FSM Communications Sector Performance and Efficiency: Report on Significant Matters

1 Introduction

A well- functioning telecommunications (telecoms) market is an important contributor to the economic and social development of the FSM and the lives of its people.

A well-functioning market requires:

- modern infrastructure and ongoing investment in new infrastructure both on the main islands and the outer islands of the FSM.;
- wide service coverage at a quality level that reflects customer needs, and at an affordable price;
- Strong trust and confidence by the people of the FSM that they have, and will continue to have, excellent connectivity to the digital world to advance their economic, social and personal needs.

Congress has recognized this and has committed to the development of a strong telecommunication market by:

- **Opening up the FSM Market to competition:** Competition helps drive performance—as telecom businesses compete for subscribers, they seek to understand customer preferences better than their competitors, and to deliver services that meet those preferences at a competitive price.;
- **Investing in modern grant-funded assets:** Obtaining funding for submarine cables to connect the people of the FSM States with each other and the rest of the world, and more recently agreeing to fund a modern fiber to the home network and modern satellite services for the outer islands. These investments form part of FSM's critical platform assets and will be looked after by a Government-owned company, the Open Access Entity, to be made available on equal terms to any retail telecoms operator that wishes to provide a service to customers;

- **Investing in new Government digital services:** Earlier this year, Congress committed grant funds to developing online interaction between Government and its citizens. This might include Citizens accessing health services online, additional education support, as well as transactional matters, such as applying for passports and licenses online.
- **Establishing the TRA as a market referee:** Congress established the TRA to encourage competition and regulate behavior, advance the interests of consumers, and provide Government, consumers and operators with information that makes clear how the sector is performing and where improvements need to be made.

This report covers significant matters relating to the performance and efficiency of the communications sector of the Federated States of Micronesia (FSM[1]). Before addressing the matters specifically required by the Act, we first explain the context of this report:

- the sector reforms carried out to date and their intent
- the benefits the reforms have already created for end-users
- the potential further benefits of the reforms that are yet to be unlocked, and
- steps the FSM Government can take to unlock those further benefits.

We then focus in more detail on:

- The contribution of the communications sector to economic development in the Federated States of Micronesia (FSM) (s319(4)(d)(ii))—we also go into further detail on the wider benefits to the country of raising telecommunications access and investment
- The adequacy and quality of services (s319(4)(d)(i))—we examine the current state of FSM's telecoms market and use comparator countries to benchmark the adequacy and quality of services provided, as well as the prices paid.

Finally, attached to this report is a summary, that highlights:

- What further actions need to be taken to improve the sector's performance;
- What the TRA's is doing to support a well-functioning market, including facilitating new competitive entry into the sector and developing greater public understanding of how the market is performing, and where it needs to improve.

[1] As required under section 319(4)(d) of the Telecommunications Act and in discharge of the TRA's function under section 304 (g)

2 Context

Access and pricing of telecoms services in FSM does not compare favorably to other similar Pacific nations

Over the last decade, the performance of FSM's telecommunications (telecoms) sector has fallen behind a number of Pacific nations with similar characteristics. In particular, the uptake of mobile services, at approximately 21 percent of the population, is much lower relative to comparators, with prices in FSM being relatively high (25 to 54 percent higher than comparators). The cost of a good-quality fixed-line internet connection is also quite high.

In recognition of these problems, the FSM Government has developed and implemented a set of reforms to improve the performance of the telecommunications sector.

The sector reform undertaken to date has helped secure grant funding to provide consumers with fiber and satellite access, and has laid the groundwork for retail competition

The reforms are designed to improve service access and quality for Micronesian consumers, as well as reducing prices by:

- Splitting the sector into two distinct parts:
    - **wholesale fiber services**, where, to reduce costs to consumers, it makes sense for a single entity to build, operate and maintain one set of submarine cables that connect FSM to the rest of the world, and one local fiber network that connects households and businesses to those submarine cables—international experience (particularly for small economies) shows that it is inefficient and ultimately costly for consumers, for operators to be competing in the provision of costly long life infrastructure
    - **retail services**, where different telecoms operators have equal rights to use the platform created by wholesale fiber to design and sell services to end users—international experience shows that competition in the retail sector can drive improved access to and quality of services, while reducing costs
- Establishing a new government-owned wholesale-only provider—FSM Telecommunications Cable Corporation, also known as the Open Access Entity (OAE)—and vesting OAE with the submarine cable assets, as well as the grant funding and responsibility for undertaking the FTTP rollout
- Creating the TRA, an independent body to facilitate competition, advance the interests of consumers through regulating behavior in the telecoms sector including abuse of market power, and provide Government, consumers and operators with information that makes clear how the sector is performing and where improvements need to be made.

These reforms are consistent with international best practice, and provide Congress and the people with the confidence that:

- the grant funding provided will be efficiently applied to improve telecoms services for Micronesian consumers, avoiding any unnecessary asset duplication, and reducing costs, which provides long term benefits through lower prices for services
- the long-lived telecoms network assets created with grant funding will be operated to maximize benefits for Micronesian consumers. —Because the OAE is prohibited from having retail customers, it will be in OAE's interest to actively encourage new operators into the retail sector and make its telecom network assets available to all operators on equivalent terms

Actions contrary to the intent of these reforms—for example, FSMTC attempting to install competing fiber assets in the same area where OAE was intending to roll-out an open-access grant-funded FTTP network—can significantly impact the development of the telecoms sector. This can occur though a number of closely connected consequences:

- it can impact donors' confidence to grant fund critical long-life infrastructure, which means FSM then needs to revert to more expensive capital or abandon investment, with the resulting longer-term impact of higher prices or poorer services or both;
- it diverts limited capital to areas of inefficient duplication with resulting loss of investment in other areas;
- it sends a confusing message to potential new entrants into the market as to how committed FSM is to an open market—while the Government has committed to the OAE being the provider of grant-funded essential long-life assets, the incumbent government-owned retail operator is seeking to act contrary to that commitment.

Experience from Pacific countries with similar population and geography to FSM demonstrates that competition is workable and beneficial

Retail competition is viable in the FSM telecoms market notwithstanding its small population size and geography. These challenges do not preclude sustainable competition from emerging:

- Retail competition is already occurring in a range of other island countries with similar populations and geographies to FSM. These include Pacific nations like Tonga, Samoa and Vanuatu, as well as Caribbean island states.
- The TRA has seen strong interest from a number of Pacific regional telecoms operators that are actively considering opportunities in the region. Two of these operators are specifically considering entry into the FSM market under the right conditions.

Competition is not only workable, but also beneficial. One of the benefits from competition is the drive by competitors to grow the market and sell their services to more customers. We see evidence of this happening across the Pacific, where new entry has driven stronger uptake of mobile services in Tonga, Samoa, Vanuatu and Fiji.

If FSM can achieve the same growth in mobile subscriptions as seen in the other countries with multiple mobile providers, we can expect to see a large increase in the number of people using mobile services. Even assuming uptake rates only move in line with

comparators that have the lowest uptake, FSM can still expect access to mobile services to approximately double or triple—that would mean 20,000 to 50,000 people gaining access to mobile services compared to current levels.

The other common benefit of competition is reduced pricing to end users. For example, achieving prices for bundled mobile services (voice and data) that are similar to prices in Vanuatu would mean a reduction in FSM prices of 25 percent. Samoa and Tonga price levels are 38 percent and 54 percent below those in FSM.

The competition benefits of the reforms are yet to be achieved—new entry by at least one full-service operator is needed

While the reforms have already delivered benefits to FSM by helping secure over $38 million of grant funding, the benefits of competition are yet to be unlocked. In order for these improvements to be realized, the potential for new entry needs to result in actual new entry into the retail market. The performance of the comparator countries (described in section 4) shows that the key to unlocking the benefits is at least one additional operator providing a range of services that is comparable to the incumbent.

While we are seeing signs of niche players obtaining or applying for licenses and getting ready to provide internet services, there are only a handful of regional players that have the expertise, capital and desire to compete as a full-service telecoms provider.

A lack of follow through on the reforms to date could mean that FSM misses out on the benefits driven by competition. With much of the difficult legislative, regulatory and structural reform now complete, it is important to keep up the momentum and continue to engage with potential new entrants on their pathway to entry.

New entry interest and support for FSMTC to be competitive

The TRA has had discussions with full-service telecoms operators in the region, and there is interest from several parties. These parties will want to engage with Government on their possible pathways to entry into the FSM.

Given this interest, it is timely for the Government to progress reform actions that will be necessary to ensure a smooth transition to a competitive market.

There are two elements to this:

- Building potential new entrants' confidence in the FSM's commitment to a fair playing field; and
- Supporting FSMTC as it re-focuses its operations away from investing in assets that the OAE is investing in, and towards the retail market—the customer.

We address each of these in turn.

Building potential new entrants' confidence

Entering a new market is a major decision for these operators, and is not taken lightly. The main barrier that all potential operators have raised with TRA has been the perceived influence of FSMTC as the government-owned incumbent. Potential new entrants, while

recognizing the considerable steps taken by Congress, will want to have confidence in the FSM's long-term commitment to a fair playing field. The TRA will work with Government on practical steps that may help evidence the ongoing commitment.

