Enhancing connectivity in Queensland: a case study approach to collaborative strategies for social impact in rural, regional and remote communities

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Abstract

Purpose – To highlight the consequences of fragmented planning, ineffective investment and a lack of strategic oversight in telecommunications decisions across rural, regional and remote (RRR) Queensland. This paper aims to demonstrate how these issues can lead to poor outcomes, increased costs and low take-up of services. Case studies identify the urgent need for informed, collaborative, strategic and collective approaches to regional telecommunications that prioritise community engagement, independent advice and forward-thinking investment strategies.

Design/methodology/approach – Partnering with industry experts, this paper used a participatory and relationships approach through story-based evaluation (Dart and Davies, 2003) of Government-led independent review submissions, anecdotal conversations and Netnography (Kozinets and Kozinets, 2015) to assess the effectiveness of current Government telecommunications investment in Queensland.

Findings – The paper provides useful examples of how procurement issues, lack of collaboration and fragmented planning can lead to poorly tailored solutions and low levels of telecommunications take-up, directly impacting the quality of public services and the safety of RRR residents. It highlights the difficulty in getting Government services and housing connected in RRR areas and underscores the need for streamlined and efficient procurement processes that prioritise the needs of consumers and businesses. Addressing procurement challenges and implementing appropriate planning, engagement and investment strategies, Governments can ensure essential telecommunication services in remote areas are not compromised, ultimately contributing to the social impact of residents in remote communities.

Research limitations/implications – Story-based evaluation has limitations, such as potential subjectivity, difficulty in generalising findings and challenges in data analysis, which may be evident in this paper.

Practical implications – Addressing procurement challenges and implementing appropriate planning, engagement and investment strategies, governments can ensure essential telecommunication services in remote areas are not compromised, ultimately contributing to the social impact of residents in remote communities.

Originality/value – Drawing on lived experiences of RRR people, this paper provides insight needed for a more strategic, inclusive, collaborative and community-focused approach to telecommunications investment

and planning in Queensland. Addressing systemic issues will ensure that investments lead to sustainable, high-quality connectivity solutions that meet the unique needs of RRR communities.

Introduction

Connectivity literacy (Better Internet for Rural Regional and Remote Australia, 2020) refers to the foundational ability to get and stay connected to telecommunications services, while digital literacy encompasses the skills required to use digital platforms effectively. The two are deeply interconnected, gaps in either area limit digital participation, and when individuals face challenges in both, the barriers compound to create significant risks of digital inclusion. To achieve effective digital inclusion, both must be addressed together in regional planning. This paper explores how strategic community-led, and place-based approaches to telecommunications investment can strengthen connectivity and digital literacy outcomes across Queensland's rural, regional and remote (RRR) communities.

To guide this inquiry, the paper draws on the Theory of Change (ToC) (Doherty *et al.*, 2022) framework, which is later applied in the practical implications section to map the causal pathways between collaborative planning, improved connectivity literacy and transformative social impact in Queensland's RRR communities. This systems-level approach supports the paper's strategic orientation and highlights the importance of multi-stakeholder engagement and long-term investment planning. In addition, the conceptual distinction between connectivity literacy and digital literacy is informed by Nutbeam's (2008) model of functional literacy, which emphasises the practical application of knowledge in everyday life, and the Organisation for Economic Cooperation and Developments (OECD) Problem Solving in Technology-Rich Environments Framework (PSTRE) (2012) framework, which assesses individuals' ability to solve problems in technology-rich environments. These theoretical lenses help clarify why connectivity literacy – defined as the ability to get and stay connected – is a foundational element for digital participation and inclusion, particularly in underserved RRR contexts.
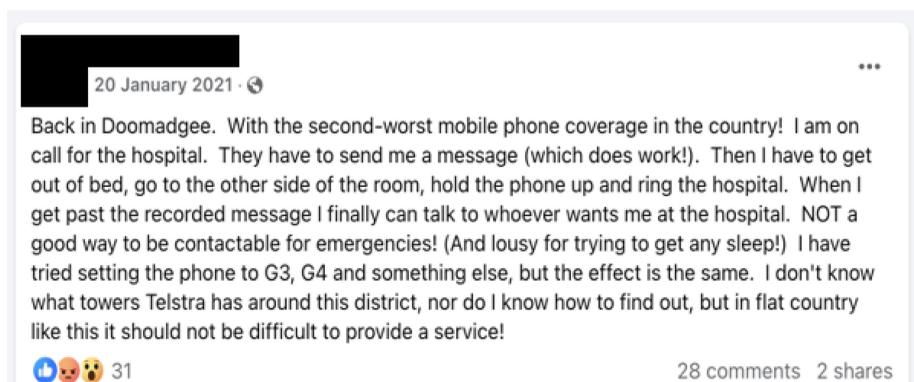
Over the past decade, consumer submissions to parliamentary enquiries have consistently highlighted critical procurement challenges in addressing telecommunications needs in RRR Australia (Hartsuyker *et al.*, 2021; Regional Telecommunications Review, 2024; Rural Regional and Remote Communications Coalition, 2024; Shiff *et al.*, 2015; Single *et al.*, 2024; Sparrow, 2015; Stretton *et al.*, 2021).

This paper builds on insights from Government-led independent review submissions, anecdotal conversations and Netnography (Kozints and Kozinets, 2015), drawing attention to system-level constraints, such as the use of single-supplier contracts embedded within state Government procurement protocols. These constraints have often prevented essential services – such as schools, health centres, hospitals and police stations – from accessing the most suitable, needs-based telecommunications solutions. As a result, public services and communities are frequently left reliant on limited or inferior technologies, despite better options being available. Furthermore, the absence of thorough due diligence, collaboration and independent advice has at times contributed to poor telecommunications investment decisions and a fragmented, siloed approach by Government services, which often fail to meet the broader connectivity needs of RRR communities.

Government and social accommodation in remote areas can also face significant challenges in accessing reliable broadband services, often due to restrictive or ineffective procurement processes, limited connectivity literacy and suboptimal investment decisions. An example of this occurred in Doomadgee (On Call Doctor, 2021), where hospital staff struggled to contact the on-call doctor in staff accommodation because the mobile network was too congested to support a phone call. Doomadgee is a largely Indigenous community located in the Gulf of Carpentaria, approximately 140 km from the Northern Territory border and 93 km west of Burketown in Queensland (Queensland Government, 2015). Network congestion occurs when too many users attempt to access the same network simultaneously, resulting in reduced speeds and unreliable service (Choros, 2025). If staff quarters and essential facilities had access to connectivity redundancy – such as the available nbn™ satellite service or an alternative solution – reliance on the mobile network could have been reduced. In such a case, Wi-Fi calling could have provided a reliable communication method, ensuring critical health services were not disrupted. This case illustrates that the failure to incorporate redundancy into connectivity planning and procurement can compromise essential public services in RRR areas (Figure 1).

