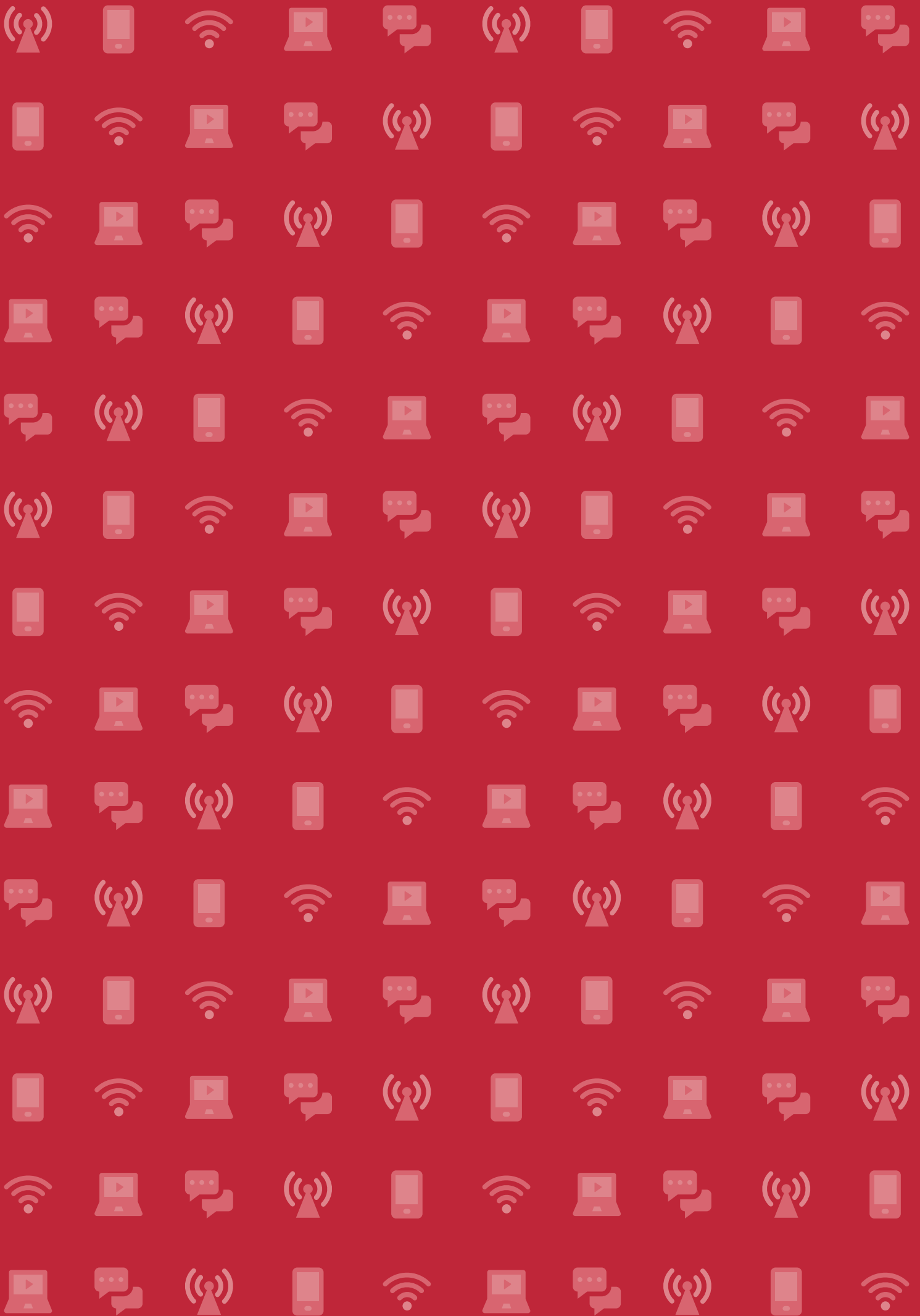


Discussion Paper No. 18

Understanding the Regulatory Environment for ICT Infrastructure in Papua New Guinea: The Coral Sea Cable System (CS2) Case Study

by Muhammad Nidhal





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Case Study**

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GLOSSARY

APEC:

Asia-Pacific Economic Cooperation

APNG:

Australia Papua New Guinea

ASN:

Alcatel Submarine Networks

BRI:

Belt and Road Initiative

BU:

Branch Unit

CoST:

Construction Sector Transparency Initiative

CS2:

Coral Sea Cable System

DFAT:

Department of Foreign Affairs and Trade

DICT:

Department of Information and Communications Technology

DSR:

Digital Silk Road

Exim Bank:

Export-Import Bank

GDP:

Gross Domestic Products

ICT:

Information and Communication Technology

ICSI:

Investment Corporation of the Solomon Islands

IDS:

Infrastructure Data Standards

ITU:

International Telecommunications Union

km:

Kilometer

KSCN:

Kumul Submarine Cable Network

m:

Meter

MoU:

Memorandum of Understanding

MTDP:

Medium Term Development Plan

NEC:

National Executive Council

NICTA:

National Information and Communication Technology Authority

NIS:

National Integrity System

NPC:

National Procurement Commission

OGP:

Open Government Partnership

PGK / K:

Papua New Guinea Kina

PIC:

Pacific Island Country

PNG:

Papua New Guinea

PPC-1:

PIPE Pacific Cable 1

RTI:

Right to Information

SIDN:

Solomon Islands Domestic Network

SINPF:

Solomon Islands National Provident Fund

SISCC:

Solomon Islands Submarine Cable Company Limited

SOE:

State-Owned Enterprise

UN:

The United Nations

UNDP:

United Nations Development Programme

UNESCAP:

United Nations Economic and Social Commission for
Asia and the Pacific

US:

The United States

EXECUTIVE SUMMARY

Over the past decade, digital connectivity has emerged as a critical new form of infrastructure, akin to roads, energy or ports—underpinning economic growth and social development. In Papua New Guinea (PNG), the advent of digital connectivity has opened up new avenues for communication, commerce, education, and governance. Indeed, the introduction of the internet in PNG nearly three decades ago (1997), has accelerated the country's digitization efforts.

However, despite the PNG government's digital infrastructure strategies, broadband access—both fixed and mobile—remains limited in Papua New Guinea. ITU (the International Telecommunications Union) recorded that only 32% of PNG's total population used the internet in 2021, in contrast with an Asia Pacific average of 60%.