S*upporting FSMTC as it re focuses its operations on customers*

Since its establishment in 1981 as national carrier, FSMTC has contributed immensely to the development of FSM's telecoms sector—at that time, a vertically-integrated government-owned national carrier was the only workable way to provide FSM (and other countries in the Pacific) with telecoms infrastructure and services. FSMTC's role was to fill both the infrastructure and the services gap that no other operator was able or willing to fill.

In the nearly four decades since then, with limited resources, FSMTC has done a great job in improving telecoms access in the FSM and keeping up with technological change. Over that time, the Pacific telecoms market has undergone extensive change. In particular, while it still makes sense for many of the core telecoms assets to be provided by a single wholesale operator, there is no longer a need for that same operator to also provide retail services.

In fact, keeping the two functions together would deter entry from the privately-owned regional operators that are willing to invest in providing retail services to consumers in the Pacific. Deterring that entry would deny FSM consumers the benefits that retail competition brings.

Congress has determined that, going forward, OAE will be the main Government-owned entity with responsibility for filling the wholesale infrastructure gap—it will own and operate the submarine cables, satellite connectivity assets and FTTP networks, that ensure Micronesians can connect to each other and the world.

As FSMTC passes on responsibility for providing the wholesale infrastructure, it will be able to focus all of its efforts on the other crucial role it has always played—understanding and serving the retail telecoms needs of Micronesian end users.

As retail competition takes hold, the structure of the FSM telecoms market will rapidly change, creating challenges for both FSMTC's and OAE's business operations. As the owner of natural monopoly connectivity infrastructure, the OAE is likely to quickly become the main state-owned driver of value in the FSM telecoms sector.

At the same time, FSMTC will be exposed to competition and face significant long-term risks to its ability to maintain and grow profitability. This risk exposure is an inevitable design feature of the reforms. Therefore, the transition from the current to the future structure needs to be carefully planned and implemented, to protect and enhance the FSM Government's investment in both the wholesale and the retail part of the telecoms sector.

We note that, in recognition of the risks to FSMTC, the Financing Agreement for the Digital Federated States of Micronesia Project contains a covenant that requires the Government to "submit to its Congress, within 6 months from the Effective Date, a report detailing the

FSMTC's transition to a retail-focused service provider, addressing the risks the potential financial and operational impacts on FSMTC of the competitive telecommunications market and the development of the National Digital Connectivity Infrastructure".[2]

Without pre-judging the outcome of this crucial report, we suggest the Government consider the following actions to prepare for the structural shift in the market, help demonstrate the Government's commitment to retail competition, support FSMTC through the restructuring it needs to prepare for competition from potential new entrants, and in doing these things better position the FSM to access the benefits of the telecommunications reforms that successive FSM Government have committed to:

1. Strengthen FSMTC's role in the retail sector by amending section 203 of the FSMTC Act of 1981 to align the powers and responsibilities of FSMTC with the intent of the reforms set out in the Telecommunications Act 2014, and to explicitly remove any overlap with the powers and responsibilities of OAE—OAE should focus on building and operating wholesale connectivity assets that in turn enable FSMTC, or any other retail operator, to design and deliver retail services that best serve end users' needs.

   These amendments are urgently needed to end unproductive and inefficient asset competition by FSMTC and OAE, which undermines the intent of the reforms and jeopardizes least-cost outcomes for end users.

2. Support FSMTC's governance arrangements to include Board members with expertise in competitive markets with strong customer orientation—This will help FSMTC's ability to compete as a retail provider in a commercial manner, while complying with its legal and regulatory obligations

3. Consider the following structural reforms to strengthen FSMTC's balance sheet as a retail focused provider:

   a. transfer FSMTC's assets that enable wholesale services (and attributable debt) to OAE—the transferred assets would likely need to include the existing copper networks (including the local loop) existing fiber networks on Pohnpei and Weno, telecom exchange buildings, and satellite connectivity assets

   b. transfer staff resourcing between FSMTC and OAE to retain and enhance the existing local telecoms sector expertise available to the Government-owned part of the telecoms sector to invest in, maintain and operate national connectivity infrastructure.

The rest of this report explains in more detail the potential of the FSM telecoms sector to contribute to the country's economic growth (Section 3) and the adequacy and quality of services in FSM relative to comparator markets (Section 4)

[2] Schedule 2, Section I.A.7.

3 Contribution of Telecoms Sector to Economic Development

Robust telecoms services have a positive impact on societies and economies, improving wellbeing through better access to health and education services, as well as contributing measurably to economic growth and prosperity. A well-performing telecoms sector will enable FSM to fully realize these potential gains.

Access to telecoms improves the wellbeing of Micronesians

Beyond direct economic growth, living standards are increased through e-health applications. Digital health strategies can create a more integrated and streamlined health system. Digital technologies, such as remote consultations and online patient data, can improve the quality and reach of the health service, drive down costs, and reduce wait times for appointments and prescriptions.

FSM has already leveraged some digital health approaches[3] and is well-placed to make more extensive use of these going forward as connectivity improves further with the upcoming fiber to the premise roll out and improved modern satellite connectivity for remote islands. Congress has also recently committed grant funds to developing online interaction between Government and its citizens. This might include more citizens accessing health services online, additional education support, as well as transactional matters, such as applying for passports and licenses online.

Better telecommunication also improves educational attainment through e-learning programs and information communication technologies. This applies to existing schools, but also widens the horizon of education at all ages. Important online resources include video conferencing, broadcasting lectures and classes, learning management systems, and online information. These resources help raise the quality of and participation in education by enabling distance and flexible learning opportunities.

More people can obtain college degrees if they can distance-learn in their home state using online universities, rather than travelling to Pohnpei or another country to pursue higher education courses. Online degrees and universities are becoming more mainstream internationally, and with improved internet connectivity Micronesians can take advantage of this shift. Encouraging and enabling online education would raise the level of human capital in FSM.

[3] For example, highly detailed x-rays and other images can be scanned and sent over the internet for computer assisted analysis or a professional second opinion (teleradiology); given a fast and reliable internet system. A study looking at a teleradiology trial in Chuuk state finds even relatively low-resolution images (in 2004) to be valuable in diagnosis. See Park JM, Ruess L, O'Connor SC, Hussain F, Oshiro DY, Person DA. Internet consultations from a remote Pacific island: impact of digitized radiologic images on referral decisions. *J Digit Imaging*. 2004;17(4):253-257. doi:10.1007/s10278-004-1022-6

A well performing telecoms sector has a positive effect on economic growth

FSM has a lot of potential to further improve growth through telecoms. There is clear evidence that effective telecoms infrastructure raises living standards and stimulates economic growth through increases in productivity. This is strongly supported by academic research showing that:

- Telecoms networks, especially mobile networks, drive economic growth in developing countries[4] [5] [6]
- FSM and other Pacific countries can increase the size of the tourism industry with greater use of information and communication technology (ICT)
- With improved internet connectivity, countries like FSM can potentially develop an e-service export industry.[7]

Telecoms contribute to growth in tourism

There is potential for further connectivity to drive commercial development in the FSM tourism industry. FSM has scope for making greater use of internet connectivity in tourism through:

- Hotel advertising and booking—hotel websites are not yet universal, for example just three of the six hotels listed by the Chuuk Visitors Bureau appear to have websites where a visitor could book.
- Providing better service to visitors—Reliable fast Wi-Fi in hotels and a good mobile service are increasingly expected by visitors. Good service improves the tourist experience and increases positive reviews. Wi-Fi connectivity in FSM hotels, especially outside of Pohnpei, can be slow and unreliable.

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[4] Most papers in the review from the ZEW Centre for European Economic Research find positive impacts of ICT on both developed and developing countries—Bertschek, Briglauer, Hüschelrath, Kauf, and Niebel. 2016. *The Economic Impacts of Telecommunications Networks and Broadband Internet: A Survey*, ZEW Centre for European Economic Research. URL: http://ftp.zew.de/pub/zew-docs/dp/dp16056.pdf

[5] Quantitative estimates include that developing countries with relatively high ICT network investment increase their productivity growth rates by between 0.1 and 0.3% annually relative to those with a modest investment rate, and an increase in mobile phone penetration of ten percent increases annual productivity growth by about 0.15%. Annual compounding these increases create significant improvements over time—Hawash and Lang. 2020. *Does the digital gap matter? Estimating the impact of ICT on productivity in developing countries*, Eurasian Economic Review

[6] A study looking specifically at Pacific finds similar results with percent of population with access to telephone lines increasing productivity per worker. Kumar, Ronald Ravinesh, Radika Devi Kumar, and Arvind Patel. "*Accounting for telecommunications contribution to economic growth: A study of Small Pacific Island States.*" Telecommunications Policy 39, no. 3-4 (2015): 284-295.