In RRR regions, Government investment lacks meaningful community engagement, fails to align with place or needs-based or needs driven approaches, and is often characterised by limited strategic planning, minimal cross department collaboration and insufficient oversight. Programs and Government departments often operate in silos, driven by commercial supplier metrics or fragmented funding logics, rather than consistent benchmarks of need or effectiveness. For example, the Regional Connectivity Program (Australian Government, 2024 – 2027a) has been subject to criticism for prioritising commercially viable rollout opportunities over high-need but low-profit communities, with funding often missing the most digitally excluded populations (FNDIAG, 2024).

When siloed Government departments operate independently, funding may be allocated in a narrow, purpose-specific manner – such as investing in improved connectivity for schools – without consideration and leveraging available funding for broader community needs. As a result, such investments may fail to enhance telecommunication services for local health facilities, emergency services or the wider public. This fragmented approach not only limits the overall impact of public investment but also reduces the Government's collective bargaining power.

20 January 2021 · 🌐

Back in Doomadgee. With the second-worst mobile phone coverage in the country! I am on call for the hospital. They have to send me a message (which does work!). Then I have to get out of bed, go to the other side of the room, hold the phone up and ring the hospital. When I get past the recorded message I finally can talk to whoever wants me at the hospital. NOT a good way to be contactable for emergencies! (And lousy for trying to get any sleep!) I have tried setting the phone to G3, G4 and something else, but the effect is the same. I don't know what towers Telstra has around this district, nor do I know how to find out, but in flat country like this it should not be difficult to provide a service!

👍😢😮 31   28 comments   2 shares

Figure 1. On call Doctor Doomadgee Hospital, Personal Facebook Post January 2021

In contrast, a coordinated, whole-of-Government procurement strategy could leverage economies of scale to negotiate better terms, ensure more equitable distribution of services, and deliver integrated telecommunications solutions that meet the diverse needs of all public services within a community. Moreover, a siloed investment model can undermine competitive grants processes that rely on comprehensive, multi-sector evidence of need, diminishing the strength of proposals that could otherwise secure funding for region-wide connectivity improvements.

This paper aims to explore the direct impacts of identified issues and the mechanisms through which fragmented planning, ineffective investment, and lack of strategic oversight led to negative outcomes. It aims to identify and evaluate elements of effective approaches that can mitigate theidentified problems and enhance telecommunications planning and investment in RRR communitiesby responding to the following questions:

(1) What are the specific consequences of fragmented planning, ineffective investment, and lack of strategic oversight in telecommunications decisions for rural, regional, and remote(RRR) Queensland?

(2) How do these issues contribute to poor outcomes, increased costs, and low take-up oftelecommunications services in RRR Queensland?

(3) What are the key components of informed, collaborative, strategic, and collectiveapproaches to regional telecommunications that can address these issues and improve community engagement, independent advice, and forward-thinking investment strategies?

Understanding the challenges

Connectivity issues go beyond Government procurement. A lesser-known phenomenon, "Connectivity Literacy" is a barrier that affects people regardless of age, gender, location or education level (Hartsuyker *et al.*, 2021). Connectivity Literacy is grounded in functional literacy [Australian Bureau of Statistics, 2011 - 2012, Nutbeam, 2008; Organisation for Economic Cooperation and Development (OECD), 2012] and encompasses the knowledge and awareness required by consumers to get and stay connected to both voice and broadband services that meet their needs and budgets (Better Internet for Rural Regional and Remote Australia, 2020).

Literacy is traditionally defined as the ability to read, write, and perform basic arithmetic. However, functional literacy extends beyond these basic skills to include the practical application of reading, writing and maths in real-life situations (Nutbeam, 2008). Functional literacy encompasses the ability to understand and use information effectively for daily tasks, such as interpreting graphs, managing finances, and making informed decisions. This broader definition highlights the importance of skills like media literacy, financial literacy and health literacy, which are essential for navigating today's complex, high-tech society.

While basic literacy is foundational, functional literacy ensures individuals can actively participate and thrive in their communities. Identified on the Australian Council for Adult Literacy (2001) website "In Australia today, one in five adults do not have the literacy skills to effectively participate in everyday life". The 2006 Australian Bureau of Statistics (2006) adult literacy and life skills survey used an internationally recognised five-level assessment of literacy to assess functional literacy levels of Australians aged between 15 and 74 years of age, see Table 1. Level 3 is regarded as the "minimum required for individuals to meet the complex demands of everyday life and work in the emerging knowledge-based economy" (Australian Council for Adult Literacy, 2009). Notably, reported by the Programme for the

Table 1. Functional literacy of Australians aged 15–74 years of age (2008); PSTRE (2011–2012)

Functional literacy - Australians 15–74 years of age	Level 1–2 (%)	Level 3 (%)	Level 4–5 (%)
Prose: the ability to understand and use information from various kinds of narrative texts, including texts from newspapers, magazines and brochures	46	37	16
Document: the knowledge and skills required to locate and use information contained in various formats including job applications, payroll forms, transportation schedules, maps, tables and charts	47	36	18
Numeracy: the knowledge and skills required to effectively manage and respond to the mathematical demands of diverse situations	53	31	16
Problem solving: goal-directed thinking and action in situations for which no routine solution is available	70	25	5
Health: basic health literacy skills that are sufficient for individuals to obtain relevant health information (for example on health risks, and on how to use the health system), and to be able to apply that knowledge to a limited range of prescribed activities	60	35	6
Problem Solving in Technology Rich Environments (PSTRE): the ability to use digital technology, communication tools and networks to acquire and evaluate information, communicate with others and perform practical tasks (25% were not classified because they opted for completing their assessments on paper rather than using a computer)	74	3	N/a

Note(s): Do not add up to 100% due to nonresponse data (Australian Bureau of Statistics, 2008, 2011 - 2012). Level 3 is regarded as the "minimum required for individuals to meet the complex demands of everyday life and work in the emerging knowledge-based economy" (Australian Council for Adult Literacy, 2009)

International Assessment of Adult Competencies (2011–2012) in Table 1, only 3% of the population under study were recorded to have the minimum standard of PSTRE.

In addition, the gap between the literacy levels of Aboriginal and Torres Strait Islander peoples and non-Indigenous Australians is unacceptably wide, and while there have been improvements in the literacy achievements of Aboriginal and Torres Strait Islander children, levels of adult literacy are still very low in many communities. Between 40% and 65% of Aboriginal adults are functionally illiterate in English (Information Access Group, 2025), which will also have an impact on Connectivity Literacy.

Connectivity Literacy is often confused with Digital Literacy. Digital Literacy is all of the skills and knowledge needed by a consumer to use technology, navigate various digital platforms, understand, use and communicate through them (Pangrazio *et al.*, 2020). Connectivity Literacy (how to get and stay connected) and Digital Literacy are deeply interconnected. Even so, limited Connectivity Literacy remains one of the largest barriers to access and inclusion in RRR Australia. Digital Literacy is well researched through the Australian Digital Inclusion Index (ADII) (Thomas *et al.*, 2023). The ADII measures digital inclusion: the ability for everyone to access, afford, and effectively use digital technologies to participate fully in society (Thomas *et al.*, 2023). However, it does not address Connectivity Literacy barriers, see Figure 2.

