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Connecting the Unconnected

Lessons for Enhancing Fast and Reliable Internet from Southwest Sumba District

by Amira Husna and Louis Budiman

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GLOSSARY

3T:
Tertinggal, Terdepan dan Terluar
(The frontier, outermost and least developed)

AKSI:
Akses Internet

APJATEL:
Asosiasi Penyelenggara Jaringan Telekomunikasi
(Association of Telecommunications Network Operators)

APJII:
Asosiasi Penyelenggara Jasa Internet Indonesia
(Association of Indonesian Internet Service Providers)

BAKTI:
Badan Aksesibilitas Telekomunikasi dan Informasi
(Telecommunications and Information Accessibility Body)

BLU:
Badan Layanan Umum (Public Service Agency)

BTS:
Base Transceiver Station

FGD:
Focus Group Discussion

GDP:
District Gross Domestic Product

GISTARU:
Geographic Information System Tata Ruang

ICT:
Information and Communication Technology

ITU:
International Telecommunication Union

Job Creation Act:
Undang-Undang Nomor 11 Tahun 2020 Tentang Cipta Kerja (Law No. 11/ 2020)

MOCI:
Ministry of Communication and Informatics

MOF:
Ministry of Finance

OSS:
Online Single Submission

PASTI:
Aplikasi Permohonan Akses Telekomunikasi dan Informasi
(Telecommunications and Information Access Application)

RDTR:
Rencana Detail Tata Ruang (Detailed Spatial Plan)

SATRIA:
Satelit Republik Indonesia

SMEs:
Small and Medium Enterprises

USO:
Universal Service Obligation

VSAT:
Very-Small-Aperture Terminal

WANTIKNAS:
Dewan Teknologi Informasi dan Komunikasi Nasional (National ICT Council)

EXECUTIVE SUMMARY

The Indonesian government has prioritized inclusive digital connectivity for the country's economic prosperity. Despite Indonesia's progress toward achieving inclusive digital transformation, the country faces a digital divide across its regions.

The ICT Development Index conducted by Statistics Indonesia (2021) shows a stark gap in access and infrastructure, ICT utilization, and ICT proficiency between the western part of Indonesia, specifically Java Island, and the most eastern parts of the country. The ICT development index in eastern regions such as East Nusa Tenggara and Papua is low, with scores ranging from 3.35 to 5.00 out of 10.00 (scores between 2.25-5.00 is categorized as low ICT development) for the years 2020–2021. In contrast, more developed regions — Jakarta and Yogyakarta — scored above 7.00, with Jakarta the only province scoring a high index of above 7.5. Absence of reliable, high-speed internet for the rural poor can exacerbate inequality. Attention to underdeveloped areas must be moved to the forefront of the government's agenda so that inclusive digital transformation can be fully realized.

The Ministry of Communication and Informatics (MOCI) must reassess its current strategy to ensure accessible internet connectivity for underserved remote and rural areas of Indonesia. Government Regulation No. 46/2021 on Posts, Telecommunications and Broadcasting aimed to enhance private investment in the telecommunications sector. But issues with The Telecommunications and Information Accessibility Body *(Badan Aksesibilitas Telekomunikasi dan Informasi* or BAKTI), ICT infrastructure programs, and overlapping local regulations have affected telecommunications sectors' ease of doing business and hampered ICT developments in underdeveloped regions.

Regulatory reform is called for to address issues found from the central to local level. From the supply-side, telecommunications operators are concerned with low return on investment for broadband penetration in underdeveloped regions. In terms of demand, rural communities struggle with the affordability of fixed broadband internet compared to mobile broadband.

Practices at the local government level further hinder ICT infrastructure developments due to unclear fees and complicated procedures for local levies and permits. This paper also highlights BAKTI's shortcomings in transparency and collaboration with relevant stakeholders undertaking digital and ICT programs.

This paper provides recommendations on the expansion of high-capacity and high-speed internet through fixed broadband technology to the underserved rural regions (typically known as the frontier, outermost and least developed regions, or 3T regions). By drawing insights from a unique case study of Southwest Sumba District, this paper recommends 1) MOCI and BAKTI as digital leaders to formulate an Integrated Investment Roadmap through a participatory, bottom-up approach; 2) MOCI and BAKTI establish an ICT Working Group to improve collaboration and transparency; and 3) MOCI in coordination with relevant ministries to eliminate ease-of-doing-business barriers within local levying and licensing processes for the telecommunications sector by providing clear guidelines for local governments.

THE CURRENT SITUATION

Internet connectivity has become a crucial element in improving the welfare of Indonesian society. High-speed and high bandwidth internet capacity serve as key infrastructure to support education, access to markets, workforce skills development, and innovation. However, a digital divide persists between urban and rural areas as well as between the western and eastern regions of Indonesia.[1]

There is a gap in Internet penetration and connectivity in rural areas and eastern regions primarily attributed to lower information and communications technology (ICT) access and infrastructure (East Ventures, 2023; Statistics Indonesia, 2021). Penetration of stable, affordable, and inclusive internet access has become an urgent government priority to ensure the benefits of digital transformation can be reaped by the rural poor. A lack of reliable internet access can further exacerbate inequality (ITU, 2020a; Asian Infrastructure Investment Bank, 2020). The development of digital ecosystems in rural areas needs to start with the development of ICT infrastructure.

Fixed broadband networks are an important technology to enable high-speed and high bandwidth internet connectivity (Castaldo et al., 2015). Fixed broadband networks enable data transmission speed to exceed 10 Mbit/s (ITU, 2018a). By July 2023, the global median for fixed broadband download and upload speeds had reached 83 Mbit/s and 37 Mbit/s respectively (Ookla, 2023a). In Indonesia, recorded speeds were 27 Mbit/s for download and 15 Mbit/s for upload (Ookla, 2023b).

In the last mile,[2] the access network through which the internet is distributed to end users, fixed broadband internet can fall under wireline and wireless categories. Wireline connections commonly employ fiber optic and copper cables, while the wireless uses networks of fixed wireless access and satellite. In Indonesia, wireline infrastructure, especially fiber optic cables, are more widely used across the fixed broadband internet supply chain (ITU, 2021a; APJII, 2023a). The shift towards fiber optic is driven by its advantages in terms of quality and cost-effectiveness compared to copper cables (World Bank, 2012; ITU, 2021b).