[7] The World Bank's 'Pacific Possible' report projects an 'additional average annual real GDP growth through ICT-enabled use of knowledge' of 0.2%. However, higher growth of 1-2% is projected in countries with a higher assumed uptake of ICT, such as PNG, Solomon Islands and Vanuatu

World Bank. 2017. *Pacific Possible, Long-term Economic Opportunities and Challenges for Pacific Island Countries,* URL: http://documents.worldbank.org/curated/en/168951503668157320/pdf/ACS22308-PUBLIC-P154324-ADD-SERIES-PPFullReportFINALscreen.pdf

- Better targeting of visitors with activity offerings and local services—increasing telecoms service levels make it easier for individuals and small businesses to connect with visitors, for example placing the location on online maps or putting an extra room on Airbnb.

Academic studies support the notion that robust telecoms increase the number of tourists in small island countries.[8] Better telecoms would increase GDP, employment and potentially allow a wider range of people to benefit from tourism. As we discuss in the next chapter, relative to similar comparators, there is plenty of room for improvement in the FSM telecoms sector to drive the potential gains.

Better telecoms can grow an e-service export industry

FSM faces the significant barrier of geographic isolation, giving rise to high transport costs. With good internet connectivity, distance to market becomes irrelevant for many service exports.

Global Outsourcing Services—for example, business process outsourcing (BPO) of 'basic data': data entry, digitization, and reconciling databases—present an exciting opportunity, especially as Micronesia is English-speaking. This would take time and training to scale, and initially FSM would only be able to provide a limited range of low-skill services.[9] However, a first step is having cheap and reliable internet communication that can enable e-service provision and generate economic growth and employment for Micronesians.[10] With submarine connections established, and the upcoming roll out of fiber to the premise, FSM is well-placed to exploit such opportunities.

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[8] An econometric study finds internet access to increase tourist development in both the short and long run for Mauritius, another isolated island country. A 10 percent point increase in the inhabitants with access to the internet is found to increase tourism arrivals by 12 percent. Seetanah. 2019. *Telecommunication and tourism development: an island perspective*, Tourism Review

[9] Kenya's BPO industry started in around 2005 with Kencall, but it took several years with a perception of poor quality and insufficient infrastructure before the industry grew into a competitive cluster. Bryce, Joel, Stephen Hartley, Zahara Kassam, Naseem Saloojee, and Brian Williams. "Kenya's off-shoring advantage: An emerging BPO cluster in East Africa." *Microeconomics of Competitiveness Paper. Harvard Business School* (2011).

[10] Fiji already has approximately 3000 jobs in this sector, and countries with good access to internet can aim to emulate this approach, as business outsourcing grows as an industry internationally. Mauritius, a world leader in global outsourcing services generates five percent of GDP and four percent of jobs through this sector.

World Bank. 2017. *Pacific Possible, Long-term Economic Opportunities and Challenges for Pacific Island Countries,* URL: http://documents.worldbank.org/curated/en/168951503668157320/pdf/ACS22308-PUBLIC-P154324-ADD-SERIES-PPFullReportFINALscreen.pdf

4 Adequacy and Quality of Services in the FSM Telecoms Market

TRA is in the process of designing an information-gathering and monitoring process for FSM. The TRA is aiming to implement the process during the second half of this year. Implementation will rely heavily on the support and co-operation of the market operators, as the operators will be the holders of the key relevant data.

Our assessment of the adequacy and quality of services therefore relies on publicly available information, including FSMTC's annual report and website, as well as data available from international databases (such as the International Telecommunications Union) and research into offerings from Pacific telecoms providers.

Key observations are set out in boxes for easy reference.

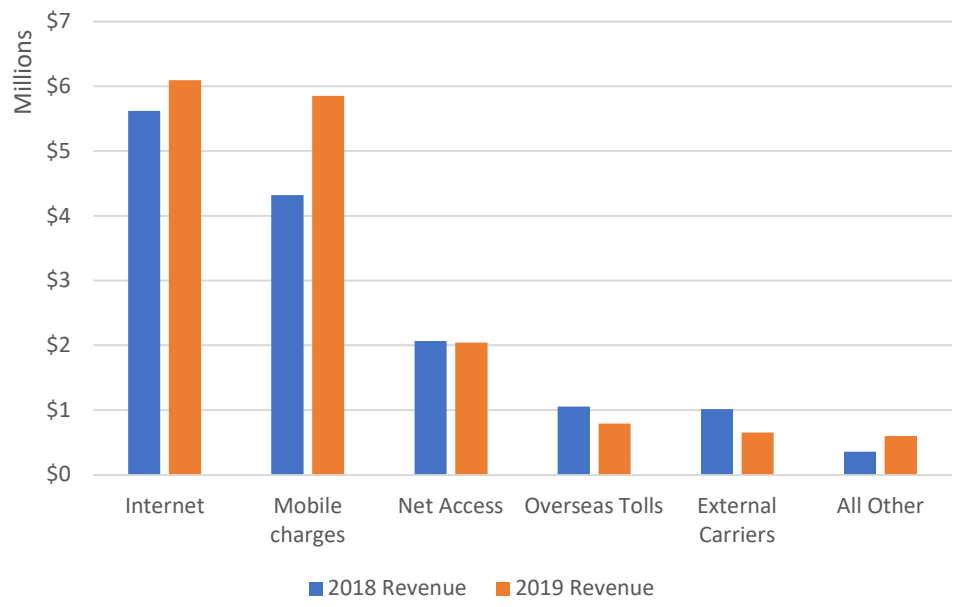
Telecoms market structure overview

FSM's retail telecoms market is currently supplied by a single entity, FSM Telecommunications Corporation (FSMTC). The wholesale market for the undersea Fiber Optic connection (to Yap, Pohnpei, and Chuuk) is supplied by FSM Telecommunications Cable Corporation, also known as the Open Access Entity (OAE). The OAE is also in the process of planning a nationwide roll out of open access fiber to the premise (FTTP) networks using grant funding from the World Bank.

The TRA has recently issued further licenses to a potential t internet service provider (ISP) looking to operate in Yap, and a further ISP provider looking to operate in Chuuk, Kosrae and Pohnpei. The TRA is also in discussions with a number of other operators that are considering targeted or full-scale entry into the FSM telecoms market in the near future.

Key segments of retail services include fixed internet connections, mobile, and fixed landline services. There is a continuing trend of mobile services, and particularly mobile broadband, increasing in importance, and landline services declining.

Figure 1: Annual Revenue from Retail Telecoms Services, FSM



Source: FSMTC Annual Reports. Excludes discounts and recovery of bad debts

Current services for mobile are 3G/4G mobile (depending on location), calls, and SMS messaging. Fixed internet offerings include Asymmetric Digital Subscriber Line (ADSL) and Very High Bitrate Digital Subscriber Line (VDSL). FSMTC's VDSL connections require direct physical connection to the terrestrial Fiber Optic network. FSMTC also offers fixed phone lines, a wireless internet service through Wi-Fi hotspots across all states, as well as a cable television service.

We benchmark FSM's services against a sample of other Small Island Developing Countries (SIDCs)

Table 1 shows the countries we studied for comparison with FSM. There are many possible drivers that impact the customer demand for telecoms services in different countries. We seek to measure key drivers to identify suitable comparator countries for the FSM market. The key drivers considered include:

- Population served—a higher population reduces fixed costs per customer, providing economies of scale
- Proportion of population in urban areas—a higher proportion reduces cost per customer at a given quality of service level for mobile services, since it is cheaper and easier to service a smaller geographic area than a larger area with the same number of subscribers
- Presence of submarine fiber optic cables—this improves service levels and reduces operating costs for providers relative to satellite connections. This is closely related

with the degree of geographic isolation of the islands; for example, Caribbean islands are arranged in a chain and are much better served with cable infrastructure[11]

- The income levels of residents—higher income consumers will be able and willing to pay for a higher quantity and range of services. We look at Gross National Income per capita as the best proxy measure for this.
- The proportion and wealth of the population living and working in other countries—a larger overseas diaspora increases demand for communication services in order for family and friends to stay in touch remotely. Family members from overseas may also subsidize telecoms hardware and service costs for local family members. We use remittances as a percentage of gross domestic product (GDP) as a proxy for this driver.

In the table below we highlight country metrics that are no more than 50 percent above or below the equivalent metric for FSM.