This also stands in contrast with PNG's rising strategic profile. As a result of its geographical location, abundant natural resources, and a reliance on international investments, PNG has become valuable to many countries with interests in the region. In turn this has resulted in growing geopolitical tensions between global powers, particularly between Australia and China. This is evident in the laying of the latest international subsea cable—the Coral Sea Cable System (CS2).

The CS2 is a significant telecommunications infrastructure initiative connecting Australia, PNG, and the Solomon Islands. The project involves a 4,700 km fiber-optic subsea cable that links both PNG and Solomon Islands to Australia. Its purpose is to deliver faster, more affordable, and reliable internet connection to both PNG and the Solomon Islands. In turn, it is expected that the CS2 will support PNG and the Solomon Islands' further integration into the global marketplace through the development of entrepreneurship improved digital skills and enhanced information sharing between the three countries.

Australia, through the Department of Foreign Affairs and Trade (DFAT), has been a major contributor to the project, contributing two-thirds of the financing, with PNG and the Solomon Islands equally sharing the remaining one-third. As the major contributor, Australia selected Australian-based Vocus and French-based ASN (Alcatel Submarine Networks) to construct and install the fiber cables.

However, in spite of the relative success of the project, there have been reports of significant challenges, including concerns about the financial terms of the agreement, security and transparency issues, and the geopolitical implications of major powers' interest in the Pacific region.

This paper explores these issues in more detail, before providing final recommendations and lessons learned in the context of the Coral Sea Cable System project, with a specific focus on PNG. Key recommendations include:

- The PNG government should legislate for a Right to Information Law to promote transparency and accountability in public project management.
- The government and the public should take into consideration prospective partners' standards for governance and transparency when deciding who to collaborate with in these types of infrastructure projects.
- Donors or financiers of infrastructure development projects should insist that the government and other recipients publish relevant information to the public as part of the funding arrangements.
- The pooling of human and financial resources at a regional and sub-regional level will result in enhanced broadband connectivity.
- A sub-regional intergovernmental platform for effective coordination and cooperation in the development and delivery of ICT projects in the Pacific should be developed.

Going forward, ongoing monitoring and evaluation will be critical to ensuring the project's continued success and addressing any issues that may arise during its operation.

BACKGROUND

“Policy direction on ICT infrastructure development is further shaped by the National ICT Roadmap 2018, Digital Transformation Policy 2020, Connect PNG Act 2021, and the Digital Government Plan 2023-2027.”

In today's modern world, access to fast and reliable digital connectivity infrastructure is critical, underpinning both economic growth and social development. In PNG, such growth has historically been compromised by poor take-up rates and quality concerns. In turn, this has impacted on opportunities for improved communication, commerce, education and governance.

Hence, in 2010, the government of PNG introduced the Medium Term Development Plan (MTDP) approach—a five year rolling development plan providing a clear, accountable plan for investment in sector policies, including the Information and Communication Technology (ICT) sector. The MTDP is guided by the

PNG Development Strategic Plan 2010–2030 and the PNG Vision 2050 in the context of national and economic development frameworks.

Policy direction on ICT infrastructure development is further shaped by the National ICT Roadmap 2018, Digital Transformation Policy 2020, Connect PNG Act 2021, and the Digital Government Plan 2023-2027. The long term objective centers around the improvement of national ICT services through extensive infrastructure upgrades and improvements in internet speed, penetration, stability, and accessibility.

Key to this effort was the deployment of robust fiber optic cables to upgrade the national network and expand high-speed internet services. The project consisted of two components, implemented concurrently under different financing and implementation arrangements, namely the Australian-backed international Coral Sea Cable System (CS2) and the Chinese-backed domestic Kumul Submarine Cable Network (KSCN). These dual cable projects aim to alleviate the high cost of local internet access and enhance the capacity for domestic data transmission whilst ensuring international connectivity (INA, 2022).

The surge in large-scale critical infrastructure projects recognize PNG's rising strategic profile and its inherent leadership potential in a region that has been rapidly rising up the international agenda (Graham, 2023). PNG's growing importance is also underscored by its strategic location and sizeable population of over 11 million inhabitants (National Statistical Office, 2023). It is also the largest island in the Pacific Island Country (PIC) region and constitutes the largest of Australia's own first island chain. It's not just the closest country to Australia's mainland but it shares an 820-kilometer land border with Indonesia, and is the hinge between Southeast Asia and the southwest Pacific (Graham, 2023; Natanegara et al., 2023).

PNG's abundant natural resources and access to important sea routes further elevate its geopolitical significance. Moreover, the country relies most of its infrastructure development on foreign investments, attracting international interests and has resulted in growing frictions between global powers in the region, particularly between Australia and China (Nangoi, 2021).

In 2018, the Solomon Islands awarded a contract to Chinese-owned Huawei to build an underwater telecommunication cable network that would connect Honiara (Solomon Islands) and Port Moresby (PNG) to Sydney's (Australia) fiber optic cable infrastructure. This prompted security concerns by the Australian government, who then intervened and offered to jointly fund the construction of the cable, with Australia providing the majority of the financing (Remeikis, 2018).

Against this background, the purpose of this case study is to understand the governance, financing, and implementation arrangements of the CS2 project, with a particular focus on any technological, geopolitical, and socio-economic implications for PNG.

By doing so, the study seeks to collect information relating to PNG's public infrastructure projects within the ICT sector, whilst illustrating the current regulatory environment within which ICT projects are planned, pursued, and procured in PNG.

Transparency and accountability issues are a particular focus of the analysis, evaluating the overall governance of the project. Equally important, the study also provides practical recommendations for future projects in PNG and beyond.


PROJECT OVERVIEW

Project Highlights

Stretching approximately 4,700 kilometers of undersea cable, the CS2 connects both Port Moresby, PNG and Honiara, Solomon Islands to the major East Coast Internet Hub in Sydney, Australia. CS2 replaced the recycled Australia Papua New Guinea (APNG)-2 cable, which was decommissioned in February 2021 (Horst & Foster, 2023). The transition from the APNG-2 cable to the CS2 involved a shift from an analog coaxial copper cable to the newer fiber optic cable, resulting in a significant increase in data capacity of up to 20 terabits—20,000 times the capacity of the previous APNG-2 system (Solomon Business Magazine, 2018).

It is expected that the CS2 will support PNG and the Solomon Islands’ development of entrepreneurship and digital skills, and their further integration into the global marketplace. In turn, improved internet access and connectivity may translate into additional GDP of more than US\$5 billion and close to 300,000 additional jobs in the Pacific by 2040 (DFAT, 2018a). Table 1 provides a summary of the design of the project.