The concept of Connectivity Literacy - defined as the knowledge and awareness required to get and stay connected to telecommunications services - can be further understood through established theories in consumer behaviour and marketing. It intersects with constructs such as consumer knowledge (Alba and Hutchinson, 1987), which influences decision-making and

Connectivity Literacy		Barriers	Barriers Specific to RRR Areas
Choosing a Technology	How to find the range of technologies that may be available at a residence or business, including satellite, fixed wireless, mobile broadband or fibre. Choosing which technology meets a consumers' needs, wants and budget and knowing how to get connected to that technology. Navigating address check sites and coverage maps and considering backup options (such as a secondary service) where necessary.	• Misinformation/disinformation • Lack of independent advice and technical support • Lack of transparent, accurate information • Broad range and large number of stakeholders • Confusing terminology • Biased sales tactics • Historical beliefs • Complexity • Media and social media rhetoric • Echo chambers • Consumer mistrust • Scams • Solutions focussed on digital literacy • Poor industry support and technical help • Addressing and mapping issues • No guide or platform or help centre • Confusing, complex consumer protections • Consumer digital apathy, fatigue or disinterest • Myths and Furphies • Lack of community engagement • Offshore call centres • Public awareness/ observability	• More frequent technology migrations (shifting from one technology to another) • Increased onus on RRR consumers to know what to do • More choices of types of technologies (fixed line, fixed wireless, nbn™ satellite, WISP, LEO satellite, ADSL, alternate fibre/cable, mobile broadband) • Support organisations underfunded and under resourced • Lack of local technicians and specialists • Bush broadband is bad narrative • Lack of telco stores and equipment suppliers • Geographically unique factors specific to RRR areas • Less reliable technologies with less transparency • Lack of competition and a history of monopoly provider
Choosing a Provider	How to find and choose a provider that offers the chosen technology and can support a consumer in staying connected. Understanding payment methods, how to contact a provider v using provider apps v dashboard.		
Choosing a Plan	Navigating through a wide range of plans, data allowances, speed tiers and add-ons. Understanding CIS documents, contracts and terminologies and the intricacies of what is included in a connection plan. Finding an affordable plan.		
Selecting and Upgrading Equipment	Selecting, updating and configuring connectivity equipment, such as routers, mesh systems and P2P including considering backup power options. Knowing how to improve wi-fi coverage, choose headsets and cameras to improve video conferencing, telehealth and education lessons.		
Troubleshooting a Connection	Knowing how to identify and report a fault or degraded connection, including those caused by weather events. What to do when you have connection issues and how to solve problems such as dropouts, slow speeds, buffering, poor wi-fi and other performance issues. How to get issues escalated and how to stay connected in an emergency.		

Figure 2. Adapted from "Connectivity Literacy" (Better Internet for Rural Regional and Remote Australia, 2020)

service adoption; consumer confusion (Walsh and Mitchell, 2010), which arises from complex or misleading information; and information asymmetry (Mrkva *et al.*, 2021; Wiktor and Sanak-Kosmowska, 2021), where consumers lack access to the same level of technical or commercial insight as providers. These dynamics are compounded by choice architecture - the way connectivity options are presented, often shaped by commercial interests and sale biases rather than consumer needs (Thaler and Sunstein, 2008a). In RRR contexts, limited connectivity literacy exacerbates these barriers, leaving consumers vulnerable to poor value, less reliable and lower-quality services, with little competition, further entrenching suboptimal choices and reinforcing digital exclusion. By framing connectivity literacy within these theoretical constructs, the paper highlights the systemic nature of access challenges and the need for independent, transparent and community-informed telecommunications planning.

Connectivity literacy underpins all forms of digital participation. Deficits in connectivity literacy undermine the effectiveness of Government infrastructure and research programs, limit business operations, disadvantage individual consumers, reduce the effectiveness of consumer advocacy and hinder telecommunications decision-making at local, state and federal levels. Yet there are no benchmarks, and historically it has received little attention, research or funding (Figure 3).
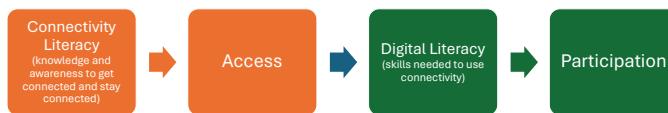

Figure 3. Connectivity vs Digital Literacy: Pathways to Inclusion
Source: Authors' own work

Place-based and needs-based regional connectivity planning is central to meeting RRR consumers' needs for improved access, awareness and accountability. A proactive approach that includes establishing a national strategic framework with performance measures, improved procurement processes across all Government levels and stronger consumer protections is needed. The Australian Digital Inclusion Alliance (ADIA) and First Nations Digital Inclusion Advisory Group (FNDIAG) have both recently called for unified benchmarks to guide investment and ensure those most excluded are prioritised (ADIA, 2024; FNDIAG, 2024a).

Government procurement issues, including single supplier contracts, often compromise the quality of public services and the safety of residents. This underscores the need for streamlined and efficient procurement processes that prioritise consumer needs, especially in critical sectors like healthcare, education and public safety.

International research reinforces the systemic nature of connectivity barriers in rural and remote regions. Studies from Canada (McMahon *et al.*, 2014), the USA (Strover *et al.*, 2024; Strover, 2001) and the European Union (Calvo *et al.*, 2019; Casady *et al.*, 2023) highlight similar challenges in infrastructure deployment, procurement inefficiencies and digital exclusion. Comparative frameworks such as the OECD's Digital Economy Outlook (OECD, 2020) and the Broadband Commission's Global Connectivity Targets (ITU and UNESCO, 2022) emphasise the importance of inclusive, place-based planning and community engagement in achieving equitable digital access. These global perspectives align with the concept of connectivity literacy and underscore the need for strategic investment models that prioritise local needs, independent advice, and long-term sustainability. By situating Queensland's experience within this broader international context, the paper contributes to a growing body of work advocating for resilient and inclusive telecommunications systems worldwide.

Defining the problem

The Australian telecommunications industry places the onus on consumers to be connectivity literate. However, there is little independent support and education available to assist them. State Government departments and program staff are often not experienced in regional technologies and barriers to access and lack the connectivity literacy to advise remote communities, schools, health centres, emergency services and other Government facilities including staff accommodation. Often, decision-makers have not visited these communities and have not conducted a thorough place-based demographic analysis. Instead, Government competitive tender grants programs frequently rely on advice from telecommunications operators, whose recommendations are often shaped by commercial interests and lack independence.

Telecommunications providers are commercial entities that prioritise profit, and often promote products that maximise revenue rather than consumer suitability. This creates systemic risks of biased advice, influenced by commercial incentives, information asymmetries and behavioural marketing strategies (Thaler and Sunstein, 2008b). In practice, consumers and Government stakeholders may not be presented with the most cost-effective or needs-based solutions (Organisation for Economic and Development, 2010). This often leads to the promotion of more expensive or less suitable services and products, which can result in consumers being misled or underserved, as they might not be informed about more suitable or cost-effective connectivity options that would better meet their needs from alternate providers.

