to complement undersea cables and provide coverage in remote areas is seen as a worldwide success story. However, the digital connectivity gap continues to widen and worsen, as the 'Cable Kings' prioritise cable connectivity to commercially attractive countries while neglecting to build this infrastructure for other regions. This results in less commercially attractive countries to rely on satellites as their only way of connecting to data centres, which leads to slower connectivity speeds due to increased congestion and affect their ability to support advanced tech like smart cities and autonomous networked transport. The digital connectivity gap – lack of infrastructure to support increased demand on internet connectivity – is recognised by the United Nations as a major underlying cause of negative impacts on population health, education, and employment outcomes for people outside of core cable hotspots.

The increased reliance on cable infrastructure is leading to growing reluctance from governments of smaller economies to impose regulations on cable companies due to the fear of retaliation – such as their internet connections being deliberately slowed. Parties across the political spectrum in all countries are raising concerns about the erosion of state sovereignty and the shift in power to private companies.

Carbon emission targets are far more challenging to reach due to the energy requirements for the expected exponential growth of cable infrastructure. As such, some governments are incentivising innovation in satellite communications technology, related to the sustainability and carbon accounting of all network-related research, development, manufacturing, and operations, with sustainably produced batteries and energy sources, to reduce the amount of space debris and increase the longevity of the satellite.

'I just turned 18 and you would think I'd be excited about finally getting a right to vote.

It's true that I used to be excited about the possibility of having a say in who is elected to run our country. But what is the point in voting when it's not really governments who decide some of the most important stuff that controls how we live and talk to each other and how we access stuff we need like healthcare and transport and whatever. I wish I could cast my vote for one of the 'Cable Kings' instead. And, if I could, I'd vote for the 'Cable Kings' that are serious about finalising the full global transition to a decarbonised world economy. This is my future you are messing with.'

Frustrated teenager, 18, in a country dominated by the 'Cable Kings'

PLATFORM POWER



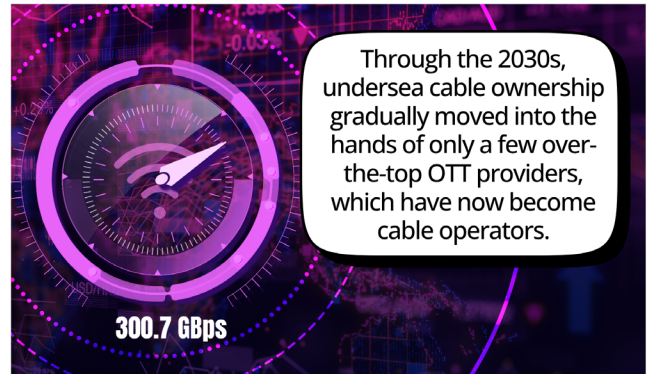
Through the 2030s, undersea cable ownership gradually moved into the hands of only a few over-the-top (OTT) providers, which have now become cable operators.



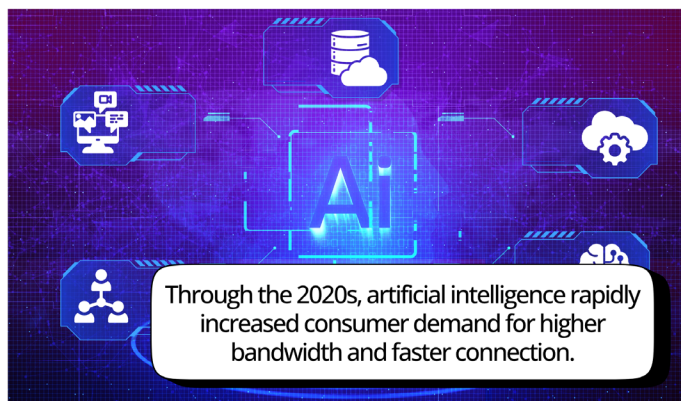
Control of this essential infrastructure shifted away from telecom carriers to a small group of large multinational technology companies.



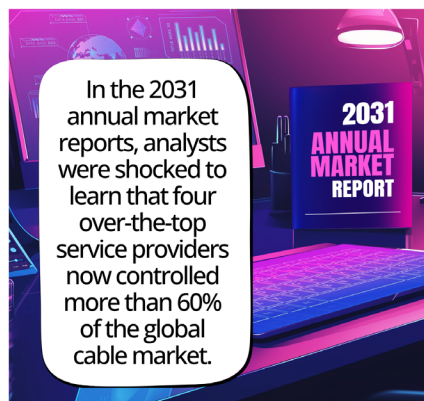
By the 2040s, decisions about establishing and maintaining international cable connections are driven primarily by private sector interests.



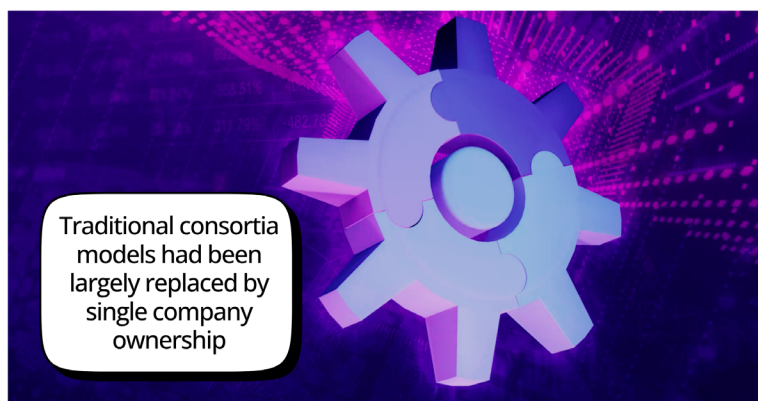
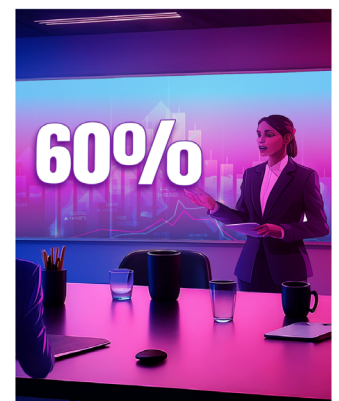
Through the 2030s, undersea cable ownership gradually moved into the hands of only a few over-the-top OTT providers, which have now become cable operators.