Table 1.
Project Design of the Coral Sea Cable System

	Owner(s)
	The Coral Sea Cable Company, with equal shareholding by The Commonwealth of Australia, PNG DataCo, and SISCC
Project location (landing points)	Sydney, Australia – Honiara, Solomon Islands – Port Moresby, PNG
Project announcement year	2017
Ready for service year	2019
End of service year	2044
Project cost	AUS\$137 million (K324 million or US\$93 million)
Length (km)	4,700
Design Capacity (Tbps)	20
Fiber Pairs	4
Wavelengths per Fiber Pair	100
Capacity per Wavelength (Gbps)	100
System Supplier	Alcatel Submarine Networks and Vocus Communications
System Installer	Alcatel Submarine Networks

Source: Compiled from Submarine Telecom Forum (2023), DFAT (2018a)

The stated aim of the CS2 project is to deliver faster, more affordable, and reliable internet connections to both PNG and the Solomon Islands (GHD, 2018). Moreover, the CS2 seeks to enhance information sharing and bolster relations between the three countries (BRI Monitor, 2021). Prior to the CS2, only 11–12% of the populations of PNG and the Solomon Islands had internet access (2017 estimates). These low rates of take-up reflected, in part, the constraints of the technological infrastructure being used at the time.

For example, at the time, PNG had two international submarine fiber-optic cable connections to Australia. These cables were the APNG-2 submarine—operational since 2006 and providing 1.12 gigabits/sec—and the PNG Spur of the PPC-1 cable—which offered 10 gigabits/sec after its completion in 2009. The CS2 provides capacity 20 times higher than the latter (Global Infrastructure Hub, 2020).

The Solomon Islands on the other hand, had been reliant on satellite links for international telecommunications connectivity, which is expensive and provides limited bandwidth capacity (UNESCAP, 2019). Table 2 below sets out the project timeline of the CS2 project, from its public announcement in 2017, to its operational commencement in 2020.

Stretching approximately 4,700 kilometers of undersea cable, the CS2 connects both Port Moresby, PNG and Honiara, Solomon Islands to the major East Coast Internet Hub in Sydney, Australia.

Table 2.
Coral Sea Cable System Project Timeline

Date	Description
November 2017	Public announcements made on the project
December 2017	Vocus contracted to scope out the design, construction and procurement of the CS2
June 2018	Project commenced through a trilateral MoU on funding arrangements between Australia, PNG, and the Solomon Islands
September 2018	Finalized design with lock down of options
February 2019	Ground-breaking ceremony
March 2019	Completed physical survey of planned cable route
September 2019	Completed manufacture and assembly of power feed equipment, cable, repeaters and branching unit
October 2019	Completed lay of the cable
December 2019	Systems commissioned
February 2020	Start of commercial operations in PNG and the Solomon Islands

Source: Compiled from several sources, including Global Infrastructure Hub (2020) and Horst & Foster (2023), processed by authors.

Project History

The CS2 project was initially awarded by the Solomon Islands to the Chinese telecommunications giant Huawei Technologies in mid-2017. However, due to geopolitical concerns, the Australian government intervened and announced that it would jointly fund an alternative proposal by the Australia-based Vocus Group.

The project shift was due to Australian Government concerns about the potential security risks of having a Chinese company involved in such critical infrastructure (Hutchens, 2018; Hundt, 2020).

The CS2 project was initially awarded by the Solomon Islands to the Chinese telecommunications giant Huawei Technologies in mid-2017. However, due to geopolitical concerns, the Australian government intervened and announced that it would jointly fund an alternative proposal by the Australia-based Vocus Group.

As a result, at the 2017 Asia-Pacific Economic Cooperation forum in Vietnam, the PNG Government and the Australian Government agreed to commit to lay a new high-speed optic cable (Malcom Tunrull, 2017). This commitment was further enhanced during the 2018 Asia Pacific Economic Cooperation (APEC) Ministerial Meeting on the theme of “Harnessing Inclusive Opportunities, Embracing the Digital Future.”

The PNG government then decided to join a trilateral MoU with Australia and the Solomon Islands, signed in June 2018, to co-finance the construction and installation of the Coral Sea Cable System (CS2) (APEC, 2018; DFAT, 2018b). This intervention shifted the earlier deal with China-led Huawei to Australian-led Vocus and took place during a time of escalating tensions between the United States (US) and China, with the digital domain, including undersea networks, emerging as a key security arena between the two global powers.

Box 1. The Coral Sea Cable in the Context of China’s Regional Interests

China’s interest in international submarine projects in the Pacific, to some extent echoes the BRI (Belt and Road Initiative) agenda—a Chinese-led global infrastructure development and trade strategy. As part of the BRI, China’s Digital Silk Road (DSR) targets developing countries such as those in the Pacific Islands to bolster their commercial and technological capabilities (Hillman, 2021). Notably, PNG was the first Pacific Island Country (PIC) to engage in an MoU and cooperation plan for jointly constructing the BRI with China (CGTN, 2023).

The DSR presents a pathway for Chinese technology firms, many of which encounter scrutiny in advanced economies, to tap into new markets. Within lower-income markets, the priority of affordability often outweighs security concerns, making China’s service providers quite appealing (Hillman, 2021).

For example, Between 2008 and 2021, China provided US\$3.9 billion in aid to the Pacific, primarily directed towards countries with official diplomatic ties to Beijing, such as Cook Islands, Fiji, Micronesia, Niue, Papua New Guinea, and Samoa. However, China’s overall

economic influence amongst the 14 aid-dependent island nations in the region is losing ground because of better loan deals being offered by US allies, especially Australia (Letman, 2023).

For China, securing influence in the Pacific region ensures a supportive bloc with its position on issues that are decided in international fora, like UN votes (Tan, 2022). Sino-Pacific relations is further molded by the competitive atmosphere between China and Taiwan, resulting in the emergence of 'checkbook diplomacy,' which aims to gain diplomatic favor through economic aid and investments in the Pacific island region (Synergia, 2018).

In response to the growing presence of China infrastructure investment in the Pacific region, Australia has taken proactive measures through the Pacific Step-up Policy, which promises to vastly increase support for infrastructure development in the PIC, particularly the southern countries of the Pacific (Wallis, 2021).

Australia's 2017 Foreign Policy White Paper presaged this shift when it called for 'a new chapter in our relations with our Pacific family' (DFAT, 2017). The Step-up Policy fulfills Australia's commitment to 'tackle infrastructure deficiencies that prevent developing economies from fully engaging in global markets' (Bishop, 2013). The policy also serves the core purpose of ensuring the Pacific Islands won't fall under the influence of China's growing presence in the region (Natanegara et al., 2023).