Fixed wireless and satellite are less commonly used compared to fiber optic technology. Out of the total of 13.4 million fixed broadband subscriptions in Indonesia, only 103,000 (0.8%) and 9,540 (0.07%) are fixed wireless and satellite internet subscriptions, respectively (ITU, 2021a). The capital and operational expenditures required for a fixed wireless internet network are relatively low compared to a fiber optic network, but wireless quality can vary depending on line of sight and distance — particularly challenging in mountainous topography (ITU, 2020b). Satellite internet can overcome geographical challenges and provide wider coverage, but is prone to interference from weather and requires high capital investment and therefore high subscription costs due to satellite launches and ground station hub setups (ITU, 2021b; ITU, 2020b).

While fiber optic still holds the advantage in delivering high internet bandwidth and transmission speed, wireless technologies can be an alternative and complement in situations where wired deployment is challenging, particularly in remote areas with difficult terrain (World Bank, 2012).

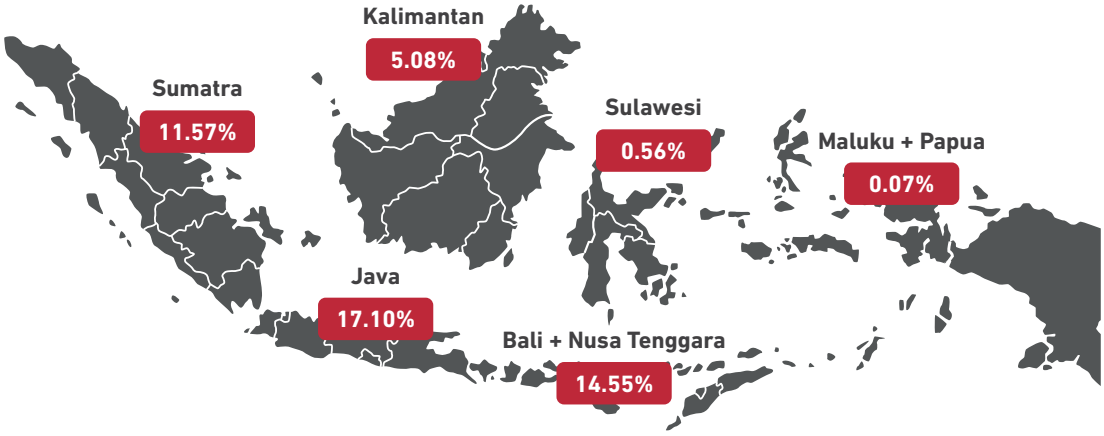
[1] The western region of Indonesia, in this context, encompasses provinces in Sumatra, Kalimantan, Java, and Bali, while the eastern region are those located in or surrounding Sulawesi, Maluku, Nusa Tenggara, and Papua islands.
[2] See Annex I for broadband infrastructure supply chain from first to last mile network.

In comparison to mobile broadband, fixed broadband access lags in terms of affordability and availability. Mobile broadband internet is considerably more accessible and affordable in remote or rural areas as it is typically channeled through wireless networks such as base transceiver stations (or BTS) (World Bank, 2021).

Mobile broadband affordability is key to its accessibility. According to the International Telecommunication Union (ITU, 2021c), mobile broadband prices in Indonesia account for 0.9% of the Gross National Income (GNI) per capita, compared to 7.6% of GNI per capita for fixed broadband prices. The cost of fixed broadband is higher than the UNESCO Broadband Commission's target, which is a price of less than 2% of GNI (UNESCO Broadband Commission, 2023) and also higher than the global median of 3.1% of GNI per capita — making the cost of fixed broadband internet in Indonesia more than twice as high relative to income as what is paid in half of the world (ITU, 2022a).

Indonesia has 115 mobile broadband subscriptions per 100 inhabitants, while the number of fixed broadband subscriptions is only 5 per 100 inhabitants (ITU, 2021c). Penetration of fixed broadband internet is relatively low, particularly in eastern Indonesia, and there is uneven distribution across regions (see Figure 1).

Figure 1.
Distribution of Customers Served with Fixed Broadband Access



Source: Directorate General of Posts and Informatics Operations (2019) data extracted from MOCI's Strategic Plan 2020–2024.

> "Remote and rural areas are less densely populated and their economic progress increasingly relies on reliable internet connectivity through mobile broadband as digital services/ applications become more essential and widely used."

Remote and rural areas are less densely populated and their economic progress increasingly relies on reliable internet connectivity through mobile broadband as digital services/ applications become more essential and widely used (ITU, 2021b). Despite the higher coverage and vital role of mobile broadband in providing internet connectivity and the higher coverage it has achieved, speed and quality remain highly variable, unlike fixed broadband (World Bank, 2021). The limitations of mobile broadband in accommodating extensive data use and bandwidth-intensive activities highlights the growing importance of fixed broadband access.

Table 1 summarizes the comparison between the two types of broadband in terms of the enabling technology, pros and cons, and fitting user preferences.

While fixed broadband is a general-purpose technology,[3] it is particularly significant in rural areas for competitiveness and digital services/applications of sectors such as education, health, and government (ITU, 2020b; ITU, 2022b). These sectors have been identified as priorities by the government and help target its initiatives to accelerate fixed broadband penetration in rural areas, as outlined in MOCI's Strategic Plan 2020–2024 (MOCI, 2021a), and Digital Industry Development Master Plan 2023–2045 (National Development Planning Agency, 2023a). Despite this targeting, the availability of fixed broadband access remains limited, even in priority locations such as schools, medical facilities, and government offices (East Ventures, 2023).

"While fixed broadband is a general-purpose technology, it is particularly significant in rural areas for competitiveness and digital services/applications of sectors such as education, health, and government."

Table 1.
Comparison between Fixed and Mobile Broadband

	Fixed Broadband	Mobile Broadband
Definition	High-speed internet access provided through wireline or wireless technology to a fixed location, i.e., residence, business, office	High-speed internet access provided through cel-lular networks using mobile communication de-vices
Technology (last-mile)[4]	Wired: Fiber optic, copper cables, digital subscriber line (DSL) Wireless: Fixed wireless access, satellite	Base transceiver stations (BTS)
Pros	• Stability • Higher speed • Higher data usage • Cost-efficiency[5]	• Portability • Wider coverage • Lower subscription cost • Lower installation cost
Cons	• Fixed premise coverage • Higher subscription cost • Expensive and complex installation	• Data limits • Limited speed • Signal interference from environmental factors
Fitting user preferences (in rural areas)	Schools, medical facilities, government offices, and businesses (including corporations and SMEs)	Individuals (for personal use), small household farmers, micro enterprises

Source: ITU (2018); World Bank (2018); ITU & UNESCO Broadband Commission (2022) and author analyses.