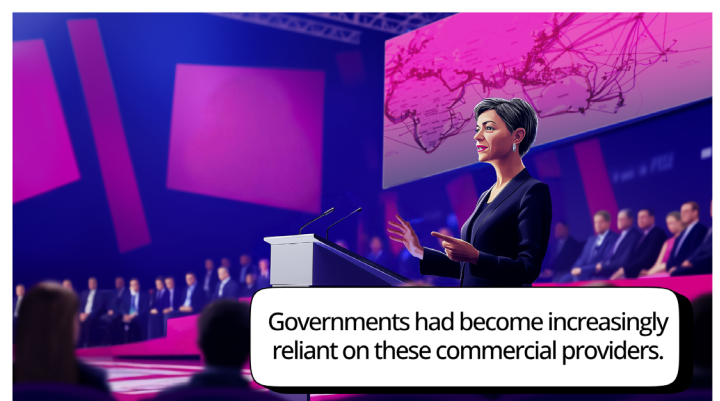
Through the 2020s, artificial intelligence rapidly increased consumer demand for higher bandwidth and faster connection.



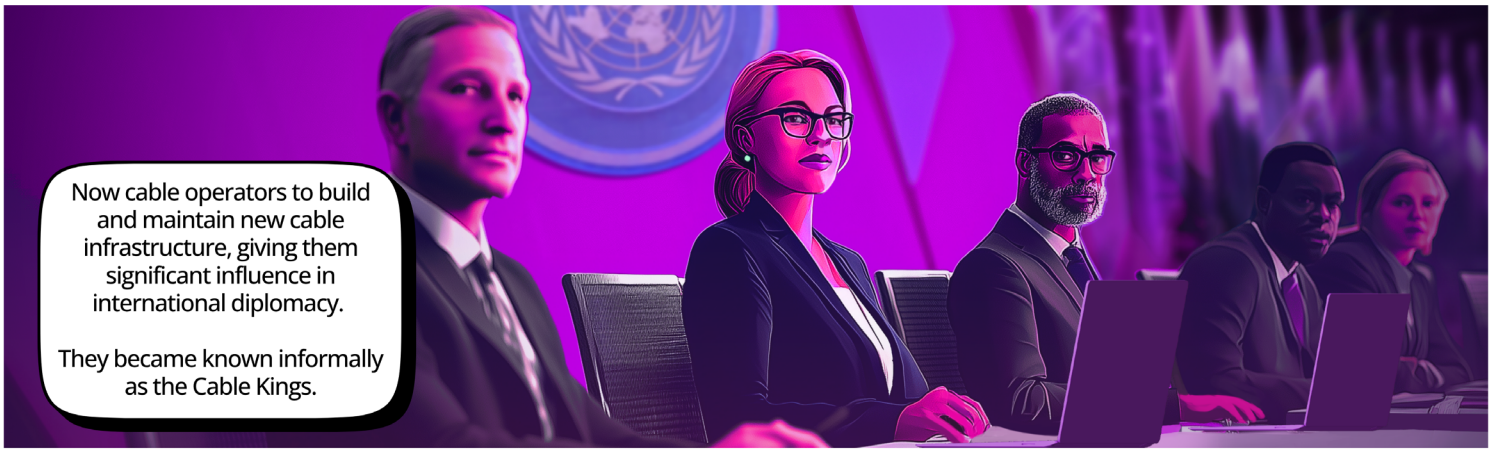
In the 2031 annual market reports, analysts were shocked to learn that four over-the-top service providers now controlled more than 60% of the global cable market.



Traditional consortia models had been largely replaced by single company ownership



Governments had become increasingly reliant on these commercial providers.



Now cable operators to build and maintain new cable infrastructure, giving them significant influence in international diplomacy. They became known informally as the Cable Kings.



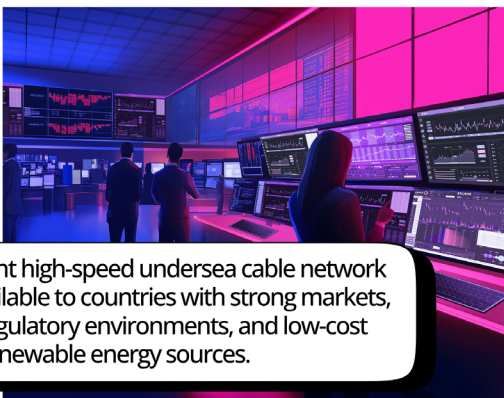
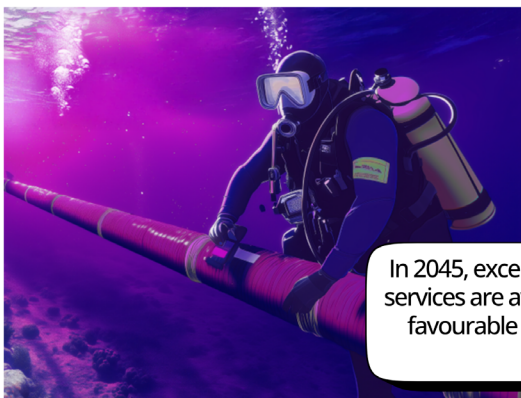
In 2037, two countries - Solkara & Brenthia - were vying for a significant cable bid to establish a new data hub in the region. Surprisingly, the bid was won by Brenthia despite it being a less favorable location for cable endpoints.