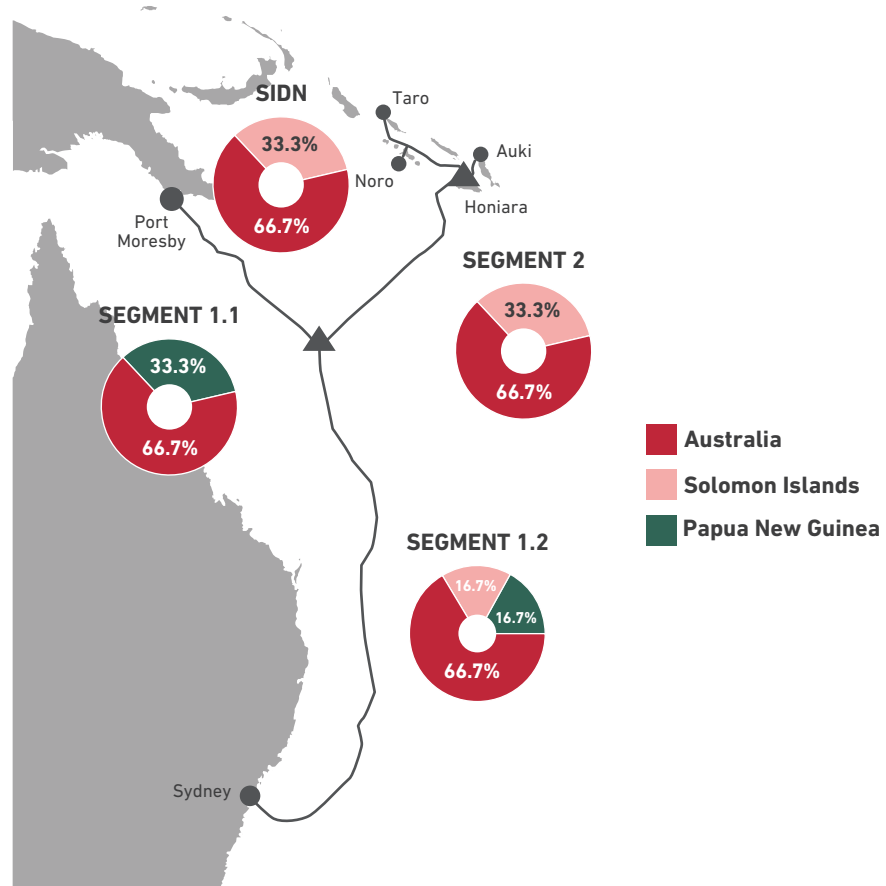
Project Financing

The CS2 project was carried out in partnership between the Australian Department of Foreign Affairs and Trade (DFAT) and infrastructure providers namely PNG DataCo Limited (DataCo) in PNG and the Solomon Islands Submarine Cable Company Limited (SISCC) in the Solomon Islands. The design, construction, and installation were managed by the Australian-based Vocus Communications, whilst the technology and cable design was supplied by the French-based Alcatel Submarine Networks (ASN). Additionally, the modular cable landing station for PNG DataCo in Port Moresby was designed and constructed by the US-owned XSite Modular.

The total cost of the project was approximately AUS\$137 million or US\$93 million (Pakham, 2019). About two-thirds (66.7%) of the project funding came from the Australian government, with PNG and the Solomon Islands contributing the remainder equally (Horst & Foster, 2023; Qiu, 2019). The specific co-contribution was based on a formula where PNG and the Solomon Islands each covered 16.7% of the total cable system cost for the Branch Unit (BU) and evenly split the co-contribution for overall project management (Global Infrastructure Hub, 2020). Figure 1 below provides more details about the financing arrangements surrounding the project.

The total cost of the project was approximately AUS\$137 million or US\$93 million. About two-thirds (66.7%) of the project funding came from the Australian government, with PNG and the Solomon Islands contributing the remainder equally.

Figure 1.
Cost Distribution for Each Segment of the Investment



Source: Global Infrastructure Hub (2020).

The Solomon Islands Government contribution to the CS2 project was made through the SISCC (Solomon Islands Submarine Cable Company Limited), which is a joint venture company established in 2016 to build and operate the fiber optic communications system for the Solomon Islands. The SISCC shareholders are composed of the Investment Corporation of the Solomon Islands (ICSI) with a 51% share, and Solomon Islands National Provident Fund (SINPF) with a 49% share (SISCC, n.d.).

While the SISCC is not a state-owned enterprise (SOE), it does operate under direct government investment through the ICSI along with the representation and participation of the people of the Solomon Islands through the SINPF. Following the completion of the shareholder agreement in 2018, shareholders purchased their shares with a combined value of AUS\$29.7 million (K72.6 million), sufficient to fully fund the co-contribution required by the Solomon Islands' Government under the tripartite MoU (SISCC, n.d.).

Under this agreement, SISCC constructed all the landing party¹ infrastructure in the Solomon Islands, ensuring their readiness for the subsequent cable installation of the 730-kilometer

¹ The term "landing party" refers to the entity that owns and operates the cable landing station, which is the facility that terminates the submarine cable and connects it to the domestic or international network. The landing party may be a local telecommunications company, a group of local companies, the submarine cable operator or a special private company (Telecom Review, 2022).

Solomon Islands Domestic Network (SIDN) (Global Infrastructure Hub, 2020). Once the cable reached the landing party, it would then extend across the Solomon Islands' four provinces; linking Auki in Malaita Province, Noro in Western Province and Taro in Choiseul Province with the capital Honiara through the SIDN. The SIDN was constructed in parallel with the international CS2. The financing of the domestic SIDN follows a similar approach to the CS2—two-thirds funded by Australia and one-third by the Solomon Islands' SISCC (Global Infrastructure Hub, 2020).

With regards to PNG, an equivalent Landing Party Agreement was signed between the Australian Government and PNG's state-owned DataCo. DataCo operates and manages over 2,100 km of fiber-optic network comprising both terrestrial and submarine cables. It was established by the PNG Government as an SOE in February 2014 to own, manage, operate and maintain telecommunications wholesale infrastructure and assets. Its stated objective is to ultimately provide high capacity, resilient and robust wholesale international and domestic network telecommunications at competitive and non-discriminatory prices to retail service providers in the country (PNG DataCo, n.d.; Global Infrastructure Hub, 2020).