[3] General-purpose technology refers to an enabling ICT platform that can potentially influence the economy and serve as a key resource across economic sectors (World Bank, 2012).
[4] A growing trend called the Fixed Mobile Convergence (FMC) has ensued in Indonesia's telecommunications industry since early 2022 (Carter, 2020);(Republika, 2022);(Mixvoip, 2023). Telecommunication operators have started to opt for this technology - which allows integration of fixed and mobile broadband networks - as an avenue to expand internet coverage (Dhanesworo, 2022);(Merdeka, 2023); (Hadi, 2023). However, FMC has yet to be largely implemented in the country and technicalities of the infrastructure are still under development.
[5] Fixed broadband subscriptions can offer unlimited data plans, while mobile broadband plans typically have lower data caps, with extra fees for exceeding these limits. This makes fixed broadband more suitable and cost-efficient for activities that demand a significant amount of data, such as video conferencing, high-quality video streaming, and large file downloads and uploads (ITU & UNESCO Broadband Commission, 2022)

Small and Medium Enterprises (SMEs) have increased their use of online platforms and services such as e-commerce and digital payments to build resilience in the face of economic recovery (ITU & UNESCO Broadband Commission, 2022). Poor access to quality broadband internet, particularly in rural areas, has hindered the uptake of online services for business purposes.

Issues related to business and commercial aspects seem to be the underlying reasons for low fixed broadband internet provision in such areas. Firstly, investments in fixed broadband infrastructure by telecommunications industry players[6] are expensive (Rahayu & Sari, 2020). Fiber optic connections require extending cables from the backbone network to Points of Presence (PoPs) to the end-user premise.[7]

An interview with a representative from Association of Telecommunications Network Operators (*Asosiasi Penyelenggara Jaringan Telekomunikasi* or APJATEL) revealed that infrastructure challenges for fiber optic developments make reaching remote areas in Eastern Indonesia challenging. In particular, the distance from PoPs to last mile and passing through arduous terrain makes infrastructure development challenging. Extending one kilometer of fixed broadband cable could cost up to 200,000,000 IDR, equivalent to around 13,000 USD. In addition, Indonesia's complex geography makes construction of passive infrastructure for telecommunications purposes such as ducts, poles, and civil works and other logistical developments in rural and remote areas complicated and costly (Giga Connect & BCG, 2021; Ram, 2017). These elements add to the high capital expenditure for any telecommunication operators, especially those in the fixed broadband industry, to reach remote and rural areas.

Several major internet service providers (ISP) dominate the fixed broadband internet market in Indonesia. According to a survey conducted by Association of Indonesian Internet Service Providers (*Asosiasi Penyelenggara Jasa Internet Indonesia* or APJII) (APJII, 2023b), the eight key players are IndiHome, First Media, IConnect, MyRepublic, MNC Vision, Biznet, CNB and XL Home. IndiHome is the clear market leader, serving 54.21% of surveyed customers, far more than the second market leader, First Media, which serves only 3.19% of the market.

Telkom Indonesia — a state-owned enterprise and the provider of IndiHome internet service[8] — serves as the largest fixed broadband operator, reaching 9.2 million internet users nationwide (Telkom Indonesia, 2022). This is due to their commitment to expanding internet coverage and infrastructure across the country rather than concentrating on populous cities.[9] Because extending services to the rural market is not attractive to most ISPs, tight competition between ISPs takes place in urban areas, while internet coverage in rural and remote areas is generally understood to be predominantly provided by Telkom Indonesia.

Secondly, in addition to the high cost of infrastructure are high regulatory costs resulting from complex and unclear local regulations and procedures, which discourage fixed broadband infrastructure development. District regulations cover licenses, local levies, and leasing and are not in line with central government policies (Dwiardi, 2020). Local governments at the provincial

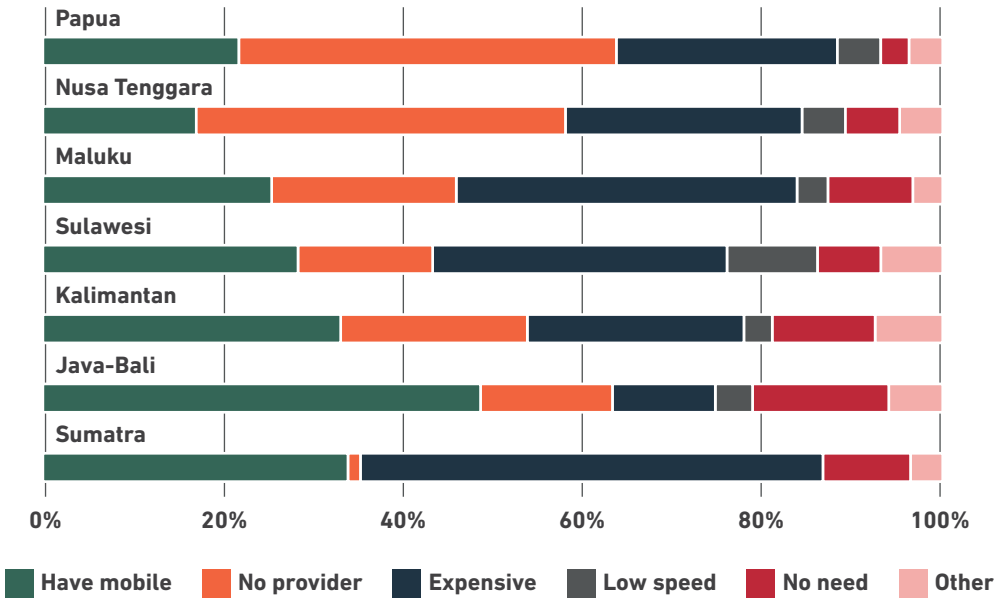
[6] See Annex II for definitions and distinctions between network operators and internet service providers.
[7] See Annex I for broadband infrastructure supply chain from first to last mile network.
[8] As of July 1, 2023, IndiHome is operated under PT. Telekomunikasi Seluler (Telkomsel) which is a subsidiary of Telkom Indonesia and the largest cellular telecommunications carrier in Indonesia (Diahwahyuningtyas, 2023; Telkomsel, 2023). The integration of IndiHome to Telkomsel is in line with their Fixed Mobile Convergence initiative.
[9] According to several news reports, Telkom Indonesia has made a long standing commitment to expand broadband connectivity to remote and underdeveloped regions of Indonesia in an effort to close the spatial digital gap (Telkom Indonesia, 2020; Purwanti, 2023).

and district level tend to see telecommunications operators[10] as a source of local revenue (World Bank, 2021), including by charging fees in excess of what is justified by laws and local regulations. For example, representatives from APJATEL and APJII reported illegal or informal "taxes" to lease land, right-of-way, and licensing levied by local government officials. According to these sources, there is no clear district regulation that underpins the amount or calculation of the fees. The fees levied are based solely on the local government's discretion which could add significantly high regulatory costs to telecommunication operators' operational expenditure. The business association representatives expressed that these unpredictable and inflated costs discourage industry players from investing in rural areas and hinder cooperation with local governments.