Commentators attributed Solkara's loss of the bid to its lack of affordable green energy and strict cabotage laws that require Solkara's domestically owned vessels to carry out any cable repairs within their maritime zones.

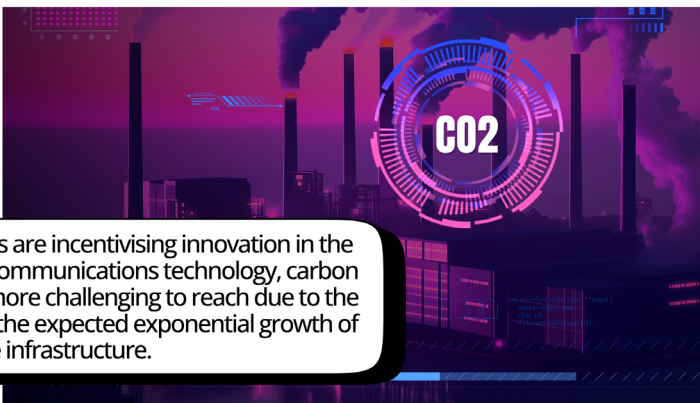
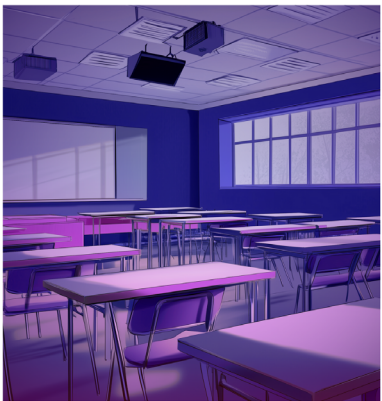
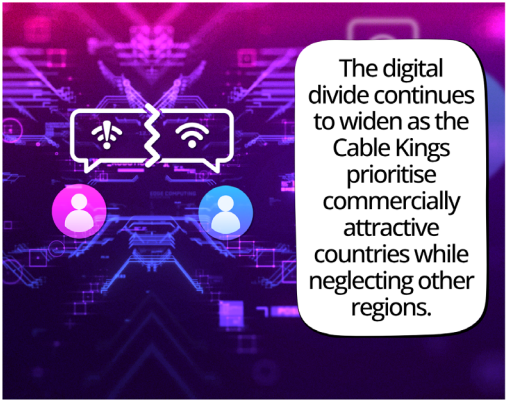
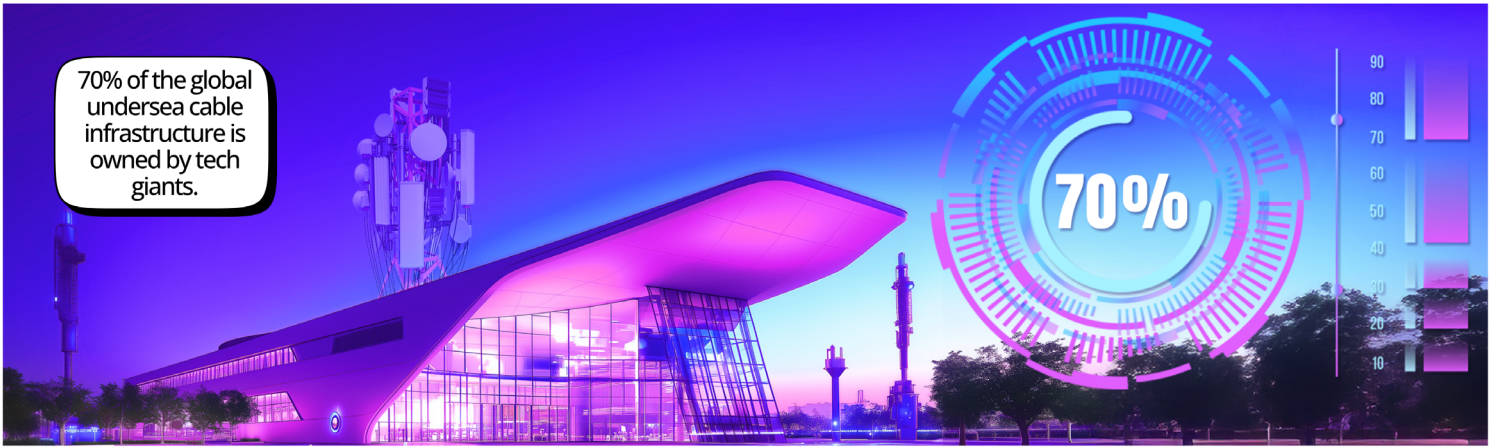


Investment in research and development of satellite technology increased during the 2030s as countries wanted to supplement cable connectivity with satellite connectivity.



In 2045, excellent high-speed undersea cable network services are available to countries with strong markets, favourable regulatory environments, and low-cost renewable energy sources.