In 2018, the PNG Government secured a loan from China's Exim Bank to fund the domestic Kumul Submarine Cable Network (KSCN). The project was financed largely through a concessional loan² estimated at US\$270 million (K879 million³), with the PNG Government putting forward 15% of the cost and the remaining 85% covered by the Exim Bank (Kumul Consolidated Holdings, n.d.). The borrowing of this loan sparked controversies regarding the actual loan amount and the process by which it was borrowed.

Reports indicate that the aim of securing the KSCN funding was to finance PNG's contributions towards the international CS2 project from Sydney to the BU then towards the DataCo landing party/station (Potter, 2021; BRI Monitor, 2021). The rest of the fund was then to be used to finance the construction of the PNG domestic cable system, forming a cross-subsidy funding arrangement between KSCN and CS2, which DataCo required due to its fiscal constraints as reported by Australian media sources (Potter, 2021; The Australian, 2020).

With the Exim Bank as the grant source, the construction of the domestic KSCN was awarded to Huawei. From receiving the CS2 at the landing station in national capital Port Moresby, Huawei then began construction, connecting Port Moresby to Madang, Alotau, Popondetta and Lea (BRI Monitor, 2021).

² Concessional loan is a loan made on more favorable terms than the borrower could obtain in the marketplace. It can be in the form of an interest rate below the market place, deferred repayments, or income-contingent repayments. Concessional loans by the government are issued to support the achievement of government policy objectives, including in ICT-related projects (Australia Department of Finance, 2023).

³ The exact loan amount remains unclear, with varying figures reported. The highest reported sum is US\$279 million (K1 billion), while the lowest is stated as US\$200 million (K661 million), see Natanegara et al., (2023) and INA (2022).

Project Implementation

The project implementation of CS2 was divided into three main phases.

The first phase involved a feasibility study/survey which was conducted by Vocus. This consisted of a three month scoping study, which included identifying requirements, engaging with the governments of PNG and Solomon Islands on cost, performance, and feasibility options for the investment, and commencing permits (BRI Monitor, 2021). The purpose of the survey was to ensure that the manufacture and installation of the cables were as precise as possible, taking into account the undersea terrain from Sydney to the BU then to Solomon Islands and PNG (Global Infrastructure Hub, 2020).

The second phase involved the manufacture and assembly of the power feed cable equipment's repeaters and the BU as well as preparing the installation of over 2,500 km of cable from Sydney to the BU in the coral sea. Four fiber-optic pair cores, sheathed in one physical cable, were to be installed from Sydney to the BU (Vocus, 2020). The main BU is laid at a depth of 4,650 m on the coral sea floor, where the four fiber-optic cables then split to both the Solomon Islands and PNG (Global Infrastructure Hub, 2020).

The third and last phase involved the completion of the landing stations/parties in Sydney, Honiara, and Port Moresby after which the four fiber-optic pair cores were connected to the BU, before splitting, with each cable containing a two-fiber pair core (Vocus, 2020). The cables lead to both the Solomon Islands and PNG to meet up with their respective landing stations (Global Infrastructure Hub, 2020).

Anticipated Economic and Social Impacts

From an economic perspective, the investment in CS2 aimed to facilitate access to the global digital economy for both PNG and the Solomon Islands. By offering more cost-effective bandwidth to licensed operators, it would make the telecommunications services more affordable for end-users. Despite a considerable reduction (up to 70%) in the prices of entry-level internet packages in PNG between 2013–2016, the cost per gigabyte still remained substantially higher when compared to developed countries (Global Infrastructure Hub, 2020).

Indeed, costing approximately 10–20% of average monthly incomes, entry-level internet prices prior to the CS2 project were out of reach for the majority of PNG citizens. The pricing was also above the ITU's benchmark for driving rapid uptake of the internet, which is less than 3–5% of average monthly income (Tohmatsu, 2016).

At the wholesale level, the access rate was as high as US\$1,700 per Mbps each month in 2013. This reduced to approximately US\$445 per Mbps each month in mid-2016 and fell further to US\$170 per Mbps per month in 2017. The rate is estimated to be further reduced to US\$98 per Mbps per month for a 1 Gbps connection when the CS2 is commercialized (PNG DataCo, 2020).

The maximum wholesale price for international submarine cable transmission capacity in PNG is determined by the National Information and Communication Technology Authority (NICTA)—an independent regulatory body overseeing and promoting the ICT sector in PNG. Based on public notices from late 2019, the maximum wholesale price for the CS2 was set to drop to an equivalent

of US\$52 (K185) per Mbps per month for 2020, US\$38 (K135) per Mbps per month for 2021, US\$25 (K90) per Mbps per month for 2022 and US\$21 (K75) per Mbps per month for 2023 (NICTA, 2019; Global Infrastructure Hub, 2020).

In terms of social impacts, the CS2 project is expected to accelerate the integration of digital technologies into education and healthcare, as well as contribute to better governance outcomes (for example, digitization of government services) (Public Environment Report, 2018). The significant improvements in internet reliability, speed, quality and affordability in PNG and Solomon Islands will be transformative to business development and should result in substantial social benefits.

It should be noted that the cable offers capacity well beyond forecast demand in PNG and the Solomon Islands. As a result, the CS2 could also unlock new opportunities for growth and connectivity for the two countries as they connect their tourism and agribusiness industries to the global marketplace, offering easier access to business and education services and boosting person-to-person interaction (Global Infrastructure Hub, 2020).

“From an economic perspective, the investment in CS2 aimed to facilitate access to the global digital economy for both PNG and the Solomon Islands.”

GOVERNANCE GAPS AND IDENTIFIED RISKS

Transparency and Accountability

“There is limited publicly accessible information regarding the project’s preparation, procurement, implementation, and completion phases on any official PNG government websites.”

Policies and legal frameworks that encourage transparency and accountability of public finances and development projects are in place in PNG via the Public Finances (Management) Act 1995. Additionally, the procurement process for publicly-funded projects must adhere to the standardized framework overseen by the National Procurement Commission (NPC), as governed by the National Procurement Act 2018. The NPC replaces the Central Supply and Tenders Board and has jurisdiction for all PNG public and statutory bodies at both the national and regional levels.

The establishment of the NPC in 2019 signified a major reform towards a more accessible, efficient, and transparent procurement system in PNG (Natanegara et al., 2023; OGP, 2022). Indeed, the main function of the NPC is to conduct procurements on behalf of the PNG government, ensuring timeliness, transparency, and non-discrimination throughout the process. The NPC is responsible for approving and awarding contracts based on the procurement value thresholds outlined by the National Procurement Act.