Lastly, fixed broadband internet penetration in rural and remote areas are also driven by aspects from the demand-side. Rural communities typically have lower purchasing power than urban communities, and fixed broadband is less affordable than mobile broadband.

The Digital Economy Household survey, conducted in 2020 (World Bank, 2021), shows that fixed broadband subscriptions are low (particularly in eastern Indonesia) because often there is no provider available, and because the setup and subscription costs are too expensive, and because consumers already have mobile coverage (see Figure 2). This finding is supported by APJII's Internet Profile survey (APJII, 2023b) in which most respondents say that they pay monthly subscription fees of fixed broadband typically in the range of IDR 100,000 to IDR 500,000 (6.5 USD to 32.5 USD). In contrast, to subscribe to mobile broadband internet, 42% of users pay below IDR 50,000 (3.25 USD) and another 43% pay between IDR 50,000 and IDR 100,000 (6.5 USD) monthly. This stiff competition from mobile providers makes it less likely that investments in fixed broadband infrastructure in rural areas will yield high return on investments for fixed broadband network operators and service providers and further discourages private investment.

Figure 2.
Reasons for Not Subscribing to Fixed Broadband Internet by Region



Source: Digital Economy Household Survey (2020) data extracted from World Bank (2021).

[10] See Annex II for distinctions between telecommunications operators and service providers.

> The cyclical relationship between the providers and end-users creates barriers to enter and expand fixed broadband connectivity to rural areas from both the supply and demand side.

The cyclical relationship between the providers and end-users creates barriers to enter and expand fixed broadband connectivity to rural areas from both the supply and demand side. Low provision of fixed broadband due to market and regulatory barriers further creates issues of internet affordability faced by end-users in rural and remote areas of Indonesia. In turn, high prices and low presence of fixed broadband internet services shrunk demand of end-users in hard-to-reach areas that are typically of the lower income population, which further hindered telecommunication operators from entering the fixed broadband market. Competition of internet providers in the underserved regions is low or could even be considered non-existent. This helps to explain why a state-owned firm, Telkom Indonesia, to primarily tap into the underserved markets on the basis of its commitment as a state-owned enterprise. Lack of viable markets and competition left many remote and rural regions remain untouched by high-capacity internet service.

The government of Indonesia has introduced several interventions to address the aforementioned underlying issue of low broadband connectivity in remote and rural areas of the country. The Ministry of Communications and Informatics (MOCI) has as to accelerate fixed broadband connectivity in rural and underserved areas. Presidential Regulation No. 96/2014 Indonesian Broadband Plan 2014–2019 was issued in an effort to narrow the digital divide through broadband penetration targets: to cover 49% of rural households and 6% of the total population with throughput of 10 Mbps (MOCI, 2018; MOCI, 2020).

MOCI also has reestablished The Telecommunications and Information Accessibility Body *(Badan Aksesibilitas Telekomunikasi dan Informasi* or BAKTI), an institution mandated to bridge Indonesia's digital divide in its frontier, outermost, and least developed regions (*daerah tertinggal, terdepan, dan terluar* or 3T regions)[11] and carry out the Universal Service Obligation. According to MOCI Regulation No. 5/2021 on Telecommunications Provision, the Universal Service Obligation (USO) is a non-state tax revenue derived from a mandatory contribution by telecommunications operators amounting to 1.25% of gross income. USO is considered as a tool to facilitate affordable and equitable access to telecommunications services (World Bank, 2012).

To further develop integrated and targeted ICT policies and programs, the government established the National ICT Council (*Dewan Teknologi Informasi dan Komunikasi Nasional* or Wantiknas), through Presidential Decree No. 1/2014 (Wantiknas, n.d.). Wantiknas is tasked with setting the strategic direction of national ICT development, as well as evaluating and providing input on cross-ministerial ICT programs to ensure effectiveness and efficiency. Wantiknas has an implementing committee and advisory committee, comprising members from various ministries, industry players, business associations, academics, and practitioners. Wantiknas is overseen by a steering committee led by the president and it operates with budget allocations from the Ministry of National Development Planning.

[11] See Annex III for mapping of underdeveloped regions of Indonesia.

Government interventions proceeding the issuance of The Job Creation Act in 2020 (and amendments under Law No. 6/2023) centered around easing investments and leveling the playing field for market players in the telecommunications sector. The MOCI Strategic Plan 2020–2024 outlined Indonesia's Digital Transformation Policy. In terms of rural internet penetration, MOCI's strategy has focused on distribution of mobile broadband and wireless networks through the construction of BTS towers and satellite ground stations. Internet access through fixed broadband infrastructure for households in the frontier, outermost, and least developed regions has not been made a priority. The challenge remains as MOCI needs to reassess its current strategy and determine future strategies in addressing the issues found at the local level such as unclear retribution fees and licensing procedure for telecommunication operators.

CURRENT POLICIES ADDRESSING THE SITUATION

Three main policy areas were identified to be reformed or amended in order to boost penetration and investments in fixed broadband internet to the underdeveloped, remote, and rural areas of Indonesia. The policy areas consist of universal access and service funds, government support to enhance private investment, and ease of doing business. Table 2 presents existing regulations, policies, and strategies that correspond with these policy areas.

Table 2.
Policy Areas Mapping

Regulation/Policy/Strategy	Policy Areas			
	Universal Access and Service Funds	Government Support to Enhance Private Investment	Ease of Doing Business	
			Local Retribution	Licensing
Government Regulation No. 46/2021 on Posts, Telecommunications and Broadcasting	√	√	√	√
MOCI Regu lation No. S/2021 on Telecommunications Provision	√	√	√	√
MOCI Regulation No. 2/2021 on MOCI Strategic Plan 2020-2024	√	√		√
MOCI Regu lation No.3/2018on BAKTI Organi zation and Work Structure	√			
Government Regulation No. 10/2021 on Local Taxes and Retribution to Support Ease of Doing Business and Local Services			√	

Universal Access and Service Funds

The Telecommunications and Information Accessibility Body, BAKTI, as an institution under MOCI has a large degree of freedom to manage the telecommunications sector's Universal Access and Service Funds. The Universal Service Obligation (USO) contribution are funds levied to telecommunication operators as a joint commitment to build inclusive telecommunications access (MOCI, 2019a). Initially it was formalized in MOCI Regulation No. 10/2018 on Implementation of USO and updated in MOCI Regulation No. 5/2021 on Telecommunications Provision which states that the USO contribution would be collected from 1.25% of telecommunication operators' gross income. Article 197 of the regulation stipulated that all USO contributions be transferred and managed by BAKTI to finance their programs on ICT infrastructure provision and the ICT ecosystem.