A similar situation occurs when communities receive upgraded infrastructure. They are often not supported in how to get and stay connected to the upgraded service leading to low uptake of newer improved technologies. Short term funding cycles can also play a significant

role in procurement issues, particularly in the context of telecommunications investment and decisions. These funding cycles often result in a lack of long-term strategic planning, as investments are made without considering the future needs and sustainability of the solutions being implemented (McMahon *et al.*, 2014). This challenge is further compounded by the rapid pace of technological change, while telecommunications infrastructure typically takes many years to roll out, often leaving regional communities struggling to keep pace with new solutions.

Government tenders are marketed broadly, which means that selection criteria may not be specific enough to meet place-based solutions for public services such as education, health care and policing in RRR areas. In urban areas, connectivity is relatively cheap and ubiquitous and there are a variety of service options available to satisfy most consumer demands. When demand is not met, large groups of consumers can rally to apply pressure, prompting commercial suppliers to provide the desired service. This dynamic reflects a broader flaw in procurement systems, which tend to reward scalable, volume-driven solutions that naturally align with urban markets. As a result, tenders may undervalue or overlook the specific operational realities and long-term needs of low-density, high-cost environments like RRR regions. In RRR areas, the infrastructure required to support public service connectivity is costly, slow to build and difficult to replace (McMahon *et al.*, 2014). Populations are widely dispersed – without sufficient scale, communities lack the collective leverage to influence procurement decisions or infrastructure investment.

Government funding criteria is often broad in scope, which affects the implementation of comprehensive, place-based solutions that address the unique needs of different RRR communities. There is often pressure to spend allocated funds quickly within the funding cycle, leading to rushed decisions and investments in suboptimal solutions that may not be the best fit for a community's place-based needs (McMahon *et al.*, 2014). Subsequently, short funding cycles can make it difficult to identify priorities and engage with a community effectively, as proper community engagement requires time to understand the specific needs, demographics and preferences of the community, which may not be feasible within a short application period (Marshall *et al.*, 2019).

In addition, funding for telecommunications infrastructure is typically allocated through a competitive grants process, where operators present their proposed solutions directly to local Governments and communities, forming partnerships to ultimately apply for funding. However, there is often a lack of independent, expert guidance available to help rural and remote local Governments and communities understand and meet their unique needs. Without impartial advice, communities are left vulnerable to being influenced by telecommunications operators whose proposals may be driven more by commercial interests – such as maximising profit or reinforcing brand presence and market share (Kall, 2022) - than by a genuine commitment to delivering the most suitable or future-proof solution for the community.

In addition, single-supplier contracts embedded within state Government procurement protocols can lead to further constraints. Investment into single supplier telecommunication services is persistent, yet there is little evaluation of their outcomes or effectiveness (Barrett, 2016; Calvo *et al.*, 2019; Casady *et al.*, 2023).

Systemic weakness in public procurement and practices persist through repeated procurement issues that have affected telecommunications investment and decisions in Queensland, for example:

- *Siloed state government procurement processes:* often result in schools, health centres, hospitals, and police stations not being connected to the best-available technology for their specific needs (Isolated Children and Parents' Association, 2021). This lack of strategic planning and oversight can lead to poor outcomes and

increased costs and bring limited benefit to the community and other Government services in the area.

- *Contracts with single providers: s*chools in rural and remote areas of Queensland are often restricted to using technologies supplied by a single approved provider, regardless of whether the solution is fit-for-purpose. This not only prevents access to the most effective, place-based connectivity solutions, but also limits the ability to leverage broader infrastructure investments. When funding is siloed, opportunities are missed and even when communities receive upgraded infrastructure, schools are often unable to benefit from it.

- *Remote area government accommodation approval:* Staff accommodation facilities often face difficulties in getting approval for fixed broadband connections due to procurement issues. For example, when the approved supplier does not offer the available nbn technology or alternate fibre/fixed wireless within a community, Government staff are directed to the only service available from the approved supplier (mobile broadband). In many rural and remote areas, the mobile network is congested and unable to cope with the large data demands required by consumers.

- *Lack of training for government departments IT staff:* State Government departments and associated program staff often lack experience in regional connectivity technologies and challenges and have limited awareness and connectivity literacy. This affects their ability to give accurate advice about connectivity to remote communities, schools, health centres, emergency services and other Government facilities, which in turn affects the outcomes of procurement processes.

- *Profit-driven sales bias:* Government funded partnerships can result in perverse outcomes, where success of the program is undermined by low community uptake of the funded solution. For example, a local Government partnership with Field Solutions Group (FSG) – an alternate fixed wireless provider – and Blackall/Tambo Shire Council was intended to improve connectivity in the region. However, many community members remain unaware of how to access FSG's services due to poor marketing and limited local engagement. As a result, uptake remains low, and FSG has since gone into receivership. The local Government area is now advocating for an NBN technology upgrade, which would have introduced competition, improved affordability, and better aligned with the needs of the community. Nonetheless, the grant funding has already been allocated, highlighting how commercially driven operators can influence grant processes to the detriment of long-term community outcomes.

Overall, short funding cycles and a lack of independent advice and community needs analysis, contribute to procurement issues by limiting the ability to plan strategically, causing inconsistencies in funding, restricting the scope of projects, creating pressure to spend quickly and hindering effective community engagement.

By ensuring short-term funding initiatives engage with effective place-based and needs-based community analysis and independent advisors, it is possible to create resilient and adaptable telecommunications infrastructure that meets the evolving long-term needs of RRR Australia. This approach will not only address immediate connectivity issues, but it will also lay the foundation for sustainable, transformative social impact that can withstand the fluctuations of Government election cycles.

Stringent procurement protocols and oversight can create inefficiencies (Calvo *et al.*, 2019). Instead of supporting place-based solutions, resources are often diverted into

compliance requirements, reducing the overall effectiveness of telecommunications delivery. While these measures are intended to ensure accountability, they frequently result in significant delays, reduced competition and choice and the adoption of less effective and affordable technologies. This highlights the need for more strategic, inclusive and community-focused approaches to telecommunications investment and planning.

Methodology
Evaluation: a systematic approach
This study used a participatory and relationships approach through story-based evaluation (Dart and Davies, 2003) to assess the effectiveness of current Government telecommunications investment in Queensland. The case studies and connectivity literacy concepts were developed through a desktop study conducted between 2015 and 2024, drawing on publicly available documents, Government submissions, and advocacy reports. Lived experiences, perspectives, and insights were captured using Netnography (Kozinets and Kozinets, 2015), which involved analysing relevant public Facebook pages, forums, advocacy group pages, and volunteer networks. Personal narratives and anecdotal accounts were also collected through informal and conversational interviews with individuals and community representatives during agricultural field days and other RRR events. These qualitative insights were complemented by document analysis and reviewed by three researchers to ensure thematic consistency and alignment. Table 2 provides examples of the organisations and stakeholders whose submissions and contributions informed this analysis.

Results
The following case studies were selected by the researchers because they highlight how fragmented planning, ineffective collaboration, and a lack of strategic oversight and connectivity literacy in telecommunications investment decisions can lead to poor outcomes, increased costs, and low uptake of telecommunications services. These examples demonstrate the consequences of failing to future-proof infrastructure and make sound investment decisions, often leaving communities with outdated, unaffordable, unsuitable, or unsustainable solutions. Each case study underscores the urgent need for informed, strategic approaches to regional telecommunications that prioritise community engagement, independent advice, and forward-thinking investment strategies.