However, difficulties remain. For example, political interference in the procurement process and limited e-procurement capacity remain issues (Transparency International PNG, 2021a). Despite the legislative reform, transparency is still a concern in PNG’s procurement system, as demonstrated by limited proactive disclosure of procurement information and fragmented procurement mechanisms (Transparency international PNG, 2021b).

With regards to the CS2 project, despite the framework of the Infrastructure Data Standards (IDS) for proactive disclosure developed by the Construction Sector Transparency Initiative (CoST)⁴, there is limited publicly accessible information regarding the project’s preparation, procurement, implementation, and completion phases on any official PNG government websites.

Fortunately, this lack of transparency from the PNG government is compensated for by information and transparency provided by other parties involved in the project, namely the Coral Sea Cable Company Pty Limited, an Australian registered company with equal shareholding by The Commonwealth of Australia, PNG DataCo and The Solomon Islands Submarine Cable Company, as well as Australian government websites.

Nevertheless, perhaps due to the sensitive nature of the project, most of these documents lack detail regarding the terms of the MoU, project procurement processes, budgets, contracts, and implementation, with whole sections of the documents redacted. See Table 3 for an assessment of the CS2’s transparency.

⁴ The CoST IDS is a globally recognized standard for transparency and accountability in infrastructure projects. It includes two types of disclosure: proactive disclosure (disclosure of information ‘without official request’) and reactive disclosure (disclosure of information ‘upon request’).

**Table 3.
Coral Sea Cable System Transparency Assessment**

Project Phase	Project Information	Availability
Project Identification	<ul style="list-style-type: none"> Project owner Sector, subsector Project name Project location Purpose Project description 	Fully available at: <ul style="list-style-type: none"> coralseacablecompany.com/ siscc.com.sb/coral-sea-cable-system cdn.github.org/umbraco/media/3749/coral-sea-cable-system.pdf
Project Preparation	<ul style="list-style-type: none"> Project scope (main output) Environmental impact Land and settlement impact Contact details Funding sources Project budget Project budget approval date 	Partially available in publicly available websites at: <ul style="list-style-type: none"> solomonislands-data.sprep.org/system/files/4131708-REP-A-Solomon_Cables_PER.pdf cdn.github.org/umbraco/media/3749/coral-sea-cable-system.pdf www.treasury.gov.pg/wp-content/uploads/2023/05/2019-Volume-2a.pdf
Project Completion	<ul style="list-style-type: none"> Project status (current) Completion cost (projected) Completion date (projected) Scope at completion (projected) Reasons for project changes Reference to audit and evaluation reports 	Partially available in publicly available websites at: <ul style="list-style-type: none"> cdn.github.org/umbraco/media/3749/coral-sea-cable-system.pdf www.submarinenetworks.com/en/systems/asia-australia/coral-sea/coral-sea-cable-system-overview
Procurement	<ul style="list-style-type: none"> Procuring entity Procuring entity contact details Procurement process Contract type Contract status (current) Number of firms tendering Cost estimate Contract administration entity Contract title Contract firm(s) Contract price Contract scope of work Contract start date and duration 	Partially available in publicly available websites at: <ul style="list-style-type: none"> www.dfat.gov.au/sites/default/files/dfat-foi-1807-f2012.pdf coralseacablecompany.com/the-system www.treasury.gov.pg/wp-content/uploads/2023/05/2019-Volume-2a.pdf <p>At the time of writing, primary information on the procurement process, contract type, MoU agreement are not readily available in publicly accessible websites.</p>
Implementation	<ul style="list-style-type: none"> Variation to contract price Escalation of contract price Variation to contract duration Variation to contract scope Reasons for price changes Reasons for scope & duration changes 	Partially available in publicly available websites at: <ul style="list-style-type: none"> www.aph.gov.au/api/qon/downloadattachment?attachmentId=5323af8e-2586-4b4b-a639-472e87a58894

Source: Construction Sector Transparency Initiative (2013); BRI Monitor (2021)

More generally, in order to encourage more open, transparent, and accountable governance in public administration and public finance management, the PNG government became a member country of the Open Government Partnership (OGP) in 2015. This global partnership consists of 75 member countries, 104 local governments, and thousands of civil society organizations (OGP PNG, 2023).

The PNG OGP National Action Plan 2022-2024 (OGP, 2022a), shows that there are still many issues to be resolved. One critical area to be noted is the weak flow of public information caused by administrative hurdles. There is no law in PNG, such as a Right to Information (RTI) Law, that forces government and business entities to share important public information. As a result, information is kept secret, reducing the opportunity for the government sector, business sector and public to use data for evidence-based policy design and investment purposes.

The enduring effects of the entrenched ‘culture’ of secrecy, stemming from the historical absence of RTI Law since PNG’s Independence, was evident while developing this report. Major challenges in establishing a dialogue or meeting with key officers in Kumul Consolidated Holdings, DataCo, and NICTA, resulting to a lack of confirmed reliable communication.

Another issue to be noted is the absence of a central government data repository system. Such a system would make data management easier and allow public access through an e-government portal. Without it, information is spread and shared in an unorganized manner.

Finally, PNG continues to suffer from a lack of public access to government expenditure reports. The government agencies do not disclose their spending well. Not only does this allow for possible fund misuse, it also reduces public trust in the public finance management.

However, difficulties remain, as these governance issues show that infrastructure development in PNG requires better focus on both structural and institutional reforms alongside legislative reforms. Transparency International PNG (2021b) analyzed this situation in the National Integrity System (NIS) assessment in 2021. NIS looks at both the laws and the actual operations of different sectors in PNG, such as public administration, finance, and procurement activities. It uses indicators such as transparency, accountability, and integrity to measure activities.

The assessment reveals that, whilst these sectors have relatively good legal frameworks, there are still gaps in practice, showing a mismatch between the laws and their implementation in PNG.

For example, despite various efforts by non-government organizations and government agencies, transparency remains an issue in the PNG public sector. In 2022, PNG received a score of 30 on Transparency International Corruption Perceptions Index, which utilizes a scale of 0 to 100. This ranking positioned the country at 130th globally, signifying a high level of corruption within the nation. This also represented a slight worsening of the situation, with PNG achieving a score of 31 in 2021 (Transparency International, 2023).

Another issue to be noted is the absence of a central government data repository system. Such a system would make data management easier and allow public access through an e-government portal.