Under MOCI Regulation No.3/2018 on BAKTI Organization and Work Structure, BAKTI has discretion and authority over their business plans and budgets, execution, and monitoring of its work plans subject to internal inspection by MOCI and abiding by standards of Public Service Agency *(Badan Layanan Umum* or BLU) officials.

According to Government Regulation No. 23/2005 on Public Service Agency Financial Management and Government Regulation No. 74/2012 on Amendments to Government Regulation No. 23/2005, a Public Service Agency (BLU) is a working unit of state ministries/institutions/district governments for the purpose of providing public services. BLU operates as a semi-independent body, generating its own revenue and providing services to the public based on efficiency and effectiveness, rather than with a focus on profit. The organizational structure of a BLU is more similar to a company than to a government agency in that it is headed by a President Director/CEO and Board of Directors. A BLU can also charge fees to the public with considerations of service continuity, equity and justice, and healthy competition. These fees are proposed by the head of the BLU to the respective ministries/institutions/district governments then approved by the Ministry of Finance or the appointed ministries/institutions.

BAKTI's role became pivotal in MOCI's Strategic Plan 2020–2024, which focuses on National Digital Transformation as part of the Indonesian government's National Medium-Term Development Plan 2020–2024. MOCI's Strategic Plan was officially launched in MOCI Regulation No. 2/2021 which sets the policy directions and targets in developing digital infrastructure and connectivity that are inclusive, secure, and reliable.

> "MOCI Regulation No. 3/2018 lays out policies that strengthen telecommunications operators' compliance with the USO but overlooked the need for transparency in how BAKTI allocates USO contributions."

MOCI clusters the targeted end-users into non-commercial (3T regions)[12] and commercial areas (non-3T regions), but the definition or distinction does not reflect the specific internet needs and readiness of each region. In terms of last mile infrastructure, programs of internet access in 3T regions focused on expanding 4G network coverage. The telecommunications infrastructure to provide such connectivity is primarily BTS towers. Extension of fiber optic based fixed broadband was targeted to unserved commercial areas (overlooked areas in the populous cities) and households in unserved sub-districts. Thus, internet access through fixed broadband infrastructure for households in 3T regions is not currently a national priority.

The Strategic Plan also outlined the four-year target of USO funds as a source of MOCI's Non-Tax State Revenue or *Penerimaan Negara Bukan Pajak* (see Table 3 and Table 4). BAKTI is mandated to manage 100% of the USO funds to provide fixed and mobile broadband infrastructure in non-commercial areas.

Table 3.
Maximum Limit of BAKTI's Non-Tax State Revenue Source

Non-Tax State Revenue Source	Maximum Limit
Telecommunications and Information Accessibility Body (BAKTI)	
USO Contribution	100%

[12] 'Non-commercial regions' refers to the term '3T areas' in MOCI's Strategic Plan. While 'commercial areas' refers to non-3T areas, including rural and underserved districts within non-3T areas.

Table 4.
Target Budget for Non-Tax State Revenue Source through USO Contribution

No.	Work Unit	Non-Tax State Revenue Source Target Fiscal Year					Total
		2020	2021	2022	2023	2024	
5	Telecommunications and Information Accessibility Body (BAKTI)	3,306,515,830,375	3,367,000,000,000	3,305,000,000,000	3,233,000,000,000	3,089,000,000,000	16,300,515,830,375
	a. KKPU-USO Contribution	2,785,616,074,379	2,841,000,000,000	2,870,000,000,000	2,898,000,000,000	2,927,000,000,000	14,321,616,074,379
	b. Banking Service	520,899,755,996	526,000,000,000	435,000,000,000	335,000,000,000	162,000,000,000	1,978,899,755,996
B	Non-Tax State Revenue Source Target for USO	3,306,515,830,375	3,367,000,000,000	3,305,000,000,000	3,233,000,000,000	3,089,000,000,000	16,300,515,830,375

Source: MOCI Regulation No. 2/2021 on MOCI Strategic Plan 2020-2024.

Using funds from the USO, BAKTI has carried out four primary ICT infrastructure projects aligned with the MOCI's Strategic Plan and aimed to improve connectivity in the 3T regions. The first program is the provision and construction of BTS towers (BAKTI, 2018a), including those for the 4G network, to expand the network coverage for mobile broadband internet. While the development of 4G BTS towers has surpassed that of 2G and 3G, 54% of the 296 thousand 4G BTS towers in Indonesia are still concentrated in Java island, while other islands in the eastern region like Sulawesi, Nusa Tenggara, Maluku, and Papua in total having less than 15% (MOCI, 2023a). With USO funding, BAKTI built 5,410 BTS towers in 3T regions across Indonesia from 2015 to 2022 (MOCI, 2023b).

Secondly, BAKTI has initiated the Palapa Ring project (BAKTI, 2018b), which builds the first mile or backbone fiber network to connect 57 districts/cities in the 3T regions with a total project area of 11,610 km of submarine and inland fiber optic backbone (National Development Planning Agency, 2023b). The project was completed in late 2019 under a public-private partnership (PPP) scheme with fiber optic-based network operators. While it is the core component for both fixed and mobile broadband internet, this newly-built fiber network has not increased broadband connectivity in the underserved areas. The project falls short of being a complete solution as it only extends the national first mile network, and there remains low penetration of the middle and last mile network connecting to the sub-district or village level (Chen et al., 2023).

The Palapa Ring network is government-owned but available for lease by network operators. However, uptake has not met the government's target. In 2021, the utilization rate of the Palapa Ring network reached 30.5% in the eastern part of the country (MOCI, 2022a). According to MOCI's Annual Report 2019 (MOCI, 2019b), fiber optic coverage at the village-level reached 36.02%, or 29,978 out of 83,218 villages. Industry players consider the Palapa Ring leasing fee expensive and its coverage limited (Handoko & Zhang, 2021; Interview, 2023). Extending the middle mile network out of the Palapa Ring network remains costly for the operators.