Table 1: SIDC Comparison Sample

Country	Area	Mobile operators/internet service providers	Country Population	Urban Population (% of total)	GNI per Capita (US$)	Remittances as % of GDP
FSM	Pacific	1 - FSM Telecom	114,000	23 %	$3,400	5.8
Countries in Comparator Sample						
Fiji	Pacific	3 - Digicel (Mobile Only), Vodafone, TFL	890,000	56 %	$5,860	5.2
Samoa	Pacific	2 - Vodafone Samoa, Digicel (Samoa) Ltd (Mobile only)	197,000	18 %	$4,020	18
Solomon Islands	Pacific	2 - Solomon Telecom / Our Telekom, Bmobile-Vodafone (Mobile only)	670,000	24 %	$2,020	1.4
Tonga	Pacific	2 - Digicel Tonga Ltd (Mobile only), Tonga Communications Corporation Ltd	111,000	23 %	$4,300	40.7

[11] See https://www.submarinecablemap.com/#/

Vanuatu	Pacific	3 - Digicel (Vanuatu) Ltd, Telecom Vanuatu Ltd (TVL), Wantok (mobile only)	300,000	25 **%**	$3,130	3.9
Kiribati	Pacific	2 - Amalgamated Telecom Holdings Kiribati, Ocean Link (mobile only)	118,000	54 **%**	$3,140	10.6
Countries not in Comparator Sample						
Palau	Pacific	2 - Palau National Communications Corporation, Palau Telecoms / PT Waves	18,000	80 **%**	$17,280	0.8
Grenada	Caribbean	2 - Digicel, Flow	112,300	36 **%**	$9,650	4.1
Dominica	Caribbean	2 - Digicel, Flow	83,800	70 **%**	$7,090	8.9

Source: UN data for Population, 2019 figures. World Bank data for remittances and GNI, 2018 figures. GNI uses Atlas Method

The best comparators, using the metrics in Table 1, would be Tonga and Vanuatu, followed by Kiribati and Samoa. We also include comparisons with the Solomon Islands and Fiji, while recognizing these are substantially different markets, especially in population. Palau is geographically close to FSM. However, it has a geographically-concentrated population that is one fifth of FSM's, and GDP per capita five times higher than FSM's. Given these differences, we do not use Palau as a useful comparison country. The two Caribbean countries in Table 1 differ substantially from FSM in terms of economic metrics and urbanization levels, and we do not use them as comparators.

All our comparison countries have retail market competition

New market entry has potential to increase service quality and decrease costs through competition. A new provider will enter the market only if it sees potential to make a profit, and will price its services in order to gain market share. This can also prompt the incumbent to improve quality and reduce prices.

The comparison countries all have their own individual characteristics, but all share some important characteristics with FSM. Based on our comparison, there is no obvious characteristic of the FSM sector that would prevent competition. For example – FSMs

small population does not appear to be a barrier, as comparators with similar and smaller population do have more than one retail provider.

> Given the successful market entry that has occurred in many Pacific SIDCs over the last 15 years, FSM is an outlier in having just a single retail supplier of telecoms services. However, FSM can address this by continuing to implement the reforms that have been put in place.

We focus on mobile phones and fixed internet services

While landlines remain an essential service for many users, over time these are increasingly superseded by new mobile and internet technology. Similarly, satellite television services are replaced by consuming similar content using online services. Therefore, mobile services and fixed internet are the most important services for evaluating market performance.

There is an issue with adjusting for service quality. For example, connections could be cheap, but could at the same time be unreliable, or have actual speeds that do not meet advertised ones. It might also be difficult to actually obtain a new connection that meets the advertised characteristics. We are not able to directly address service quality at this stage due to data limitations, and have relied on the data available.

4.1 Access to Telecoms Services

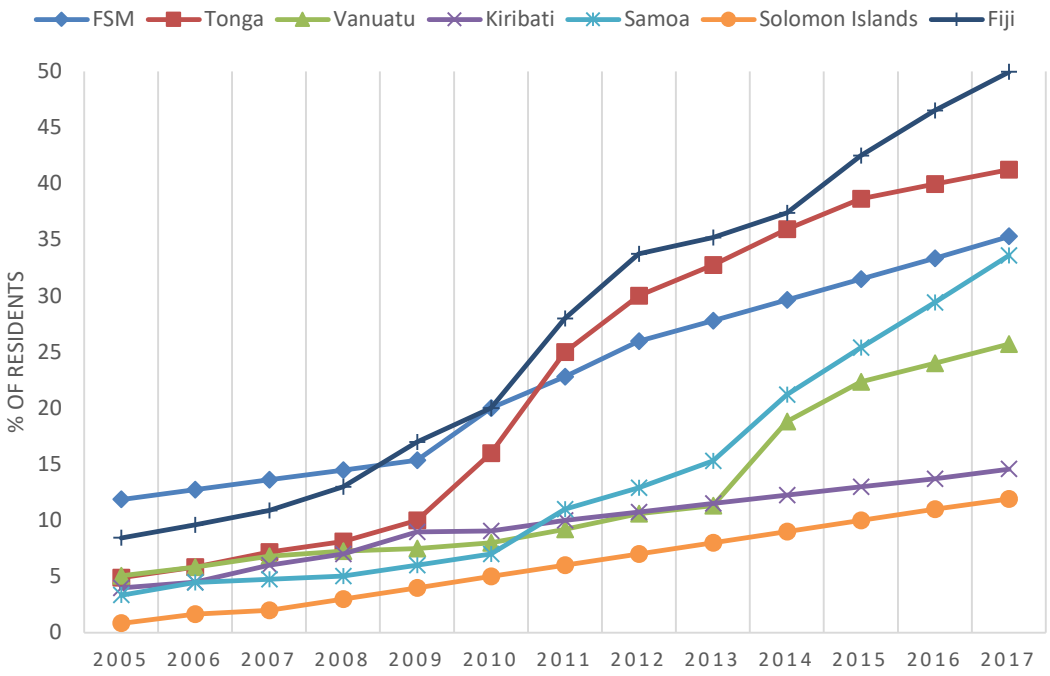
We use ITU data to compare access to telecoms services in FSM and comparator countries over time. The latest data available is from 2017, or in some cases 2018. We compare statistics on 'use', rather than theoretical access. This incorporates service quality and price, since, if prices are high relative to the actual service received, use will be impacted.

FSM has moderately good internet use penetration, but the rate of increase in uptake is low

Figure 2 shows the proportion of residents using the internet. In 2017, 35 percent of FSM's population used the internet. This is about average, compared with other Pacific countries. Fiji's population has the highest use, at 50 percent, while Solomon Islands has the lowest use at 12 percent.

> The growth in uptake rate for internet use in FSM has been relatively slow. From leading the comparator sample in 2005, FSM was in third place in 2017. Based on the observed trend, it is likely that Samoa has since pushed FSM into fourth place. Since 2010, additional uptake has been similar to the Solomon Islands and Kiribati, and much slower than Tonga, Samoa, Vanuatu, and Fiji.

Figure 2: Percentage of Residents Using the Internet



Source: International Telecoms Union

The presence of submarine cables is a key driver, allowing much greater service quality for all internet (mobile or fixed) users compared to satellite. The large increase in Vanuatu's access rate from 2014 appears to be associated with the ICN 1 cable, linking Fiji to Vanuatu entering service on 15 January 2014. The newly connected Chuuk and Yap submarine cables mean that FSM is well-positioned to increase uptake in the coming years. Similarly, the increase in Samoa from 2010 appears to be associated with the American Samoa Hawaii Cable.

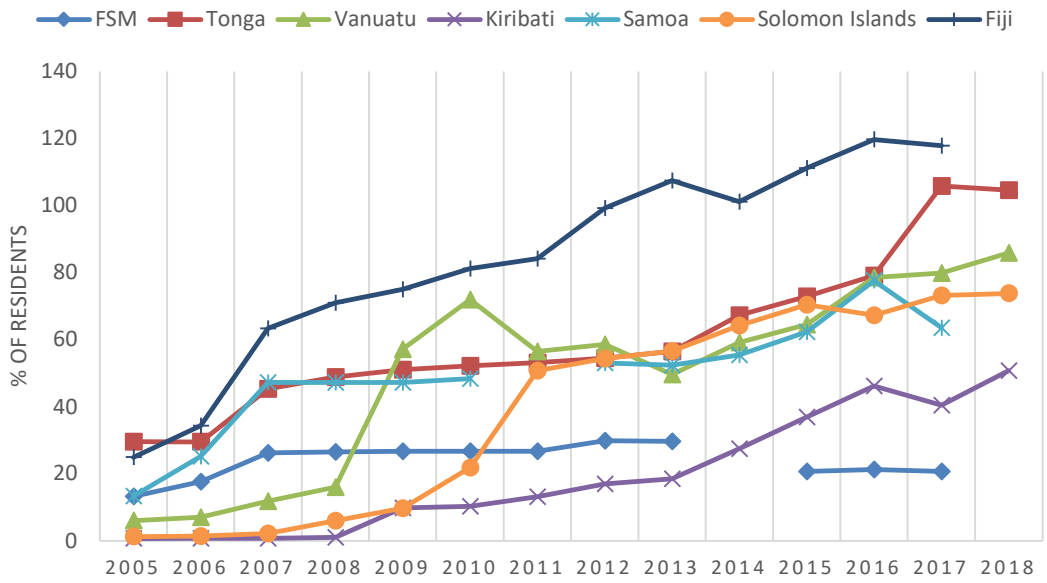
FSM has relatively low rates of mobile phone use

Figure 3 shows the proportion of people with mobile phone subscriptions (pre-paid and post-paid) over time.

FSM has had flat mobile subscription rates since 2007, which stands in contrast with the rest of the Pacific comparator SIDCs.

For completeness, Appendix B also provides a map of mobile coverage on the main islands of each FSM state compiled by FSMTC.