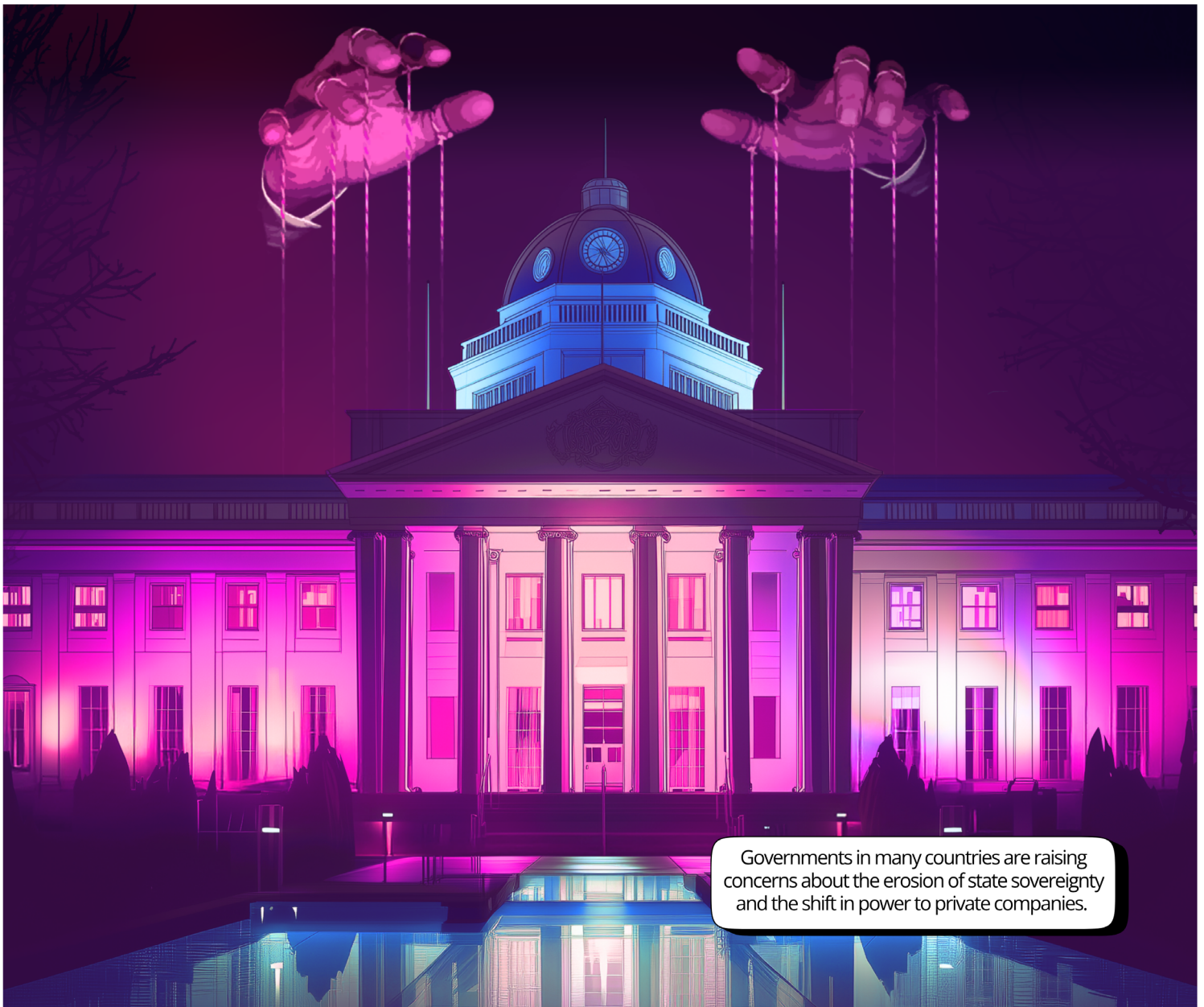
The increased reliance on cable infrastructure is leading to growing reluctance from governments of smaller economies to impose regulations on cable companies due to the fear of corporate retaliation.



I just turned 18, and you would think I'd be excited about finally getting the right to vote.



But what is the point in voting when governments are no longer the ones who decide how we live and talk to each other, and how we access health care and transport?



Governments in many countries are raising concerns about the erosion of state sovereignty and the shift in power to private companies.

SCENARIO 3: REGIONAL RESILIENCE

2030 is known as the 'year of disasters' across the Indo-Pacific. It marked a turning point for the region as it faced the consequences of escalating climate emergencies on regional connectivity, prompting countries to prioritise the resilience of undersea cables. By 2045, countries across the Indo-Pacific adopted 'Regional Resilience' as their motto for connectivity, resulting in flourishing international cooperation. However, some influential governments have begun to use the increased international trust to strengthen their power. Citizens in some countries are becoming increasingly concerned about potential government overreach into their daily lives.

TURNING POINT	CONNECTIVITY PROFILE
2030 – Year of disasters 'climate crisis'.	▪ Different quality dependent on a country's resources
TECHNOLOGY BREAKTHROUGH	
Routine automated cable maintenance by underwater repair drones.	▪ Regional cooperation is top priority ▪ Harmonised regulation ▪ Public-private co-investment

Turning Point: Climate Catastrophe Brings 'Year of Disasters'

A series of devastating climate events hit countries across the Indo-Pacific in 2030, resulting in prolonged connectivity blackouts, region-wide economic downturn, and declaration of a regional emergency. As part of a cooperative international response, governments across the region agreed to expand the International Cable Protection Committee's (ICPC) role to spearhead cable connectivity recovery efforts through the next two decades. Resilience of undersea cable infrastructure came to be seen as essential for maintaining regional stability and responding to the climate crisis.

A new climate event affected the region nearly every month in 2030. Category 5 hurricanes devastated coastal areas from the Bay of Bengal to the South China Sea, causing extensive damage to the undersea cables and their branch stations. A major undersea earthquake along the Pacific Ring of Fire triggered a tsunami that severely disrupted cable landing stations between South-East Asia and the Americas, leading to prolonged communication blackouts.

'You kids keep complaining about how high the cost of living is now, but I lived through the worst of the financial crisis in 2030 – every company was in a deficit, workers couldn't get paid, and money didn't move at all for almost a year.'

I remember spending every Sunday in the queue at the bank for hours a day just to deposit our paycheques or to withdraw money because none of our online payment systems worked. Thankfully, the international powers that be learned from that disaster and put some decent money and effort into cables resilience. Today's young people should be thankful that we won't ever have to worry about a situation like that again!