Case study 1: regional connectivity program, federal funding
Telecommunication operators that partner with Government funded infrastructure programs often place financial gains and brand awareness ahead of the actual needs and long-term interests of consumers and small businesses. A lack of connectivity literacy and independent advice, can further influence programmatic decisions, leaving some communities and local Governments misled, underserved and/or unaware of more suitable or cost-effective connectivity options. As a result, public investment and resources can risk being wasted on solutions that fail to future-proof a community's telecommunications infrastructure, often leading to more frequent, disruptive and expensive technology upgrades in the future.

One example is the case of the Central Queensland towns of Bluff, Dingo and Duaringa. The Australian Government cocontributed $3.75m in a partnership with Queensland Capacity Network (QCN), Channel Wireless and Pegasus Internet, through the Regional Connectivity Program, (Australian Government, 2024–2027a) see Table 3. The program was designed to fund place-based telecommunications infrastructure projects to improve digital connectivity across RRR Australia. It aimed to target investment into local priorities to

Table 2. Example submissions to enquiries into Australian telecommunication included desktop analysis

Type of organisation	Organisation/individual name
Consumers/ businesses	• Individuals
	• Small businesses
	• First Nations
Consumer advocacy organisations	• Better internet for rural regional and remote Australia
	• Australian communications consumer action network
	• Isolated children's and parents association
	• National farmers federation
	• National rural health alliance
	• National rural women's coalition
	• Grain growers
	• AgForce
	• New South Wales farmers
Industry	• Wholesalers/statutory infrastructure providers
	• Providers/retail service providers
	• Mobile carriers
	• Tower corporations (infrastructure managers)
	• Installers and equipment suppliers
	• Infrastructure providers
	• Wireless internet service providers association of Australia
Mediator groups	• Telecommunications industry ombudsman
	• Regional tech hub
	• The good things foundation
	• Regional development Australia corporation
Industry bodies	• Comms alliance
	• Australian mobile telecommunications association
	• ustralian digital and telecommunications industry Aassociation
Researchers	• Universities
	• RMIT - ADII
	• PhD students
Advisory groups / forums	• Australian government regional telecommunications independent review committee
	• First nations digital inclusion advisory group
	• Nbn low-income and digital inclusion forum
	• LEO satellite working group
	• TIO telco accessibility taskforce
	• Australian communications and media authority consumer consultative forum
	• nbn^{TM} product development forum
	• bn^{TM} regulatory proposal Fnorum

Table 2. Continued

Type of organisation	Organisation/individual name
Government	• Local government - *councillors/mayors*
	• State Governments - *Government departments and ministers*
	• Federal Governments - *Government departments and ministers*
	• Local government associations
Facilitators/ mediators	• Regions of councils
	• TIO
	• Regional tech hub
	• The good things foundations
	• Regional development associations
Regulators	• Cooperative research Centres - WA
	• Australian competition and consumer commission
	• Australian communications and media authority
	• Australian information commissioner

Source(s): Authors' own work

maximise economic opportunities and deliver region wide benefits (Australian Government, 2024 - 2027a).

However, pitfalls in contracting arrangements means that there is little control over place-based community engagement once funding is delivered to the grantee. Inadequate levels of connectivity literacy, a limited understanding of RRR connectivity needs (Strover *et al.*, 2024) and limited community engagement regarding place-based solutions, combined with profit-driven sales bias, results in little consideration being given to RRR consumer needs, budgets and circumstances.

The townships of Bluff, Duaringa and Dingo face significant affordability challenges, with low median weekly incomes and high living costs. All three townships have a higher-than-average percentage of First Nations People [1] (see Table 3) who have a strong preference for prepaid plans over lock in contracts (FNDIAG, 2024 b). It is, therefore, likely

Table 3. Central Queensland Town Demographics: Bluff, Duaringa, Dingo

Demographics	Bluff	Duaringa	Dingo
*Population	324	262	221
*Number of dwellings	224	170	124
*Median weekly household income	$2,237	$1,300	$1,416
*Indigenous status	9.9%	23.7%	5.9%
**RCP grant amount	$1,554,000	$1,258,000	$942,000

Note(s): *2021 Census Data. Average Queensland Indigenous Status 4.6%, Australia 3.2% (Australian Bureau of Statistics, 2021a). **Australian Government (2024 - 2027a). Qld median weekly household income $2024 (Australian Bureau of Statistics, 2021 b); Australian median household income $1786 (Australian Bureau of Statistics, 2019–20)
Source(s): Authors' own work

in these communities that purchase choice is based on price, at the expense of reliability and quality. The funded solution delivered fixed broadband at higher prices than other comparable services, restricted competition by tying infrastructure to a single retail service provider and involved limited community engagement. As a result, many residents were unaware of the new service, leading to very low uptake (Figure 4).

Case study 2: Mistake Creek State School QLD (approx. 1000 km north west of Brisbane)
In case study two, a lack of communication between departments, inadequate connectivity literacy and single service provider priorities were selected over the place-based needs and best interests of the consumer and community (Table 4).

Case study 3: Education Queensland procurement
The issues identified in this case highlight the ineffectiveness of a one size fits all approach to connectivity. It demonstrates how inadequate levels of connectivity literacy, a limited understanding of RRR connectivity needs and limited community engagement regarding place-based solutions, can often lead to ineffective long-term Government telecommunications investment and frequent technology migrations (Table 5).

Case study 4: nbn^{TM} fibre to the premise upgrades in regional communities
Case Study 4 highlights a lack of collaboration between Government departments that prevented the uptake of improved connectivity. The Regional Connectivity Program Round 1 delivered nbn^{TM} FTTP to Alpha, Surat, Morven and Augathella (Australian Government, 2024–2027 b), Round 2 to Cunnamulla, Julia Creek, Quilpie and Boulia (Australian Government, 2024 - 2027c), valued at $25,778,427. Including partner investment

Background	Problem Statement	Outcome	Gold Star Solution
Regional Connectivity Program (RCP) (Australian Government, 2022b) funding Round 1 supplied alternate fixed wireless for the Central Queensland towns of Bluff, Dingo, Duaringa (nbn™ satellite mapped towns). Grantee Queensland Capacity Network (QCN, 2025) - provides carrier-grade backhaul services to other carriers and to internet and retail service providers. QCN is jointly owned by Powerlink and Energy Queensland and utilises Queensland government corporation owned assets. QCN originally partnered with March IT (2023) to provide the fixed wireless infrastructure through fibre backhaul, but the deal was terminated. QCN next partnered with Channel Wireless (commsday.com, 2022) to provide the fixed wireless infrastructure who intern partnered with Pegasus Internet (2022) to deliver consumer services.	Poor community engagement about place-based solutions with no consideration given to the high percentage of First Nations people (particularly in Duaringa 23.7% and Dingo 5.9% compared to the Queensland average of 4.6%, Table 3) or median weekly incomes and affordability challenges. Towns that are mapped for nbn™ Sky Muster (satellite), often still have consumers connected to ADSL (copper) and generally have low up-take of nbn™ services. Marketing and engagement with local businesses and consumers was limited. QCN/Pegasus plans are expensive and include an installation fee.	Very low up-take of QCN connections in these communities, most likely due to costs involved in installation and monthly plan costs, poor marketing/ awareness, advertising included misinformation about nbn products (a competitor) and was misleading (as below). No details on what addresses can get connected, no mapping of how far this solution reaches for neighbouring agricultural businesses/precincts.	A better place-based solution for these communities would have been nbn™ fixed wireless, which offers more affordable plans, no installation fees, faster speed tiers, a choice of providers, and higher speed tiers. nbn™ also supports communities through local engagement and offers assistance to LGA's in grant applications for improved connectivity. There is also a greater likelihood of future upgrades with nbn™ fixed wireless.