Figure 3: Percentage of Residents with Mobile Plan (Pre- or Post-Pay) Subscriptions



Source: International Telecoms Union

The impact of liberalizing mobile markets, and subsequent increase in competition, can be clearly identified in several countries:

- Tonga—already had two suppliers in 2005, however, one was the state-owned incumbent TCC, while the other (TONFON) belonged to the King of Tonga. In 2007 TONFON was sold to Digicel as part of the program for King Tupou VI to withdraw from commercial interest in Tonga", creating the first international investment into the sector[12]. Uptake rose dramatically in this year and continued rising from 34 percent in 2005 until it passed 100 percent by 2017
- Fiji—Digicel entered the market in 2008. Mobile use almost doubled in 2007, the year prior to liberalization due to the incumbent's activities in preparation for competition.[13] Uptake then continued to rise and passed 100 percent by 2013
- Vanuatu—Digicel entered the market in 2008, when mobile uptake was 16 percent. Just as in many other countries, a major innovation was bringing in a wide range of low-cost handsets, and new services including rollover minutes and free voicemail.[14] Uptake more than quadrupled in the next two years, before falling somewhat–

[12] Siope Vakataki 'Ofa, 2011, *Telecommunications Regulatory Reform in Small Island Developing States: The Impact of the WTO's Telecommunications Commitment*

[13] *Affordability of mobile services hampered by quasi-monopolies in the Pacific.* Network Strategies, 2013. http://strategies.nzl.com/industry-comment/affordability-of-mobile-services-hampered-by-quasi-monopolies-in-the-pacific/

[14] *Digicel Launches with The Bigger Better Network in Vanuatu* Solomon Times, www.solomontimes.com/news/digicel-launches-with-the-bigger-better-network-in-vanuatu/1998

possibly because of consumers trialing both services and cancelling afterward.[15] By 2018 uptake had passed 85 percent and was rising steadily

- Samoa—competition with the incumbent SamoaTel began in 2006, when Digicel entered the market. This, and a reform process at SamoaTel,[16] is associated with a near tripling in mobile subscriptions from 2005 to 2007. With further gains made since then, as at 2017, uptake was 64 percent.

FSMTC publishes maps of the four states wireless access (see 5Appendix B). This shows good coverage in the main population areas of the main islands of each state, but still some areas with no or intermittent service. We lack data on the population covered. According to the data available, mobile use in FSM has yet to rise beyond 30 percent.

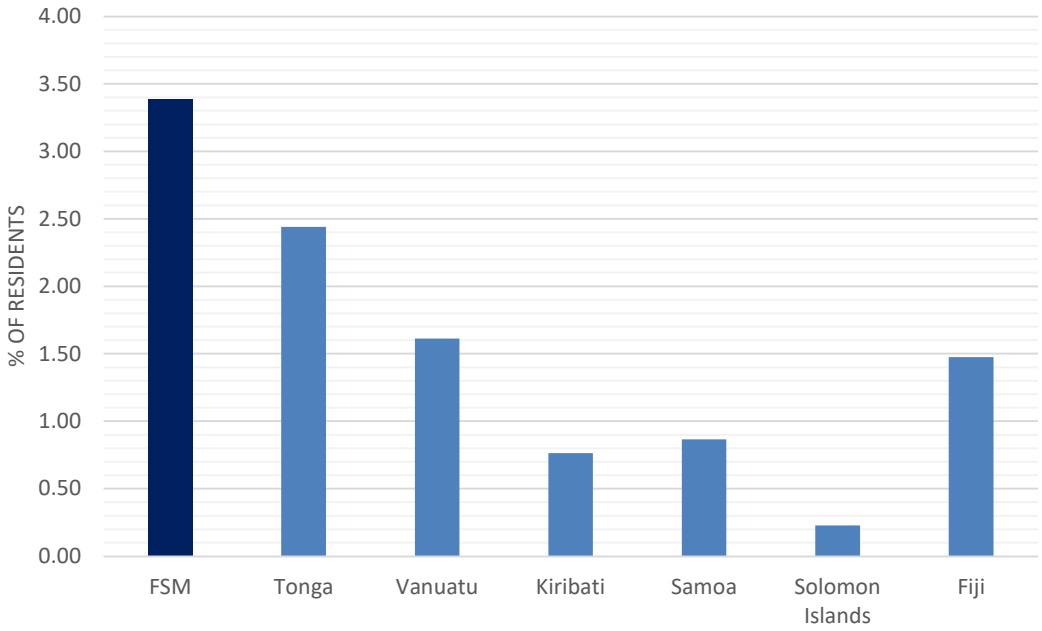
FSM has the highest fixed internet subscription rate, but the rates are very low for both FSM and other Pacific country comparators

Figure 4 shows the percentage of residents with fixed line internet access subscriptions. Fixed line internet services appear to be an insignificant part of the consumer market. FSM has the highest market penetration out of the comparator countries, at 3.4 percent. At these levels, it is likely most subscriptions are for niche uses, such as schools and offices.

[15] *Vanuatu - Telecoms, Mobile and Broadband - Market Insights and Statistics* https://www.marketresearch.com/Paul-Budde-Communication-Pty-Ltd-v1533/Vanuatu-Telecoms-Mobile-Broadband-Insights-9015824/

[16] *Samoa's Connected*. 2013. World Bank, https://www.worldbank.org/en/results/2013/04/04/samoa-connected

Figure 4: Percentage of Residents with Fixed Line Internet Subscriptions



Source: International Telecoms Union

4.2 Prices of Telecoms Services

We surveyed actual advertised plans for mobile bundle (SMS, calling, and data) prices, mobile data prices, and fixed internet prices. Details of the plans we used for comparison purposes can be found in 5Appendix A.

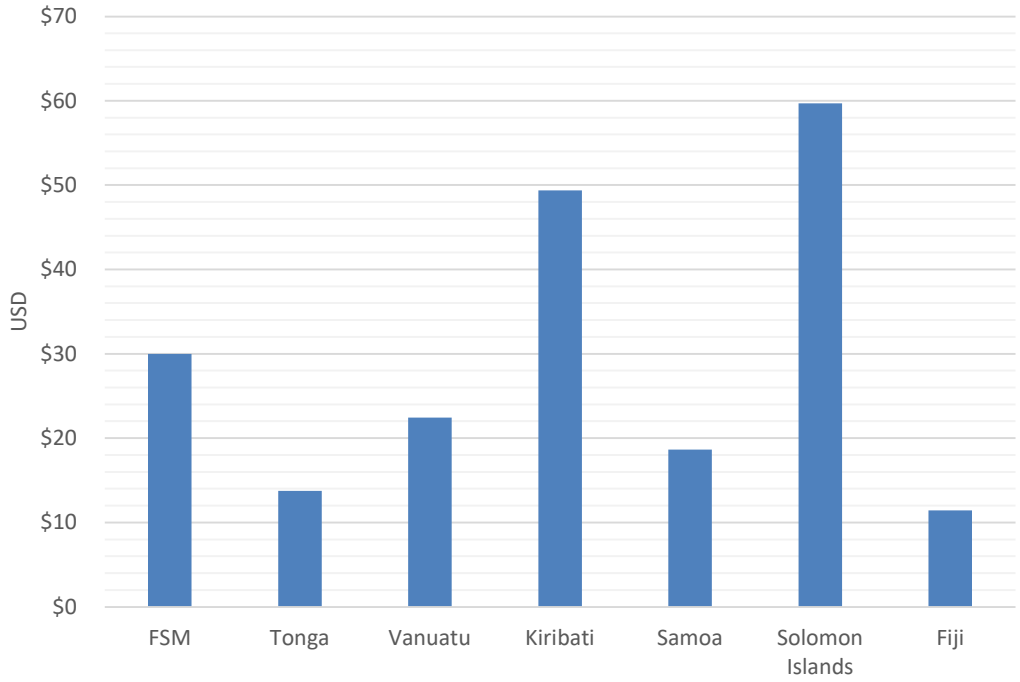
Prices for mobile services are high

Figure 5 shows the price of basic mobile plans in FSM, benchmarked against other SIDCs in the Pacific. Mobile phones are increasingly the most important technology for individual consumers—smartphones are progressively getting cheaper and more capable, with internet browsers and downloadable apps. Most consumers—in FSM and elsewhere—want at least some calling, SMS, and internet services for their mobile phone. Telecoms firms typically bundle these services into offerings of various size and qualities to the consumer. This bundling makes an exact and objective price comparison between companies and countries difficult.

The approach we took is to define a minimum standard a typical consumer could demand, and benchmark the cheapest offering available which meets this standard. This minimum standard is 1GB Data, 60 Mins in-country calls, 250 SMS per month—all benchmarked plans exceed this standard in at least one dimension.[17]

[17] The only exception we allow is Kiribati, which severely limits SMS messaging in all its plans – we instead add off plan texts to make up the difference, see 5Appendix A

Figure 5: Mobile Monthly Plan Prices – Minimum 1GB Data, 60 Mins Calls, 250 SMS



Source: Companies' advertised rates

Consumers of mobile phone services pay relatively high prices in FSM, at 30 USD for our standard bundle. Of the comparators, only Kiribati and Solomon Islands are more expensive than FSM.