Retired senior citizen, 74, Australia

Digitally advanced countries with more cables connections only suffered brief connectivity blackouts whereas countries with fewer cable connections lost almost a year of connectivity. At the brink of reaping the economic benefits of artificial intelligence and the digital economy, the disasters of 2030 pushed regional connectivity agendas back. An international review into disaster response and recovery identified that billions of dollars and countless lives could

have been saved if connectivity had been maintained throughout the crisis. Leaders of most countries in the region came together in 2031 to discuss how to navigate the way out of the disaster and pledged that they would prioritise regional connectivity resilience.

The World in 2045: Connectivity Resilience Through Cooperation

'Regional Resilience' is now the motto across the Indo-Pacific. The ICPC is now the regional regulator – with teeth – that enforces stringent standards for cable installation, maintenance, and disaster response. Governments across the region established a new body, the Cable Consortium of Asia and the Pacific (CCAP), to coordinate international collaborative efforts to improve the resilience of undersea cable networks.

The CCAP now mandates that cable operators have comprehensive disaster preparedness plans, and use of environmentally friendly materials and technologies. Permit processing for installation of new cable connections and landings has now been streamlined into regional agreements. The region has also set, and agreed to, a guideline for monitoring and patrolling maritime areas that affect undersea cable infrastructure. However, worsening food shortages are leading to an increase in national fishing vessels illegally operating in restricted zones.

More digitally advanced governments regularly offer assistance to those with fewer resources to establish and maintain their infrastructure. Through an expanded Quad ++ network, advanced economies invest into a regional fund that aims to support connectivity and resilience for the whole region, providing much-needed support and economic incentives for private sector developments in less connected neighbouring countries, as well as fostering research and development.

Public-private co-investment in new technologies has accelerated development of self-managing cable repair systems that are highly effective at ensuring uninterrupted connectivity. Redundancy measures, such as having dark fibres and including spurs for greater connectivity reach, are now expected when building new cables. Other resilience-building initiatives such as bundling undersea power cables with data cables and expansion of satellite networks are underway – all of which helps to establish redundancy and streamline monitoring, maintenance, and repair.

Scientific research grants have facilitated several new innovations including new cable designs incorporating self-healing materials that can automatically seal minor breaks and cuts, reducing the risk of downtime. These designs include real-time monitoring using AI and autonomous underwater drones equipped with advanced sensors and repair tools perform maintenance and minor repairs without human intervention. However, use of the new drones is challenging conventional maritime law and exclusion zones, as the drones are able to move undetected in areas where conventional ships and vessels are not allowed.

'Building this cohesive international cooperation has overall been a good thing, but there is that underlying feeling that it's us against them.'

"Us" being the people that governments are there to serve and "them" being the governments, who are now working together. They say they are acting in our interests, but what's the incentive for that? The way the undersea network has developed means that your government can control your data flow and what you do and don't see online. We haven't seen the full potential of this new multi-government power structure and it would be wise to keep our decision-makers accountable for what they now control.'

Professor of Digital Transformation, Leading National University, 52, USA

Yet, even with the heightened regional cooperation, digitally advanced governments throw their weight around through the ICPC. Competition to offer development assistance for state-of-the-art submarine cable and satellite packages is common and countries seeking to bridge the digital divide to boost bilateral trade and relationships are often used as pawns. There is also growing concerns among civil rights groups about the consolidation of power and data by governments.

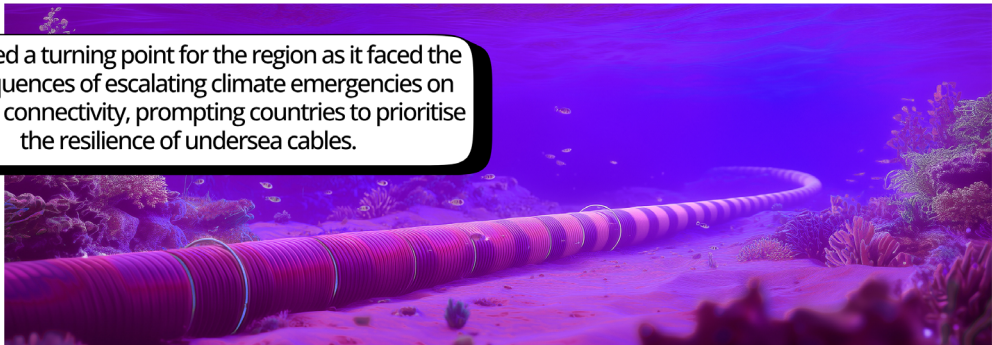


REGIONAL RESILIENCE

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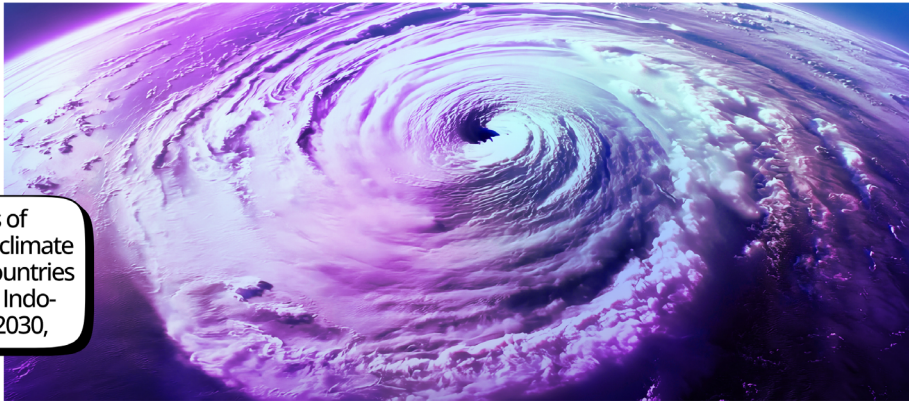
However, some influential governments have begun to use the increased international trust to strengthen their power.