Speed	Monthly Price	Installation Price	Download
Residential			
50MPS	$89.00	$330.00	unlimited
100MPS	$109.00	$330.00	unlimited
250MPS	$142.00	$330.00	unlimited
Business			
100MPS	$149.00	$330.00	unlimited
200MPS	$236.00	$330.00	unlimited
1000MPS	$549.00	$1,310.00	unlimited

https://pegasusinternet.com.au/

Functional literacy gaps: between 40% and 65% of Aboriginal adults are functionally illiterate in English, which directly impacts connectivity literacy (Table 1).

HOW DOES PEGASUS INTERNET DIFFER TO NBN IN OUR AREA?
NBN currently offer satellite services in our area which are very slow, have limited downloads and are expensive. Like Pegasus internet, Fixed Wireless technology is also used by the NBN, they just never made it to Dingo, Bluff and Duaringa. Luckily we now have a Fixed Wireless solution that is faster than NBN and less expensive.

https://pegasusinternet.com.au/pitchers/

Figure 4. CASE STUDY 1 Regional Connectivity Program: Poor community engagement to understand place-based needs and solutions

Source: Authors' own work

Table 4. CASE STUDY 2 Mistake Creek State School, suboptimal communication and poor connectivity literacy

Background	Problem statement	Outcome	Gold star solution
Mistake Creek State School's telecommunications, provided by Education Queensland, also serve community events. Before 2020, the school had no mobile coverage. Under Round 4 of the Mobile Black Spot Program (Australian Government, 2022), the school received funding for a Telstra Small Cell, designed for low bandwidth coverage in small areas. Announced in March 2019 and installed in April 2020, the project faced delays, including a \$24k+ development application fee, later reduced to \$12k by the Shire Council. The council initially aimed for a full tower, but it wasn't feasible due to the lack of available backhaul	Education Queensland (EDU QLD) did not permit the small cell to be built on school grounds, so a local landowner agreed to have it installed. The school has faced multiple technology migrations and ongoing connectivity issues. Currently, it is connected via telstra's agile satellite solution, which is inadequate. Staff have also struggled to get nbn^{TM} connections to staff accommodation, even when willing to pay. The department of housing refused the free nbn installation, preventing staff from accessing the internet at home	In recent years, Mistake Creek School has undergone multiple technology migrations. Before 2018, the school used an Optus satellite service. By 2020, it had a nbn^{TM} satellite, but connectivity issues persisted. The teacher could not get Education Queensland's (EDU QLD) IT department to help her when issues arose with the nbn^{TM} equipment (causing significant dropouts). EDU QLD's IT department told the teacher to go to Telstra. However, Telstra was not the retail Service Provider. As a result, Telstra sent the teacher back to EDU QLD's IT department. EDU QLD's IT department told the teacher to contact nbn^{TM} (nbn^{TM} are a wholesaler, not a Retail Service Provider, so they could not help). The teacher faced a frustrating cycle of blame between Education Queensland (EDU QLD), Telstra, and nbnTM, with no resolution. In 2020, the school switched to a Telstra Small Cell, which had limited capacity not sufficient to service the needs of the entire school. In 2023, Telstra installed their Agile Satellite system (Telstra, n.d.). This is a GEO based system and the school continues to have connectivity issues	A better solution would be a thorough needs analysis of the school's connectivity requirements and a place-based assessment of what is available, costs of the infrastructure and plans, length of contract etc

Source(s): Authors' own work

Table 5. CASE STUDY 3 Education Queensland procurement issues: a one size fits all approach

Background	Problem statement	Outcome	Gold star solution
Education Queensland (EQ) Bandwidth Upgrade Program (Queensland Government, 2021) - In December 2021, EQ signed a $187m 5-year agreement with Telstra to upgrade bandwidth in Queensland state schools. Telstra would also invest $109m in upgrading over 370 exchange service areas across Queensland. ADSL is the main broadband technology via telephone exchanges, so the upgrades were likely for ADSL exchanges. Phase 1 commenced in March 2022 to increase average school bandwidth speeds to 1.6 Mbps per student. Phase 2 began in 2024 to increase speeds to 5 Mbps per student by 2026. As of September 2024, 56 schools have been connected to fibre optic for the first time, with more isolated communities to be connected using low earth orbiting satellites	ADSL is an aging technology, already replaced with improved connectivity in many regional communities, which brings into question the public benefit of value for money in this case study. Details of the 5-year contract with Telstra have not been transparent. No announcements have been made as to when QLD State Schools can expect better connectivity from this program and how this will also benefit communities and other Government services in rural and remote areas	Some isolated QLD State Schools, like Jericho, Kindon, Forsayth, and Mistake Creek, still face connectivity issues despite investments. Forsayth and Kindon were previously on congested Telstra mobile networks, inadequate during peak seasons. A 5-year contract with a single provider, without considering the specific needs and available technologies for each school, has also led to missed opportunities e. g., free business-grade Fixed Wireless from a local WISP. Education Queensland declined the offer due to procurement restrictions, highlighting the limitations of a one-size-fits-all approach to connectivity. Schools such as Boulia, Morven, Augathella, Surat, and Quilpie now have nbn fibre, but funding for ADSL upgrades hasn't benefited communities, small business or government services and has been superseded by nbn fibre, though schools remain on Telstra services, which are inadequate	A needs and availability analysis would have identified appropriate place-based solutions. The funds invested could have been better leveraged to deliver long-term connectivity solutions for schools, other government facilities, and entire communities. Many towns identified by the QLD Government program in 2022, including Cunnamulla, Emerald, Alpha, Yeppoon, and Barcaldine, now have access to nbn Fibre to the Premise (FTTP). Once nbn FTTP is rolled out the ADSL/exchange is phased out and can no longer be accessed by consumers and small businesses. FTTP customers have access to improved connectivity through the nbn, making the decision to upgrade ADSL exchanges in these areas a poor long-term investment

Source(s): Authors' own work

and cocontribution the total investment into the FTTP upgrade in these communities was over $50m.

Despite this investment and improved connectivity in the townships, there has been a low uptake of nbn fibre broadband services, particularly for Government organisations, public interest premises and staff accommodation facilities. Improved connectivity would increase social impact and assist in attracting and retaining staff in small rural communities by enabling better access to digital resources, remote working opportunities, and enhanced service delivery (Harrington and Hay, 2026). Even though social impact through improved health, education and emergency response services were used as case studies in grant applications, existing Government contracts and procurement barriers have prevented these services from benefiting from the improved infrastructure.