Kiribati currently lacks a submarine cable connection, until the Southern Cross NEXT cable begins service.[18] We understand Kiribati may have only recently had competition evolve in its retail market. However, the new entrant (Ocean Link) does not yet appear to be actively competing for internet services.[19] Solomon Islands similarly is expecting an undersea cable to go live in 2020, with prices likely reflecting the lack of cable connectivity.[20]

[18] See https://www.submarinenetworks.com/en/systems/trans-pacific/southern-cross-next/southern-cross-next-cable-system-overview

[19] We were not able to find a company website. A Facebook page and World bank references indicate Ocean link started in 2018

[20] *Solomon Islands Undersea Cable to Go Live February: Deputy PM*. 2019. https://subtelforum.com/solomon-islands-undersea-cable-live-by-feb-2020/

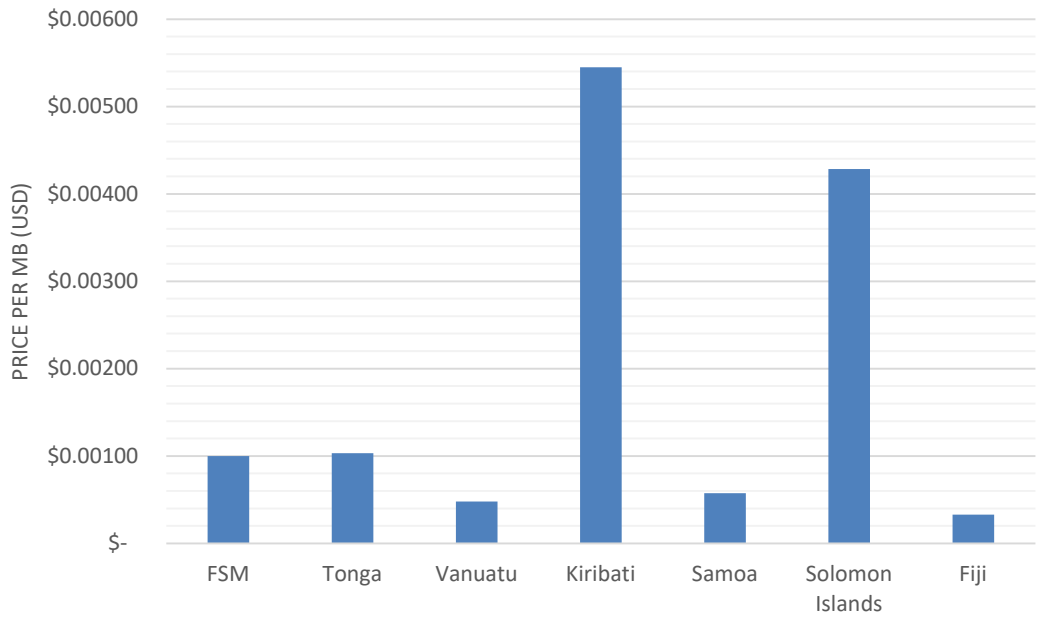
Prices for mobile data only are high relative to comparators with submarine cable connections

Figure 6 shows the price for a large mobile data only plan, benchmarked against FSM's comparator SIDCs. Many consumers specifically demand additional mobile data because:

- It may be cheaper to use mobile data exclusively instead of paying for an additional fixed connection in the home
- Mobile data is convenient if a home does not have an existing copper landline connection, or for travelers and people in temporary accommodation
- In some instances, mobile data provides a superior service to the fixed line internet offerings available.

The approach we take here is to determine the cheapest mobile data (per MB) offering in FSM and benchmark this plan against other small Pacific countries. In FSM, the cheapest offering available is 5GB valid for 5 days, priced at 5 USD. Not all countries had the same data allowance or terms. The price of mobile data is therefore calculated at a price per MB for an approximately equivalent sized plan over a month: five GB times six, or 30 GB / month.

Figure 6: Mobile Broadband (Data) Prices Per MB



Source: Companies' advertised rates

The price of mobile data per MB in FSM is similar to Tonga, a similar size market, at 0.0010 USD for 1 MB. However, the price in FSM is significantly more expensive than in Fiji, Samoa, and Vanuatu. The only countries with significantly higher prices are Kiribati and Solomon Islands, neither of which has submarine cable connectivity.

The most basic option for fixed line broadband has a moderately low price, but higher speeds are expensive

Figure 7 shows the price per MB for fixed line broadband, benchmarked against other small Pacific countries. Fixed internet is important for applications where computers are necessary. It is used in businesses and public services like health and education. Different fixed line products control broadband use through different methods. In other words, customers may choose their fixed line broadband plan based on a trade-off between speed and/or data cap amount, and price.

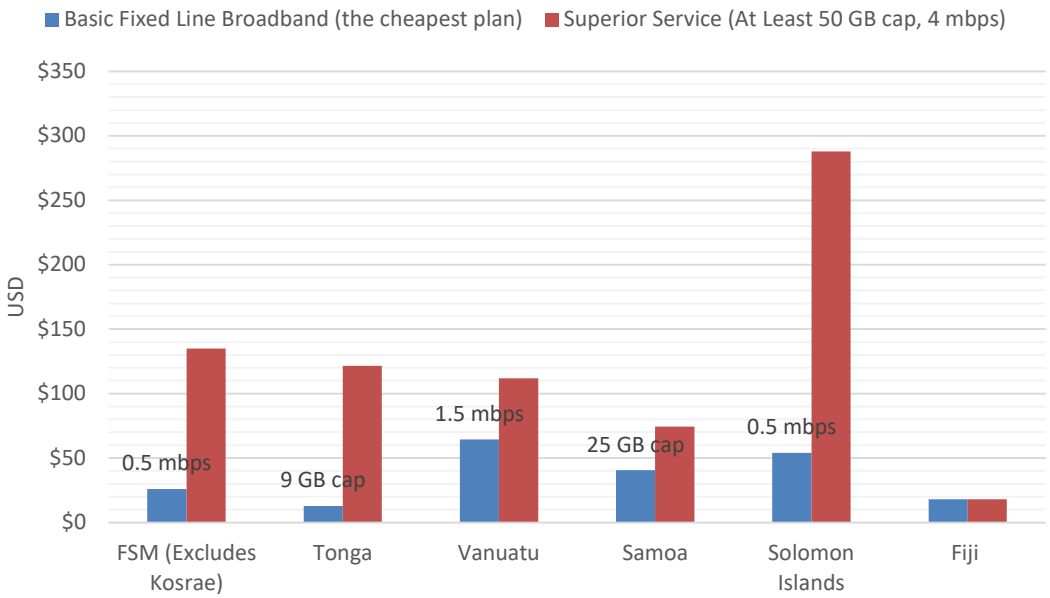
In FSM, fixed line broadband is sold according to speed of connection—actual data use is not limited. In other Pacific countries, fixed line broadband plans are categorized by data amount (data cap), speed of connection in Megabits per second (mbps) or both, such as speeds with 'fair use' data caps during peak use times.

The variety of options means it is not simple to compare prices for the same service. We have therefore identified two minimum service levels products that are available across the sample:

- 'Basic' fixed line broadband—the cheapest plan, or
- 'Superior' fixed line broadband— the cheapest plan with at least a 50GB data cap and 4 mbps connection download speeds.

We determined the price and speed of both basic and superior fixed line broadband in FSM, and benchmarked this against other small Pacific countries. It remains significant what the limiting factor for the basic plan is, which is also shown on Figure . Some countries have different minimum service levels. However, it is not clear which limits on service are more important. Some consumers will find data caps more constraining on activity and others will find speed caps more constraining.

Figure 7: Fixed Line Broadband Prices



Source: Companies' advertised rates. Note: Fiji's cheapest plan met the superior service criteria, therefore we have not included a basic fixed line broadband plan. ATH Kiribati did not have a fixed internet option – there may be high price satellite options

The cheapest monthly fixed line broadband plan in FSM is priced at 26 USD. This price is fairly low compared with similar plans across the above seven Pacific countries. However, at 0.5 mbps, FSM has comparatively slow basic fixed line broadband speed. FSM's superior service is more than four times the price, at 135 USD. FSM's superior service (4 mbps upload, 4 mbps download) is expensive compared with the other Pacific countries sampled. Only Solomon Islands prices for this service offering are higher and likely reflect the lack of cable connectivity.

5 TRA's Work to Improve Sector Performance

The previous two chapters explain the potential that the FSM telecoms sector has to support the country's economic development, and key sector areas where FSM lags behind comparator countries. The main opportunities for potential improvement are:

- significantly increasing uptake of mobile services
- increasing internet use by driving higher uptake of both mobile services and of high-quality fixed-line broadband services
- reducing prices across all services, but especially for high-quality broadband services.

Below, we explain how the TRA's recent and ongoing work will contribute to FSM capitalizing on the opportunities to improve the performance of the country's telecoms sector.

Gaining a better understanding of the market to enable more targeted regulatory and policy interventions

In order to drive sector performance improvements, policymakers and regulators need to make sure that they understand the current state of the sector in some detail. This, in turn, requires a range of information to be gathered and reviewed.

One of the key functions of the TRA is to define information reporting requirements for licensees, and to monitor market developments using that information, as well as other information gathered by the TRA. Some of the information is required in order to provide reporting to external funding parties, such as the World Bank under the FSM Connectivity and Digital FSM projects.