As already noted, PNG secured funding from China’s Exim Bank for completion of its domestic network. Typically, projects that are funded by the Chinese have limited transparency and are formed through informal and relationship-oriented methods. This is opposed to the rules-based approach favored by Western nations and multilateral lending institutions.

In this aspect, the approach to develop the CS2 project through cooperation between multiple parties, including Australia, has helped enhance the transparency, accountability, and overall governance of the project. Indeed, Australia, PNG, and the Solomon Islands established a separate entity, the Coral Sea Cable Company with equal shareholding and board representation between the three countries. Furthermore, the CS2 project was designed as a joint project between DFAT, DataCo, SISCC, Vocus, and Alcatel Submarine Networks.

This collaborative approach not only increased governance and reduced risks of mismanagement and corruption, but also helped the protection of national interests in an environment of geopolitical challenges and a battle for influence between China and Australia in the region (see Box 1).

Cybersecurity, Infrastructure and Data Protection

Globally, subsea cables account for approximately 97% of the data and information flows in trans-continental digital communications, including trillions of daily international financial transactions, and serve as the backbone for the global internet (Guinnes, 2023). The UN General Assembly (2016) has described subsea cables as “critical communications infrastructure.” The United Nations Convention on the Law of the Sea (UNCLOS) also describes intentional damage to subsea cables as a punishable offense. However, no accountability mechanism is present at the multilateral level, leading to the absence of an international safeguard against physical and/or cyberattacks on subsea cables (Acharya , 2023; Bashfield and Bergin, 2022).

In PNG, the increased use of digital technologies and improved internet connectivity enabled by the commissioning of CS2 and KSCN fiber-optic cables has inevitably increased the country’s exposure to cybersecurity risks. Over time, the government’s approach to cybersecurity policy has demonstrated some progress. For example, in 2013, the government adopted the National Security Policy, which recognized ‘Cyber-based Threats’ and the ‘National Information Security’ as critical challenges to PNG’s survival (PNG Government, n.d.).

Fast forward to 2021, the PNG Government adopted the National Cyber Security Policy (NCSP) following the ‘ransomware’ attack of late 2021 that crippled the country’s financial system (Tarabay, 2021). The policy outlines the government’s vision, goals, and objectives, as well as the evolving governance structures required to minimize cybersecurity related risks that may adversely affect national ICT development (Natanegara et al., 2023; PNG Government, n.d.).

However, notwithstanding the fact that the government has recognized the importance of cybersecurity in protecting critical infrastructure, securing government systems, and promoting cybersecurity awareness, specific policy directions regarding the protection of PNG’s commercial subsea cables are inadequate. Existing policies on security⁵ do not seem to clearly articulate government strategies aimed at alleviating security concerns. This is particularly true when it comes to monitoring cables to detect sabotage attacks and espionage, mitigating the impact of natural disasters, and enhancing investment in cable repair ships to address damage in situations where natural, commercial, and recreational (e.g. boating) hazards are the principal cause.

Indeed, as an archipelagic nation, PNG is particularly vulnerable to submarine cable outages caused by different natural hazards. Monitoring and repairing commercial undersea telecommunications, however, has generally been the responsibility of the private sector owner/operator(s) of those cables.

In PNG, the increased use of digital technologies and improved internet connectivity enabled by the commissioning of CS2 and KSCN fiber-optic cables has inevitably increased the country’s exposure to cybersecurity risks.

⁵ Such as the National Cybersecurity Policy 2021, National Security Policy 2013, National Security Policy Strategic Action Plan 2014-2020, Digital Transformation Policy 2020, National ICT Policy 2008, National Intelligence Organization Act 1984, National Information and Communication Technology Act 2009, Classification of Publication (Censorship) Act 1989, Gaming Control Act 2007, Lukautim Pikinini Act 2015, The Cybercrime Code Act 2016, Mid Term Development Plan III and IV.

Another important component that forms a baseline for security in subsea cable ecosystems is resilient data governance and data protection. Currently, PNG lacks a comprehensive and dedicated data protection policy and corresponding legislation. Recent development in this area includes the drafting of the National Data Governance and Protection Policy, which has been in development since 2021 (DICT, 2023).

One of the key objectives of this draft policy is the formulation and implementation of specific laws for data privacy, protection, and governance. The proposed policy also calls for the creation of an independent national authority to oversee and enforce regulatory compliance and establish cross border data sharing mechanisms.

Currently, PNG lacks a comprehensive and dedicated data protection policy and corresponding legislation.

The realization of such a framework is critical for PNG's growing digital status, particularly when it comes to safeguarding its commercial subsea cables against external threats and potential malicious actors. This is especially crucial in light of the heightened regional 'underwater' rivalry that PNG, along with its Pacific peers, currently contends with.

CONCLUSION AND RECOMMENDATIONS

The CS2 project involves subsea cable infrastructure that stretches approximately 4,700 kilometers under the sea, connecting Port Moresby in PNG, Honiara in the Solomon Islands, and the major East Coast Internet Hub in Sydney, Australia. It is a critical infrastructure project that aims to open access to the internet for the citizens of PNG and the Solomon Islands, by making it more affordable, and thus facilitate the integration of both nations into the global digital economy.

The purpose of this paper has been to examine the development and delivery of the CS2 project within the regulatory environment currently in place within PNG.

This paper finds that, despite the presence of legal frameworks that promote transparency, information about this critical project is not readily available for public scrutiny. In turn, this reveals that in practice, there is still a mismatch between transparency laws and their implementation in PNG. Of note however, this lack of transparency by the PNG government was largely counterbalanced by the open disclosure of vital information from other partners to the project, including the Australian government and its appointed contractors.

In conclusion, meaningful cooperation and collaboration between multiple parties, such as the establishment of the Coral Sea Cable Company, can help enhance transparency and accountability when key parties agree to minimum robust standards. These standards should include indicators that relate to the development, delivery and evaluation of key project milestones.

In the case of PNG, the following recommendations are made:

- 1. Prioritize the issuance of a Right to Information law.** The PNG government should prioritize the development and issuance of a Right to Information law to follow best practices in the governance and implementation of ICT projects, based on the principles of transparency and accountability.
 - The NPC and NICTA websites currently provide information on public procurement tenders and bids, but they do not disclose sufficient information about procurement decisions and outcomes.
 - Important documents such as tender notices, project assessments, and contracts should be made available online.
 - A comprehensive Right to Information law could fill these gaps by ensuring public access to information and requiring government and business entities to disclose vital public information.
 - Moreover, the government should encourage and support the involvement of civil society, media, and citizens in the monitoring and evaluation of public projects and services. This would increase the demand for transparency and accountability, and create a culture of openness and trust.