Rather than a place-based approach to determine the best connectivity solution for each location, some Queensland Government and public interest premises are locked into older, less reliable technologies and plans sold by a single service provider. In addition, instead of leveraging existing new infrastructure, some facilities are being connected via satellite technology, even when a fibre option is available. For example, some of the new Central Western Queensland Country University Centres (Australian Government, 2025) have been connected to Starlink internet services, despite nbn Fibre to the Premise (FTTP) being available. For example, in Barcaldine and Boulia nbn fibre would offer faster speeds, lower latency, increased reliability, and be more affordable.

In the Queensland towns that have been upgraded to nbn fibre, few schools, health centres and emergency service buildings have connected to the new infrastructure. Leveraging the upgraded connectivity could significantly improve the quality of life for staff and residents, making RRR communities more attractive and sustainable and ensuring investment is maximised.

It is essential for the Queensland Government and other Government-funded services to collaborate between Departments, align planning, policies, and contracts with available infrastructure and community needs to fully utilise the potential of these investments. Doing so would ensure that the connectivity upgrades fulfil their intended purpose of boosting economic growth, improving public services, and supporting rural resilience.

Taken together, the four case studies reveal recurring systemic challenges in Queensland's regional telecommunications landscape. Case Study 1 highlights how poor community engagement and limited provider competition can undermine infrastructure investments, particularly in low-income and high First Nations population areas. Case Study 2 demonstrates how siloed departmental decision-making and inadequate connectivity literacy can lead to suboptimal solutions, even when infrastructure is available. Case Study 3 exposes the limitations of one-size-fits-all procurement models, showing how they fail to accommodate place-based needs and miss opportunities for more effective, community-aligned solutions. Case Study 4 illustrates how even well-funded upgrades like nbn™ FTTP can fall short of their intended impact when cross-departmental collaboration and contract alignment are lacking. Across all cases, the absence of strategic planning, independent advice, and meaningful community engagement emerges as a consistent barrier to achieving equitable, reliable, and future-proofed connectivity in RRR communities.

Discussion

This paper aims to highlight the consequences of fragmented planning, ineffective investment, and a lack of strategic oversight in telecommunications decisions across rural, regional, and remote (RRR) Queensland. The study demonstrates how these issues can lead to poor outcomes, increased costs, and low take-up of services. Specifically, the paper

identifies the negative impacts of these issues on telecommunications outcomes in RRR areas, including compromised service quality and increased financial burdens. It also explains how these problems contribute to poor outcomes by creating inefficiencies and barriers to service adoption. Finally, the paper outlines the key components of effective approaches, such as informed, collaborative, strategic, and collective planning, which can enhance community engagement, provide independent advice, and promote forward-thinking investment strategies.

The case studies illustrate the consequences of failing to future-proof infrastructure and make sound investment decisions, often leaving communities with outdated, unaffordable, unsuitable or unsustainable solutions. Across the case studies, low uptake of upgraded services was a recurring issue. For instance, in Duaringa, where 23.7% of the population identifies as First Nations and the median weekly income is $1,300 (well below the national median weekly income), the cost of installation, poor marketing and limited provider choice has contributed to poor adoption of new services. These figures highlight the importance of affordability and culturally appropriate engagement in connectivity planning. Negative outcomes of fragmented planning, ineffective investment and a lack of strategic oversight in telecommunications decisions across Queensland have led to poor outcomes, increased costs and low uptake of services.

Single supplier contracts within state Government procurement protocols are also preventing essential services from accessing the most suitable technology solutions. Similarly, Government and social housing face challenges due to restrictive or ineffective procurement processes and suboptimal investment decisions. Inadequate procurement processes and a lack of needs analysis and planning in RRR telecommunications can and has resulted in significant gaps in connectivity and at times infrastructure, impacting the quality of public services and the safety of residents.

Connectivity literacy is arguably the largest barrier. There is a lack of consumer experience and on-ground grass roots understanding, connectivity literacy and meaningful community engagement. This limits the ability to identify and address the real-world connectivity needs of RRR areas. The absence of genuine collaboration with communities and stakeholders has resulted in a failure to prioritise sustainable, impactful solutions for RRR Queenslanders and the services they rely on to conduct their business and deliver health, education and emergency help.

Quantitative data reinforces the qualitative findings. For example, in the case of the Field Solutions Group (FSG) partnership with Blackall/Tambo Shire Council, uptake of the funded fixed wireless service remained low due to limited community awareness and engagement. Ultimately, this low uptake may have contributed to FSG entering receivership. Similarly, despite over $50m invested in nbn™. FTTP upgrades across multiple Queensland towns, uptake among Government services and accommodation remains minimal.

There is an urgent need for informed, strategic approaches to regional telecommunications that prioritise community engagement, connectivity literacy training, independent advice, and future focussed investment strategies.

To achieve meaningful change at both state and national levels, a new approach is needed to reimagine telecommunication strategy for RRR communities. While national reform is needed, localised leadership and community-driven planning can serve as scalable models for broader application. In this papers context Queensland is uniquely positioned to lead by example. The State's proactive investment in digital infrastructure, commitment to regional inclusion, and collaborative innovation ecosystem (Government, 2023–2026) make it a natural frontrunner in shaping a future-ready, equitable communications strategy. A renewed focus on strategic planning, targeted infrastructure assessment, program evaluation and

community-driven solutions through improved leadership is required to inject new energy and insights into addressing long-standing challenges.

Theoretical contribution

The paper addresses a significant gap in the social impact literature by highlighting the consequences of fragmented planning, ineffective investment, and a lack of strategic oversight in telecommunications decisions across rural, regional, and remote (RRR) Queensland. It emphasises the urgent need for informed, collaborative, strategic, and collective approaches to regional telecommunications that prioritise community engagement, independent advice, and forward-thinking investment strategies.

The theoretical contribution of the paper lies in its application of the Theory of Change (ToC) framework to map the causal pathways between collaborative planning, improved connectivity literacy, and transformative social impact in Queensland's RRR communities. This systems-level approach supports the paper's strategic orientation and highlights the importance of multistakeholder engagement and long-term investment planning. Additionally, the paper draws on established theories in consumer behaviour and marketing, such as consumer knowledge, consumer confusion, and information asymmetry, to further understand the concept of connectivity literacy.

By situating Queensland's experience within a broader international context, the paper contributes to a growing body of work advocating for resilient and inclusive telecommunications systems worldwide. The paper underscores the need for strategic investment models that prioritise local needs, independent advice, and long-term sustainability.

Practical implications

The findings highlight the importance of strategic planning, community engagement, and independent advice in telecommunications investment and planning for rural, regional, and remote (RRR) communities. Managers and policymakers can use these insights to develop more effective and sustainable connectivity solutions that address the unique needs of these communities to:

(1) *Establish a Diverse Expert Panel:* (a) Form a panel with experts in regional telecommunications, community engagement, and digital inclusion; (b) Ensure the panel members serve set terms with staggered appointments to maintain continuity and introduce fresh ideas - this approach balances stability and innovation, enabling the panel to remain dynamic, adaptive, and informed by both historical context and new perspectives.