The TRA has developed a set of proposed information metrics and indicators that it will collect and monitor. The TRA will shortly begin consultation on its proposal. This work is part of a wider TRA strategy to help lift licensee compliance and effectiveness.

The proposed metrics and indicators envisage licensees submitting quarterly financial information, as well as subscriber numbers and traffic volumes for each quarter. Other information proposed to be collected includes quality of service and customer complaint information.

This reporting will provide for a deeper understanding of the performance of the FSM telecoms sector. In particular, we will be able to benchmark directly against many of the detailed metrics collected by Samoa and Vanuatu, giving a comprehensive understanding of the relative progress made in FSM over time.

The proposed information gathering, and other obligations will be new to the licensees, and we anticipate some issues with licensees' capability to comply in the short term. The TRA seeks to work with licensees using a collaborative approach. Where there is a demonstrated commitment to compliance, we will assist licensees in understanding their obligations and how to meet them. This will take the form of a customized 'compliance pathways' for licensees. This approach may include formal "no action" letters from TRA

on compliance obligations for which the compliance pathway envisages a longer timeframe to achieve full compliance. The plan may also involve various capability support and training from the TRA.

Where licensee actions demonstrate that there is no commitment to a pro-active compliance approach, or where the Authority considers the licensee's compliance effort is not reasonable, the TRA will act swiftly and decisively to enforce compliance.

Increasing competition and consumer choice to drive improvements in accessibility, quality and affordability of telecoms services in FSM

The FSM government has worked hard to create a strong platform for improving the accessibility, quality and affordability of telecoms services in the country. Major breakthroughs have included:

- ensuring subsea cable connectivity for all four states largely using donor funding—with Pohnpei, Chuuk and Yap already connected, and Kosrae due to be connected in 2021
- securing $30.8 million of grant funding from the World Bank, with a subset of $14.8 million allocated for a nationwide roll out of fiber to the premise (FTTP)
- establishing an open access regime in the market for wholesale fiber services by structurally separating wholesale and retail services and creating an Open Access Entity
- establishing FSM's first independent regulator to provide oversight of the telecoms market and ensure a level playing field for potential new entrants.

FSM is now in a position where market competition, enabled by the good work done so far, can drive consumer benefits and also reassure multilateral donors that the grant funding was well-justified. A regulated wholesale network monopoly approach also avoids unnecessary asset duplications from overlapping asset rollouts, reducing costs and ensuring efficient use of grant funding.

Examples among FSM's Pacific neighbors show that competitive new entry into the telecoms sector can drive increased uptake and lower pricing of services, even in small island states with similar characteristics to FSM.

To enable similar or better outcomes in FSM, the TRA is actively engaging with multiple regional operators to:

- ensure they understand the FSM regulatory landscape and the level playing field that has been created through the recent reforms—our work issuing licenses, regulating access to infrastructure, and enforcing license compliance will play in important role in reassuring potential investors that the reforms are operational
- share FSM's telecoms market characteristics to facilitate potential new entrants accurately and robustly evaluating the opportunities and risks of entering that market

- understand potential operators' perceptions around barriers to entry and the extent to which appropriate regulatory action by TRA or policy action by Government can help overcome those barriers.

As a result of these engagements, the TRA recently issued its first license to a potential new entrant in the internet service provider (ISP) space. BOOM! is aiming to offer ISP services in Yap. The TRA continues to engage with a number of other parties looking to enter targeted areas of the FSM market.

Appendix A – Advertised Plans Used for Mobile Services Comparisons

Table A.1: Mobile Plan Prices

Country	Provider	Monthly prepaid plan (bundle - data, voice, and SMS) unless stated otherwise	Price (in local currency)	Currency Converter	Price adjusted to USD
FSM	FSMTC	Monthly 30: 2GB, 60 mins, 900SMS	$30	$1.000000	$30.0
Tonga	Tonga Communications Corporation Ltd	Monthly 1: 1000min, 1000SMS, 2GB	30	$0.458000	$13.7
Vanuatu	Vodafone - Telecom Vanuatu Ltd (TVL)	Bronze Plan: 2GB, 5 hrs local 30 mins international, 500 SMS	2609	$0.008600	$22.4
Kiribati	Amalgamated Telecom Holdings Kiribati	Smart 50: 100 mins 25 SMS 2,250 MB for $50. Plus 225 SMS at $.1/text	72.5	$0.681000	$49.4
Samoa	Digicel (Samoa) Ltd	SMART 50 monthly: 200mins, 250SMS, 1000MB (plus 1000MB bonus email data)	50	$0.373000	$18.7
Solomon Islands	Solomon Telecom / Our Telekom	Monthly: 400mins, 1000SMS, 2GB	160	$0.373000	$59.7
Fiji	Digicel	Monthly: 18GB, 40mins, UnlimtedSMS	25	$0.458000	$11.5

Table A.2: Mobile Data Prices

Country	Provider	No. of Megabytes in plan, based on the cheapest plan	Price in local currency	Price per MB - based on monthly plan	USD/Local Currency	Plan price in USD for one month	Price per MB adjusted to USD
FSM	FSM Telecom	Only valid for 5 days - 5000 (x6)	5 (x6)	0.001	1	30	0.00100
Tonga	Tonga Communications Corporation Ltd	30000	70	0.002	0.442	30.940	0.00103
Vanuatu	Vodafone - Telecom Vanuatu Ltd (TVL)	18000	1000	0.056	0.0086	8.600	0.00048
Kiribati	Amalgamated Telecom Holdings Kiribati	25000	200	0.008	0.681	136.20	0.00545
Samoa	Vodafone Samoa (BlueSky)	26000	40	0.002	0.373	14.920	0.00057
Solomon Islands	Bmobile-Vodafone	14000	500	0.036	0.120	60.000	0.00429
Fiji	Digicel	35000	25	0.001	0.458	11.450	0.00033

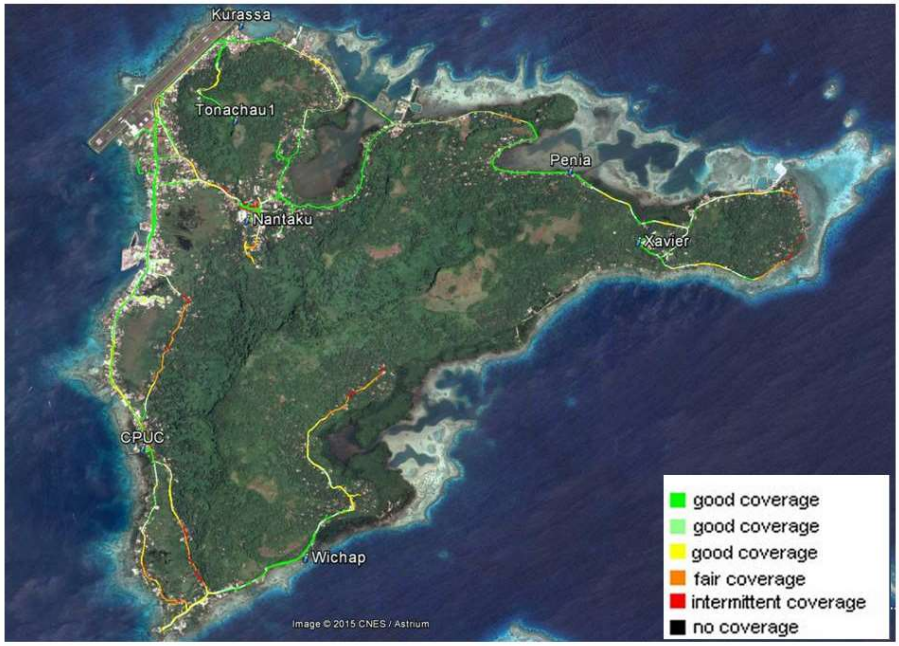
Table A.3: Fixed Internet Prices

Country	Provider	Monthly plan (cheapest option) - pre-paid	Price (in local currency)	USD/Local Currency	Price	Max Speed (for downloads)
FSM	FSM Telecom	Home Net 512	26	1	26	0.512 Mbps
	FSM Telecom	Home Net 4096	135	1	135	4096 mbps
Fiji	TFL	150 GB of data, Up to 20 Mbps downloads, Up to 1 Mbps uploads,	39	0.458	17.862	20
	Vodafone	Smart Blaze: 11GB + $1/GB additional	35	0.458	16.03	10
Samoa - Fiber	Vodafone Samoa (BlueSky)	Super basic: 25GB	109	0.373	40.657	
	Vodafone Samoa (BlueSky)	Ultra fast Silver: 55 GB	199	0.373	74.227	20 mbps
Solomon Islands	Solomon Telecom / Our Telekom	10 GB (10/5 Mbps)	750	0.12	90	approx. 10/5
	Satsol	JET 2+ 4 mbps 4 GB per day during peak times	2400	0.120	288	
Tonga	Tonga Communications Corporation Ltd	"SME lite" : 75 GB including on time bonus	$275	0.442	121.55	
		Economy + on time bonus: 9GB	29	0.442	12.818	0.47