BAKTI has also implemented another program known as AKSI or *Akses Internet*, which aims to provide free satellite internet access in important public facilities including schools, health centers, local government offices, and tourist destinations (BAKTI, 2018c). By 2022, BAKTI had

installed VSATs[13] (Very-Small-Aperture Terminal) in 15,396 such locations by leasing the internet services from satellite broadband providers such as Aplikanusa Lintasarta, Pasifik Satelit Nusantara, and Telkom Indonesia (MOCI, 2023b).

The latest project by BAKTI is SATRIA or *Satelit Republik Indonesia* (BAKTI, 2018d), a multifunction satellite launched in June 2023. This government-owned satellite is expected to provide internet access to 150,000 public facilities, with greater capacity compared to previous broadband satellites in Indonesia (MOCI, 2023b). Funding for the project came from a PPP scheme with investment from private telecommunications companies.

Although the detailed USO budget and its high-level objectives are available, the strategic plan does not disclose a detailed development plan for ICT infrastructure in non-commercial regions or 3T regions that includes priority locations and USO distribution.

MOCI launched the Telecommunications and Information Access Application (*Aplikasi Permohonan Akses Telekomunikasi dan Informasi* or PASTI) in an effort to undergo a needs-based provisioning of ICT infrastructure. PASTI is an online portal that can be accessed by local government institutions and civil society organizations to submit applications or proposals for provision of BAKTI's programs (*Akses Internet*, BTS towers, satellite, and fiber optic) (BAKTI, n.d.). Proposals must meet several conditions, including the point of provision being a public facility located within BAKTI's working area or in 3T regions where there is inadequate internet access.

Wantiknas and BAKTI jointly established the 'Meaningful Broadband Working Group' in 2019 with an objective of developing strategic plans to foster a more inclusive digital economy in 3T regions through broadband internet ecosystem (Wantiknas, 2019). The working group comprised members from telecommunications companies, state-owned companies, government ministries, technology and startup companies, and other stakeholders. The working group planned a series of seminars and dialogues involving various stakeholders to kick off its agenda (Wantiknas, 2020) that were derailed by the Covid-19 pandemic. The future of the working group is uncertain — limited information is available about its outputs.

Government Support to Enhance Private Investment

The telecommunications sector is highly regulated and restricted in terms of investments but has seen a steady shift in opening to private investment. Presidential Regulation No. 39/2014 on List of Closed Business Fields and Open Business Fields with Requirements in the Investment Sector stipulated that foreign capital ownership of telecommunications network providers, both fixed and mobile, is capped at 65%. Presidential Regulation No. 32/2020 on Infrastructure Financing through Limited Management Rights permitted private investment to contribute to public-led projects, particularly telecommunications infrastructure projects, through a Limited Concession Scheme. Finally, restrictions of foreign investment in the telecommunications

"The telecommunications sector is highly regulated and restricted in terms of investments but has seen a steady shift in opening to private investment."

[13] VSAT is a ground station that transmits and receives data over satellite communication networks (Gartner, n.d.).

sector were significantly relaxed by Presidential Regulation No. 10/2021 about Investment in Business Sectors, which moved many business lines in the telecommunications sector to the 'positive investment list' of sectors that are 100% open to foreign investment. In 2021, Law No. 36/1999 about Telecommunication was updated by The Job Creation Act (Law No. 11/2020 about Job Creation and its amendments under Law No. 6/2023), Government Regulation No. 46/2021 on Posts, Telecommunications and Broadcasting, and MOCI Regulation No. 5/2021 on Telecommunications Provision. These regulations govern areas of infrastructure sharing,[14] spectrum frequency sharing,[15] and tariff policies in the sector to expand telecommunications services nationwide while protecting consumers (MOCI, 2021b; MOCI, 2022b).

Another policy aimed at supporting investment in the ICT sector is infrastructure sharing, especially for passive infrastructure.[16] Article 23 of MOCI Regulation No. 5/2021 states that providers of passive infrastructure, including internet network operators, must make passive infrastructure open for sharing with other operators. Providers of passive infrastructure include not only telecommunications companies but the central government, district governments, state owned enterprises, and other entities. By using existing infrastructure, network operators can avoid duplication of passive infrastructure construction, leading to increased efficiency and reducing initial capital costs for some firms (TRAI, 2019; Ram, 2017). Mandatory infrastructure sharing, as outlined in MOCI Regulation No. 5/2021, is non-discriminatory and open to all network providers, with the aim of preventing concentration of market power through affiliations between specific passive infrastructure providers and telecommunications companies, promoting open access and fair competition, especially for small industry players.

Infrastructure sharing must consider business factors and sustainability. There is potential for additional revenue streams for both passive and active infrastructure providers through leasing arrangements. There is a caveat, stated in Article 24, that infrastructure providers are not obliged to share passive infrastructure in cases where infrastructure is at full capacity, reserved for larger public interests, and/or where sharing is not technically feasible.

Tariffs for using shared passive infrastructure should consider factors including cost of investment and operations, reasonable profit, market conditions, and public interest. However, market conditions take precedence over other considerations when determining pricing. The policy shows that infrastructure sharing must still consider business factors and sustainability even though infrastructure providers are obliged to open access. While providers may set their own tariffs for leasing passive infrastructure, the minister can intervene to set an upper limit for the fee on the basis of the ministry's initiative and/or whistleblowing reports from telecommunications operators, infrastructure providers, and the general public when they feel that the fee is too high or anti-competitive. Such measures are important to ensure that infrastructure providers, especially telecommunications companies that are major players

[14] Infrastructure sharing in the telecommunications sector refers to "the joint utilization of assets and/or services necessary to provide telecommunications service in order to reduce the costs of building, operating, and maintaining network infrastructure" (Garcia & Kelly, 2016).
[15] Spectrum frequency sharing is the practice of sharing the same radio frequency spectrum by multiple telecommunications operators (World Bank, 2018). Radio spectrum is a key component and finite resource in wireless broadband technology, making its effective allocation important to accommodate the growth in the broadband market (Keck et al., 2022).
[16] There are two types of infrastructure sharing: passive and active infrastructure sharing. Passive infrastructure refers to the non-electronic elements in a telecommunications network such as towers, sites, ducts and poles, as opposed to active infrastructure which entails electronic elements such as spectrum and switches.

within and operate vertically across the broadband supply chain, like Telkom Indonesia (Antoni & Asvial, 2019), set sharing fees that are equitable for smaller players (ITU, 2020b).