(2) *Implement Strategic Planning and Evaluation:* (a) Focus on strategic planning, targeted infrastructure assessment, and program evaluation - include mandatory reporting on uptake rates and cost-per-connection metrics to evaluate investment effectiveness.

(3) *Prioritize Community-Driven Solutions:* (a) Engage with local communities to understand their specific needs and preferences - use demographic indicators such as income levels and Indigenous population percentages to tailor engagement strategies.

(4) *Apply the Theory of Change (ToC) Framework (Doherty et al., 2022):* (a) Use the ToC framework to define success, identify causal pathways, and align interventions with desired outcomes.

Table 6. Theory of change

IF…	THEN…	HAS THE IMPACT OF…	TO CREATE TRANSFORMATIONAL CHANGE	CONTRIBUTES TO THE VISION OF…
If there is greater collaboration and strengthened networks with a range of different people and organisations who bring diverse experience, knowledge, and skills	RRR communities and businesses will have increased capacity to adopt new telecommunications technology and improve their community's telecommunications infrastructure and connectivity literacy	RRR communities and businesses are connected to quality, resilient, reliable, affordable and equitable voice and broadband services	RRR communities and businesses contribute to complex systems and the economy	Innovative, inclusive, future proofed telecommunications in Queensland

Source(s): Authors' own work

Recognise that solutions depend on each community's unique circumstances in getting connected, staying connected, and using connectivity effectively (Doherty *et al.*, 2022; Stachowiak, 2013) (Table 6).

The ToC framework accounts for the limitations that arise from the complexity, ambition and long-term nature of achieving improved telecommunications outcomes. For example, it recognises that external influences, varying timeframes, and differing scales of impact shape outcomes – and that solutions to connectivity are not absolute. We recommend using a project logic to:

(1) *Promote Connectivity Literacy:* Provide training and resources to improve connectivity literacy among consumers and government staff - ensure that decision-makers have a thorough understanding of regional technologies and barriers to access.

(2) *Enhance Cross-Departmental Collaboration:* Foster collaboration between government departments to align planning, policies, and contracts with available infrastructure and community needs - leverage economies of scale to negotiate better terms and ensure equitable distribution of services.

(3) *Adopt Place-Based and Needs-Based Approaches:* Implement place-based solutions that address the unique needs of different RRR communities - avoid one-size-fits-all procurement models and prioritize solutions that are tailored to local contexts.

(4) *Apply program logic to express expected outcomes:* Use direct, active language that clearly identifies who the subject of the desired outcome is and what they are expected to know, change, or do differently.

See Figure 5.

Inputs	Activities	Outputs	Outcomes
• **Technical Expertise**: Professionals with deep knowledge of regional telecommunications and digital infrastructure • **Regional Engagement Experience**: Individuals with direct insights into the unique challenges of rural and remote communities • **Government Program Expertise**: Experts familiar with state, local, and federal telecommunications programs to ensure coordination and alignment. • **Digital and Connectivity Literacy**: Specialists who can address knowledge gaps and create practical, inclusive solutions to enhance connectivity literacy and digital inclusion. • **First Nations Representation**: Members with lived experience and expertise in meeting the connectivity needs of First Nations communities. • **Governance Skills**: Leaders with board-level experience to drive accountability and strategic decision-making • **Independence**: Free from commercial or partisan influences, ensuring decisions focus on community benefits. Members should have no conflicts of interest with telecommunications providers or other vested entities, allowing for objective, transparent, and community-focused recommendations • **Funding**: To ensure that the work can be completed without barriers	• **Designing a Strategic Plan**: Developing a comprehensive roadmap for improving telecommunications and digital inclusion in RRR areas • **Assessing Regional Infrastructure**: Identifying gaps and prioritising communities needing urgent improvement using a clear, coded system • **Auditing Existing Programs**: Reviewing digital and connectivity initiatives, procurement processes, and resources, including digital and connectivity literacy training and consumer help services, to uncover inefficiencies and opportunities for improvement and collaboration • **Identifying Barriers**: Outlining the challenges to access and creating targeted strategies to overcome them • **Supporting Community Digital Planning**: Empowering local stakeholders to create, implement, and evaluate digital plans tailored to their needs, ensuring these plans evolve alongside technology and priorities	• Meaningful stakeholder engagement • Increased connectivity literacy • Policy recommendations • Improved services • Strong networks	• Improved liveability, employment, education, health and business activities. • Staff retention • Consumers have access to reliable, resilient, affordable, adequate internet
		Impact	**Evaluation**
		• Innovative, inclusive, future-proofed telecommunications strategy and investment • Sustainable, transformative social impact • Fundamental changes to government approach to rural, regional and remote needs • Improved support systems. • Sustained drop in reliance on connectivity literacy volunteer groups to advocate for RRR people	• ADII • Liveability Data • Employment Data • Education Data • Health Indicators • Policy • Stakeholder stories and feedback • Observations • Interviews

Figure 5. Recommended Program Logic for Innovative, Inclusive, Future Proofed Telecommunications in Queensland

Source: Authors' own work

Limitations and further research

This study has several limitations that should be acknowledged. Firstly, the use of story-based evaluation methods introduces potential subjectivity, which may affect the generalisability of the findings. The qualitative nature of this approach can lead to challenges in data analysis and interpretation, making it difficult to draw broad conclusions.

Additionally, the absence of a strategic plan, clear priorities, cross-department and Government collaboration, and meaningful stakeholder engagement has historically contributed to ineffective telecommunications investment and decision-making in Queensland's RRR areas.

Addressing these systemic issues is crucial to ensuring that future investments lead to sustainable, high-quality connectivity solutions that meet the unique needs of RRR communities.

Future research should focus on developing and implementing informed, strategic approaches that prioritise community engagement, independent advice, and forward-looking investment strategies. By doing so governments can ensure that essential telecommunication services in remote areas are not compromised. This will ultimately contribute to the safety, resilience and well-being of residents in remote communities.

Future studies could also explore the impact of different community engagement models on the effectiveness of telecommunications projects. Comparative analyses between regions with varying levels of connectivity literacy and infrastructure could provide valuable insights into best practices for enhancing connectivity in RRR areas. Additionally, longitudinal studies examining the long-term outcomes of strategic telecommunications investments would help to validate the proposed approaches and refine the theoretical frameworks used in this research.

Acknowledgements

Note

[1.] First Nations communities face significant challenges in achieving digital inclusion due to a lack of digital skills, limited access to affordable and appropriate digital devices, and unreliable internet connectivity. These issues hinder their ability to fully participate in the digital economy and society, necessitating tailored, community-driven approaches to bridge the digital divide and ensure equitable access to digital resources and opportunities FNDIAG. (2024b). *First Nations Digital Inclusion Roadmap 2026 and Beyond*. Online: Australian Government Retrieved from www.digitalinclusion.gov.au/sites/default/files/documents/first-nations-digital-inclusion-roadmap-2026-and-beyond.pdf

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