2. Apply governance and transparency standards for critical infrastructure collaboration. The PNG government and people should take into consideration prospective partners' standards for governance and transparency when deciding who to collaborate with in these types of infrastructure projects.

- This will ensure that vital information is made accessible by partner organizations for public scrutiny, despite transparency shortcomings and challenges that might be faced by the PNG government.
- In this manner, the overall good governance, transparency and accountability of the project will be enhanced and risks of mismanagement and corruption mitigated.

3. Include public information sharing as a prerequisite for infrastructure project funding. It is important that donors or financiers of infrastructure development projects demand that recipient government and project contractors publish relevant information to the public as part of the funding requirements.

- Such requirements for transparency will improve the accountability of involved stakeholders and help reduce governance and corruption risks, whilst making sure that the project is properly planned, takes into account environmental and social impacts, and is successfully implemented.

4. Encourage regional and/or subregional cooperation on managing local infrastructure projects in the Pacific. Investing in fiber optic cables and supporting infrastructure are capital-intensive for any one country in the Pacific. Thus, regional or subregional cooperation through pooling of financial and human resources as exemplified in the CS2 project, has proven its effectiveness in ensuring adequate implementation and management of such infrastructure projects. This model should be considered more broadly.

5. Establish an effective subregional intergovernmental platform. A subregional intergovernmental platform should be established for effective coordination and cooperation in the development of ICT connectivity within the Pacific region. This will help ensure that national and public interests are safeguarded amidst geopolitical tensions between China and Australia, as well as with the US.



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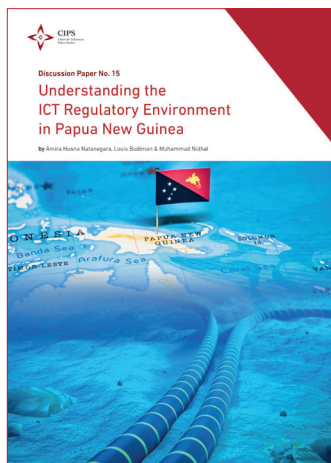
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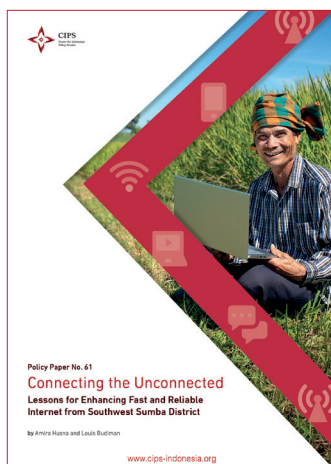
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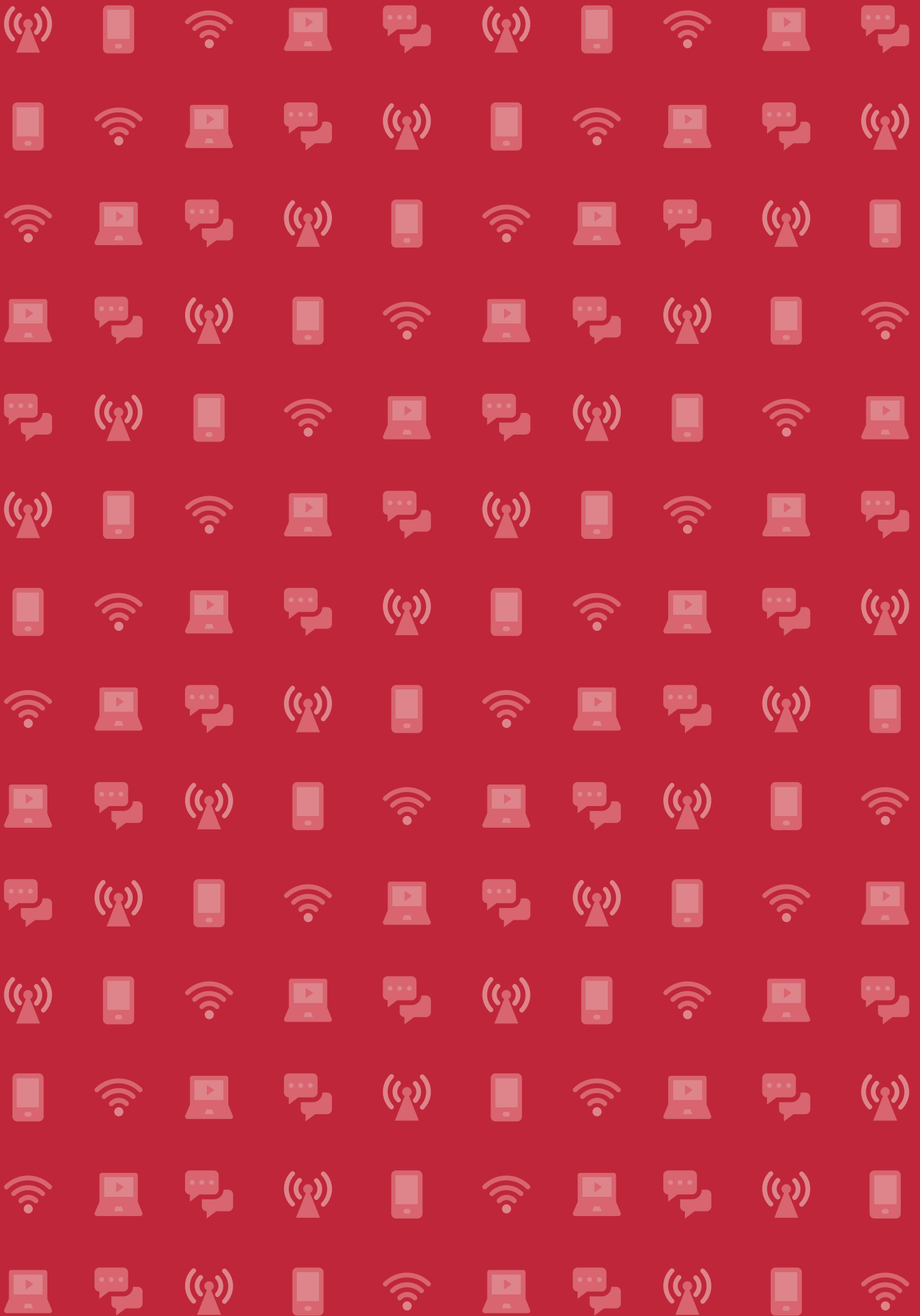
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