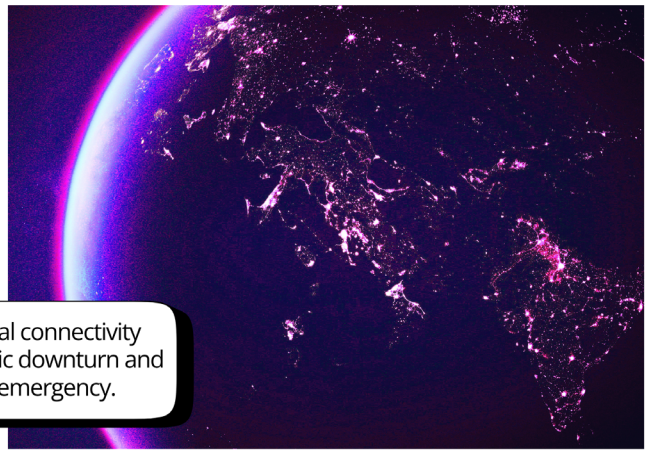
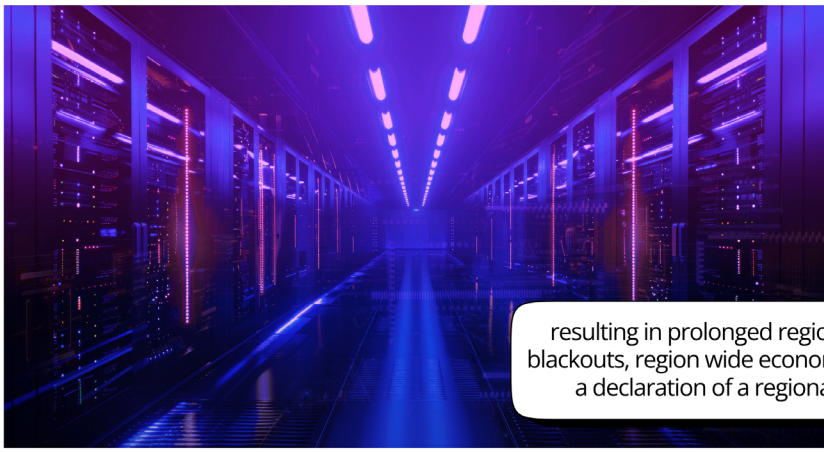


Citizens in some countries are becoming increasingly concerned about potential government overreach into their daily lives.



A series of devastating climate events hit countries across the Indo-Pacific in 2030,





resulting in prolonged regional connectivity blackouts, region wide economic downturn and a declaration of a regional emergency.



As part of a cooperative international response to the emergency, governments across the region agreed to expand the International Cable Protection Committee's (ICPC) role to spearhead cable connectivity recovery efforts through the next two decades.



Dubbed the 'year of disasters', 2030 brought a new devastating climate event affecting the region nearly every month.



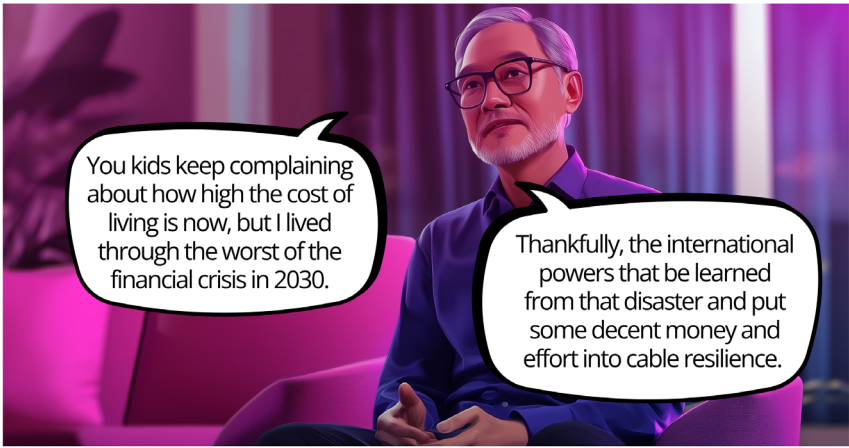
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In 2045, the ICPC is now the regional regulator that enforces stringent standards for cable installation, maintenance and disaster response.



CCAP

Cable Consortium of Asia and the Pacific

Governments across the region established a new body, the Cable Consortium of Asia and the Pacific (CCAP) to coordinate international collaborative efforts to improve the resilience of undersea cable networks.



EMERGENCY PLAN



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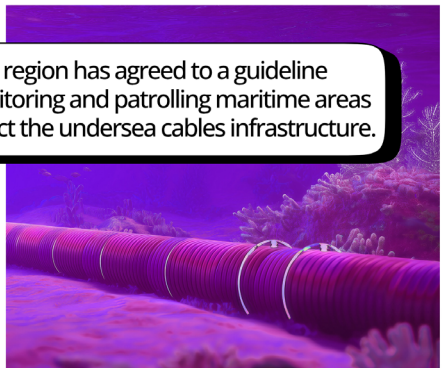
ENVIRONMENT FRIENDLY MATERIALS & TECHNOLOGY