Vanuatu	Digicel (Vanuatu) Ltd	25GB, plus unlimited data 7pm-7am (1.5 Mbps)	7500	0.008600	64.5	1.5 mbps
	Digicel (Vanuatu) Ltd	50GB Fast Home Surfer	13000	0.008600	111.8	
Kiribati	[None Found]	-	-			

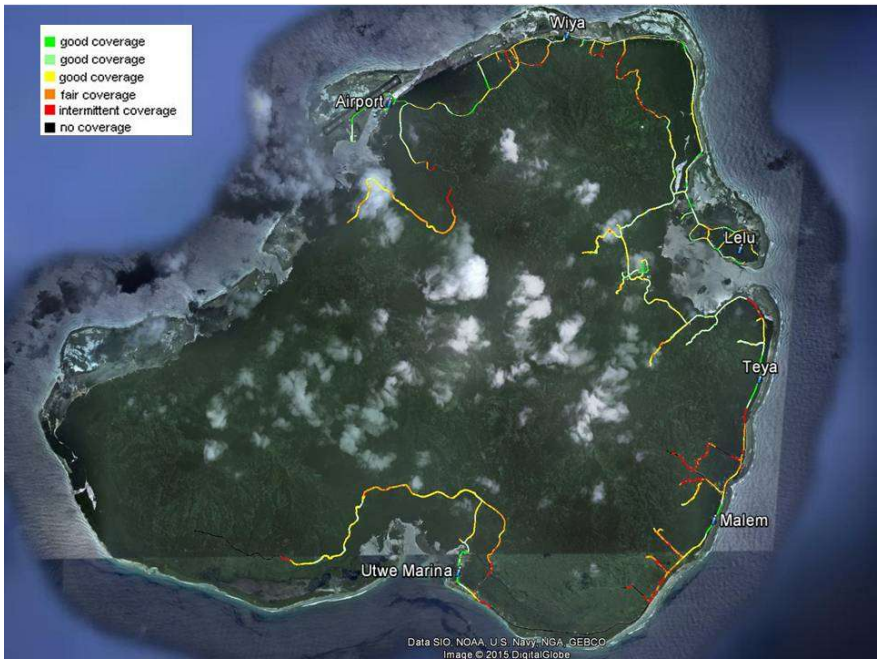
Appendix B – Maps of Wireless Coverage on Each State Main Islands

Figure B.1: Weno (Chuuk) Wireless Coverage



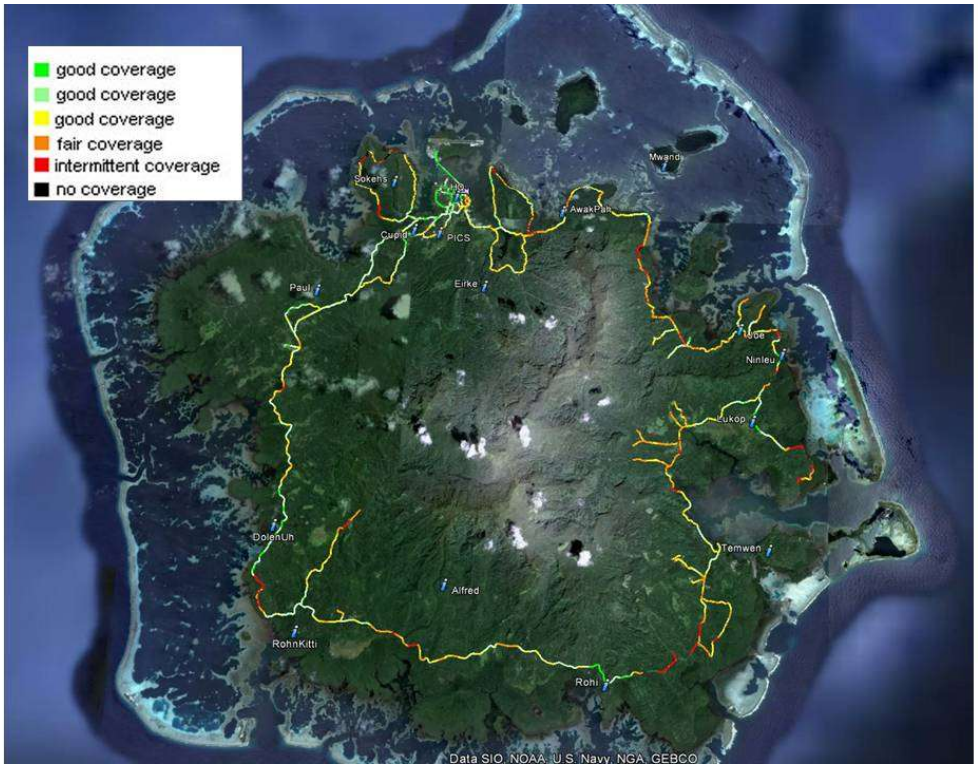
Source: FSMTC, https://www.fsmtc.fm/sites/default/files/images/chuuk-drive(1).jpg

Figure B.2: Kosrae Proper Wireless Coverage



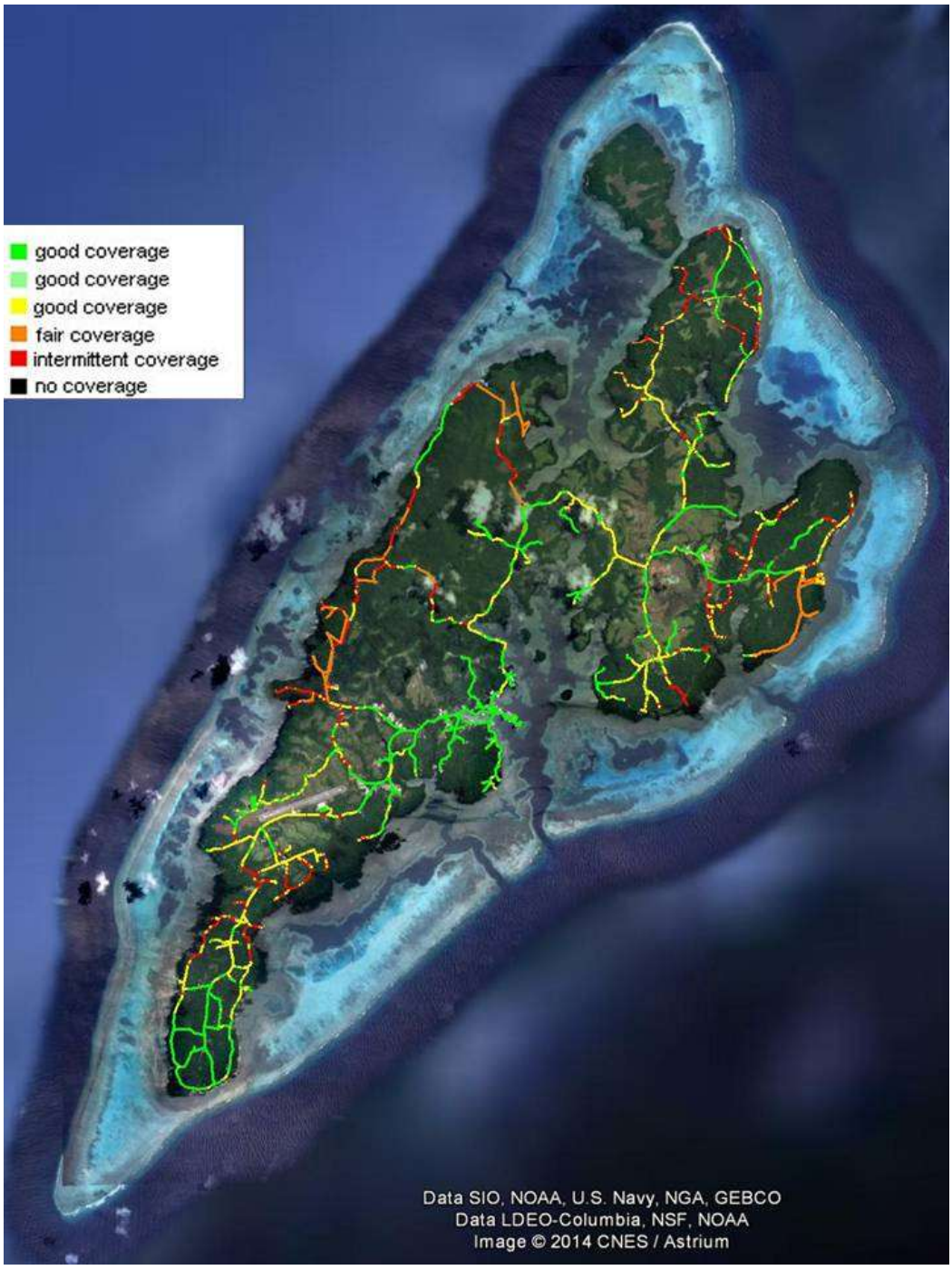
Source: https://www.fsmtc.fm/sites/default/files/images/kosrae-drive(1).jpg

Figure B.3: Pohnpei Proper Wireless Coverage



Source: https://www.fsmtc.fm/sites/default/files/images/pohnpei%20drive-2G.jpg

Figure B.4: Yap Proper Wireless Coverage



Source: https://www.fsmtc.fm/sites/default/files/images/yap-drive(1).jpg