Ministerial Decree No. 576/2022 on Evaluation Guidelines for Setting Tariffs Upper Limit and/or Lower Limit in Telecommunication Networks and Services further elaborates tariff policy, particularly service prices charged to end users. The decree provided details in Article 50 concerning the tariff policy under MOCI Regulation No. 5/2021. The guideline stipulated a whistleblowing mechanism for fees (including fees for multimedia services and leasing of backbone and backhaul networks[17]) by certain operators that might disrupt fair competition in the given area. For regions with only one provider present, as most cases in the 3T regions, MOCI may lower a fee if it exceeds the reasonable amount of tariff (maximum of 10% increment to the total unit cost plus profit). Moreover, MOCI may recommend a price ceiling intended to protect consumers and prevent exploitative behaviors of the sole telecommunications provider. However, the decree acknowledges that price ceilings might lead to withdrawal of services or reduction in capacity as it would not be a favorable condition. It is unclear what would be the course of action if withdrawal or reduction of services is the most likely outcome — whether the decree prioritizes protection of the telecommunications providers or the consumers.

Government support has introduced incentives and ease for telecommunications operators to compete with fair tariffs that are affordable for low-income consumers but do not result in an unwarranted price war. In addition, the government encourages telecommunications operators to use existing infrastructure to cut costs and lower capital expenditure. These perks, however, seem to be more beneficial for operators serving crowded and urban areas where competition exists and passive infrastructures are readily available. Moreover, passive infrastructure such as ducts, towers, poles, and manholes provided by district governments or other entities in 3T areas are not evenly distributed, especially in blank spots. While infrastructure sharing might promise significant upsides in 3T areas, the infrastructure also needs to be built in the first place to support ICT expansion. The policies address issues that persist mainly in crowded and urban areas, and not-fully address issues of low competition and lack of passive infrastructure in 3T areas.

Government Regulation No. 46/2021 and MOCI Regulation No. 5/2021 attempt to partially fill these gaps by promoting the role of local governments in providing support and improving the ease of doing business to attract investment in telecommunications infrastructure development. For instance, Article 33 of the MOCI Regulation No. 5/2021 stipulates that local governments should set leasing and use fees for local government facilities such as land, buildings, and passive telecommunications infrastructure in a fair manner and ensure business sustainability.

There are no standard technical regulations for the implementation of these measures. In practice, local governments in rural areas often impose high fees for the use of their facilities and tend to limit their use to specific network operators, hindering competition and investment in fixed broadband infrastructure development (Tabor & Yoon, 2015).

[17] While backbone serves as a core network that connects service centers, typically located in bigger cities, backhaul infrastructure (also known as metropolitan connectivity or middle-mile infrastructure) connects these core networks to the smaller towns for broader distribution of network (World Bank, 2012; World Bank, 2021).

Ease of Doing Business

Licensing

To obtain operational and commercial licenses, internet network operators and service providers undergo a licensing process overseen by the Directorate General of Post and Informatics Administration of MOCI. Since the enactment of the Job Creation Act, business licensing procedures in Indonesia must be conducted through the national Online Single Submission (OSS) system and use a risk-based approach, as stipulated in Article 6.

The OSS system is a centralized, one-stop portal intended to enhance efficiency and simplify the licensing process. Following the enactment of the Job Creation Act, the rules and procedures for business licensing, including licensing for the telecommunications sector, are further regulated by Government Regulation No. 5/2021 on Risk-Based Business Licensing. Most activities carried out by internet network operators and service providers are categorized as high-risk for licensing[18] (Lembaga OSS, 2020).

The licensing process for telecommunications operators through the OSS system ideally follow an integrated step-by-step process[19] within which operators must submit in parallel supporting and cross-sectoral permit applications. These include spatial planning, environmental, and building permits, which fall under the authority of relevant ministries as well as the local governments. For example, the deployment of fiber optics requires compliance with environmental management and utilization regulations, as specified in Minister of Environment and Forestry Regulation No. 4/2021. The issuance of the telecommunications operator business license is finalized through the OSS system after its approval by MOCI.

> In practice, challenges persist in Indonesia's business licensing system. The synchronization of data between government institutions and the centralization of data into the national OSS system is one source of challenges. The exchange of data between ministries and local governments responsible for issuing permits in different sectors is still fragmented and not fully integrated into the OSS system.

In practice, challenges persist in Indonesia's business licensing system. The synchronization of data between government institutions and the centralization of data into the national OSS system is one source of challenges. The exchange of data between ministries and local governments responsible for issuing permits in different sectors is still fragmented and not fully integrated into the OSS system (World Bank, 2021). For instance, the licensing system managed by sectoral ministries such as GISTARU (spatial planning approval) by the Ministry of Agrarian Affairs and Spatial Planning, AMDALNet (environmental approval) by the Ministry of Environment and Forestry, and SIMBG (building construction approval) by the Ministry of Public Works and Housing have not completed integration with the OSS system (Badan Pemeriksa Keuangan, 2021). Consequently, companies need to submit these cross-sectoral permit applications separately through a complicated and uncoordinated process.

[18] As outlined by the official classification (Klasifikasi Baku Lapangan Usaha Indonesia or KBLI) the Government Regulation No. 5/2021.
[19] See Annex IV for an overview of this process.

Moreover, there are variations in the implementation by local governments, ranging from the lack of integration between local licensing systems and the OSS system to limitations to the availability in important data such as the detailed spatial plan (*Rencana Detail Tata Ruang* or RDTR) used in the spatial planning permit (Situmorang et al., 2023). The spatial plan at the district/city level plays an important role in accelerating the business licensing process, especially for infrastructure deployment activities that involve territorial planning. This includes the telecommunications sector, which requires mapping of available passive infrastructure in the area. However, only a small portion of Indonesia's regions have a spatial plan integrated into the OSS system, leading to longer time for the process of site inspection and approval for businesses. Data from the OSS Agency shows that only 158 of 514 spatial plans for districts/cities in Indonesia have been integrated with the OSS system (Indonesian Investment Coordinating Board, 2023). Local governments have not made this a priority due to limitations in human resources and budget to design the spatial plan (Lembaga Administrasi Negara, 2021).

Local Retribution

Retribution is a type of local levy for the use of certain facilities owned and provided by the local government. It serves as a source of non-tax revenue to fund the development of local public infrastructure, facilities, and services. In the telecommunications sector, retribution fees are typically imposed on telecommunications network operators. Retribution policies are regulated in Law No. 1/2022 on Financial Relations between the Central Government and Local Government and Government Regulation No. 46/2021. Law No. 1/2022 outlines a list of goods and services that may be subject to retribution, while Government Regulation No. 46/2021 Article 21 stipulates that the retribution for telecommunications infrastructure should be determined based on "reasonable cost" and ensure legal certainty for businesses. Any additional type of retribution will be stipulated in further government regulations as stated in Article 88 of the law. Furthermore, local governments are given the freedom to define the types of retribution objects, the basis for imposing the fee, and the fees themselves through district regulations and to charge fees for the use of facilities other than those outlined in the law.