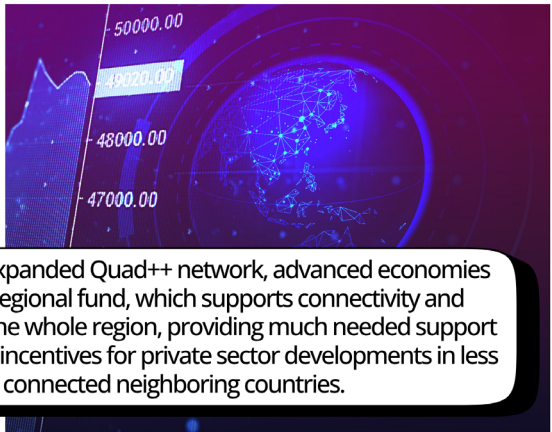
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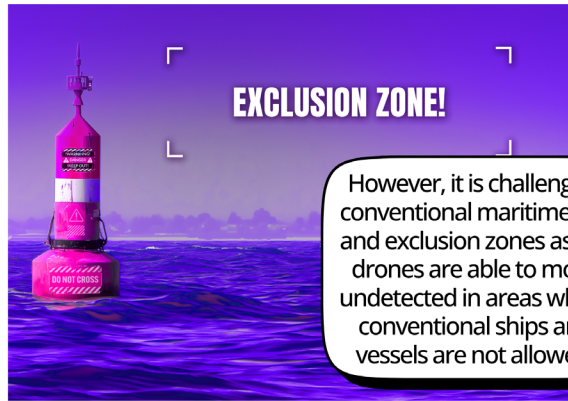
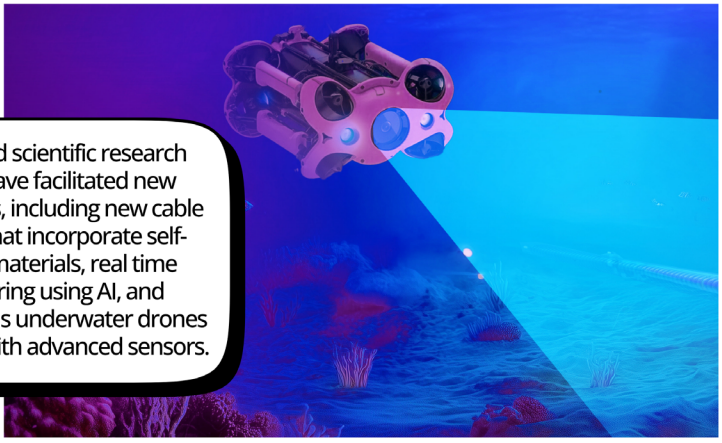
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Through an expanded Quad++ network, advanced economies invest in a regional fund, which supports connectivity and resilience for the whole region, providing much needed support and economic incentives for private sector developments in less connected neighboring countries.

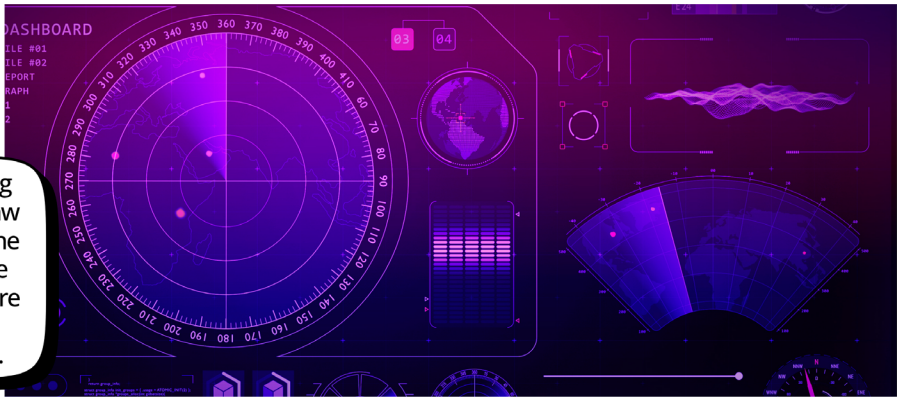


Supported scientific research grants have facilitated new innovations, including new cable designs that incorporate self-healing materials, real time monitoring using AI, and autonomous underwater drones equipped with advanced sensors.

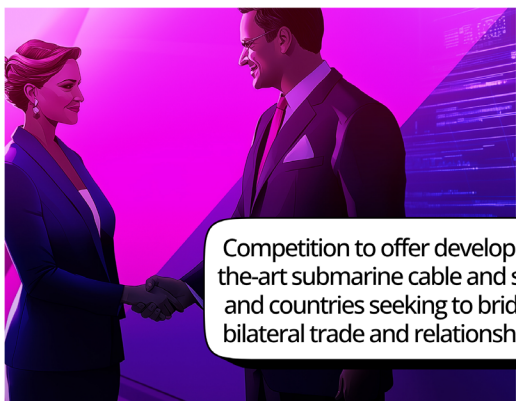


EXCLUSION ZONE!

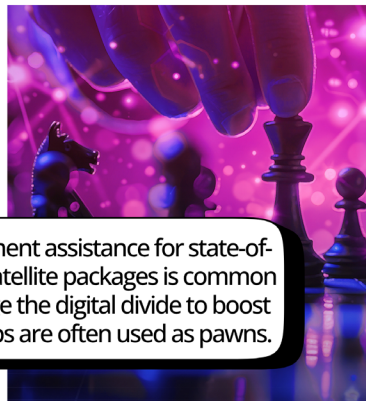
However, it is challenging conventional maritime law and exclusion zones as the drones are able to move undetected in areas where conventional ships and vessels are not allowed.



Yet, digitally advanced governments still throw their weight around through the ICPC.



Competition to offer development assistance for state-of-the-art submarine cable and satellite packages is common and countries seeking to bridge the digital divide to boost bilateral trade and relationships are often used as pawns.



There is also growing concerns among civil rights groups about the consolidation of power and data by governments.



The way the undersea network has developed means that your government can control your data flow and what you do and don't see online.



We haven't seen the full potential of this new multi-government power structure and it would be wise to keep our decision maker accountable for what they now control.

APPENDIX 1: STAKEHOLDERS CONSULTED

Table 1. Summary of stakeholders consulted through three workshops across the Indo-Pacific and QUAD member countries (Australia, Japan, United States, and India).³

Attendee's Country	Government	State-owned Entities	Industry	Civil Society	Total
South-East Asia Workshop	13	1	9	10	33
Hong Kong	-	-	1	-	1
Indonesia	1	-	-	1	2
Malaysia	3	-	-	1	4
Philippines	2	-	-	-	2
Singapore	3	-	7	5	15
Timor-Leste	2	-	-	-	2
Vietnam	2	1	-	-	3
New Zealand	-	-	1	-	1
United States of America	-	-	-	3	3
South Asia Workshop	6	-	3	1	10
India	3	-	2	1	6
Sri Lanka	1	-	1	-	2
Maldives	1	-	-	-	1
Japan	1	-	-	-	1
Pacific Islands workshop	12	3	9	5	29
Cook Islands	-	-	-	1	1
Fiji	3	-	1	-	4
New Caledonia	1	-	-	-	1
Palau	1	1	-	-	2
Papua New Guinea	2	-	-	-	2
Singapore	-	-	1	1	2
Solomon Islands	2	1	-	-	3
Timor-Leste	1	-	-	-	1
Tonga (Kingdom of)	1	-	-	-	1
Tuvalu	1	1	-	-	2
Australia	-	-	7	3	10
TOTAL	31	4	21	16	72

³ Some attendees across three workshops have been excluded from the table summary: 11 facilitators (staff from TPDC, Futures Hub, and Tech for Good Institute) and eight staff from the Australian Government Department of Foreign Affairs and Trade.

APPENDIX 2: METHODOLOGY

Draft scenarios were developed using publicly available information, then tested for plausibility and desirability at three workshops held across the region in Singapore, New Delhi (India), and Melbourne (Australia) with 72 government, industry, and civil society stakeholders (Appendix 1, Table 1) from:

- South-East Asia
- South Asia
- Pacific Island countries (Blue Pacific Continent)
- Quad nations – Australia, United States, India, and Japan

Each of the three draft scenarios was designed to test current tensions in the international undersea cables ecosystem (Table 2, see next page). Through discussions at the workshops, stakeholders explored the future scenarios from their personal and professional point of view, discussing how plausible they are, their advantages and disadvantages, and how these scenarios can be refined.

In their table groups, workshop participants were asked to reach a consensus in their group on the score for the scenario they discussed using the following scales:

Plausibility

Impossible 1	Possible 2	Plausible 3	Likely 4	Inevitable 5
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Desirability

Least 1	2	3	4	5	6	7	8	9	Most 10
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Workshop discussions also addressed broad research questions:

- What does optimal connectivity in the future mean for different sub-regions?
- What kind of undersea cable infrastructure are we going to need to support connectivity needs in 2045, considering projected growth in demand and other network technology solutions (such as satellite networks)?
- What do governments in the region need to do between now and 2045 to work with the private sector and encourage investment in the network?

Outcomes from workshop discussions were used to:

1. Refine the scenarios to improve plausibility; reduce distractions aimed at providing the best possible content for stimulating discussions with a wide range of government and industry stakeholders.
2. Develop guidance on usage of the scenarios by policymakers in future-facing discussions to identify possible practical policy interventions, engagement, and collaboration for government and industry to meet the region's future connectivity needs across the Indo-Pacific.
3. Develop actionable preliminary recommendations for the Australian Government, governments across the Indo-Pacific region, and private sector stakeholders in undersea cables.

In this report we present key research findings from the outcomes of workshop discussions, the policymakers' toolkit with the refined future scenarios and guidance on their use, and policy recommendations for governments and industry across the Indo-Pacific.

The report underwent expert review before it was finalised for publication by Dr Ryan Young, Elina Noor, Dr Ming Tan, Alan Mauldin, Paul McCann, and John Hibbard (details of their affiliations are provided on page 2).

APPENDIX 3: DATA TABLES

Data tables provided in this appendix provide greater detail about the analysis of scoring data collected at the regional workshops, and support the key findings and recommendations presented in the report.

Table 2. Analysis of desirability scores* for three future undersea cables scenarios determined by stakeholders from South-East Asia, South Asia, and the Blue Pacific Continent in three regional workshops.⁴

	Scenario 1: The Great Divide	Scenario 2: Platform Power	Scenario 3: Regional Resilience
Average Desirability Score	2.4	4.3	7.0
Median Desirability Score	2.5	4.8	7.5
Mode Desirability Score	3.5	5	8
Range of Desirability Scores	1–3.5	2.5–6	4–8

Table 3. Analysis of plausibility scores for three future undersea cables scenarios determined by stakeholders from South-East Asia, South Asia, and the Blue Pacific Continent in three regional workshops.⁵

	Scenario 1: The Great Divide	Scenario 2: Platform Power	Scenario 3: Regional Resilience
Average Plausibility Score	2.3	3.1	3.2
Median Plausibility Score	2.3	3.3	3.5
Mode Plausibility Score ⁶	2 – Possible (3 of 6)	N/A	4 – Likely (4 of 10)
Range of Plausibility Scores	2–3	1–5	1.5–4

4 The analysis in Tables 3 and 4 was determined from six scores each for Scenario 1 and Scenario 2, and 10 scores for Scenario 3.

5 Plausibility was scored on a 5-point scale from Impossible (1) to Inevitable (5). See Appendix 2 for further information on methodology.

6 For Scenarios 1 and 3, the number of times the score was reported and the total scores received are indicated in parentheses. For example, the score of 2 (Possible) was given to Scenario 1 three times out of a total of six scores through the project. The mode cannot be determined for Scenario 2 as there were six unique scores, hence there was no one score that occurred at the highest frequency.

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