> "The flexibility given to local governments resulted in a wide range of fees imposed on internet network operators. This presents a challenging situation for operators to navigate the regulatory framework and maintain operational costs in addition to various regulatory charges (including taxes from the central government, local taxes, and other forms of non-tax state revenue such as USO contributions, building permit fees, and technical and business licensing fees). Illegal levies at the local level further exacerbate the regulatory costs."

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According to Law No. 1/2022, the central government has the capacity to evaluate and adjust local retribution policies by considering other factors including requirements for national priority programs and easing investment ecosystems. Allowing only one provincial/district regulation to govern retribution subjects and rates in the given region is meant to streamline variations in local retribution policies across regions and across different levels of local governments. An implementing government regulation for Law No. 1/2022 will detail how this will take place, but these regulations are still being developed (Directorate General of Legislation, 2023). The implementing regulation is important as the provisions for retribution need to be further regulated and specified in more detail to serve as a guideline for local governments.

Provisions on the adjustments to local retribution regulations can be found in Government Regulation No. 10/2021 on Local Taxes and Retribution to Support Ease of Doing Business and Local Services. Under this framework, MOCI as the overseeing ministry for the telecommunications sector, in coordination with the Ministry of Finance (MOF), can propose adjustments to local fees and the objects they apply to in line with ongoing national strategic projects. The process itself requires layers of reviews and approvals from multiple government stakeholders to adjust a myriad of local retribution policies, and so entails a lengthy and cumbersome process that might delay or hinder the implementation of ICT infrastructure development. It remains unclear whether any adjustments have been made to local retribution policies under this scheme regarding the development of internet infrastructure and services.

STATE OF CURRENT POLICY OUTCOMES: CASE STUDY OF SOUTHWEST SUMBA

Southwest Sumba district on Sumba Island in the East Nusa Tenggara province presents a case that could represent the conditions of most remote and rural regions in Indonesia.

East Nusa Tenggara scores low in digital indexes but improved in the past four years. The ICT Development Index (Statistics Indonesia, 2021) placed East Nusa Tenggara as the second lowest rank for the year 2020 with 4.49 points.[20] In 2021 its score rose to 5.00 points but it still held the second lowest rank.

The case study then narrows to the remote and rural Southwest Sumba district, one of the areas on Sumba Island with the highest poverty rate, lowest district gross domestic product, and lowest internet penetration (Christiani & Nainupu, 2021; Renggo, 2021). The Southwest Sumba district represents lagged digital transformation progress in a disadvantaged region that is making improvements in the ICT indexes. The district exemplifies the sort of area that could be overlooked by national and district government policies and left lagging behind in terms of digital connectivity.

Fieldwork was conducted in Southwest Sumba to evaluate the development and accessibility of fixed broadband internet, perceptions of BAKTI's programs, and the regulatory and local governance issues that hinder the penetration of internet access. This fieldwork also aimed to capture local demand and digital needs for internet connectivity provided through fixed broadband such as Wi-Fi, cable modem, and others.[21]

Supply and Demand of Internet Services in underserved areas of Southwest Sumba

Coverage of fixed broadband internet in Southwest Sumba remains low, particularly for hard-to-reach areas. Fixed broadband is narrowly available to densely populated areas and public facilities across Southwest Sumba. The Head of District Informatics and Communications Office estimated the coverage of fiber optic for Southwest Sumba at about 30% of the populated area in the district, although no data can be provided on the exact coverage. Local government offices stressed that fiber optics are highly centered in the urban center of Tambolaka city and left many blank spots for the rest of Southwest Sumba district.

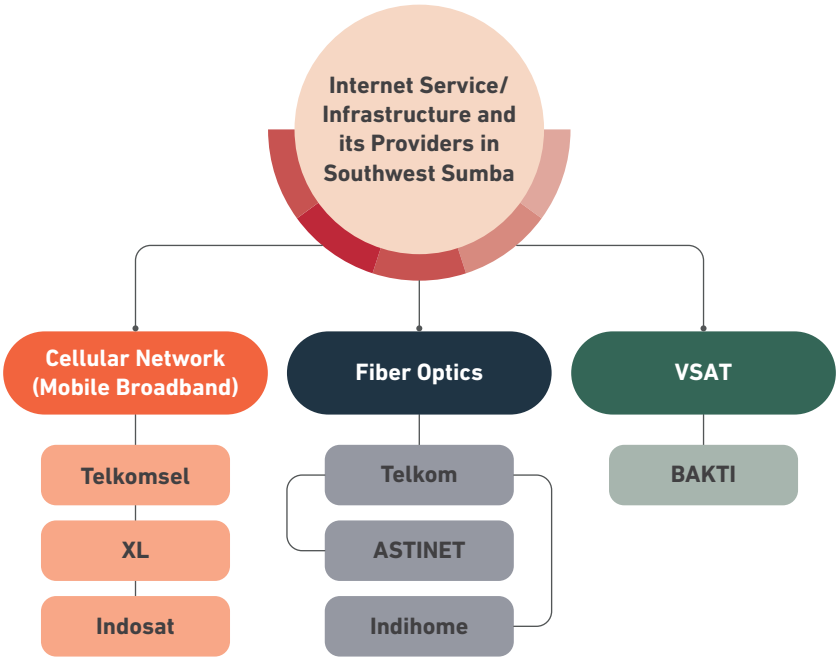
"Coverage of fixed broadband internet in Southwest Sumba remains low, particularly for hard-to-reach areas. Fixed broadband is narrowly available to densely populated areas and public facilities across Southwest Sumba."

In terms of infrastructure supply, BTS towers remain the most prominent internet infrastructure available in Southwest Sumba, with a total of 56 towers scattered throughout the region.

[20] The ICT Development Index score is categorized as high (7.51–10.00), medium (5.01–7.50), low (2.51–5.00), and very low (0.00–2.50). In its assessment, there are three main indicators: ICT access and infrastructure, ICT usage, and ICT skills. See Annex V for the ICT Development Index scores of all provinces.
[21] See Annex VI.

The cellular network provider Telkomsel, a subsidiary of Telkom Indonesia, dominated the mobile broadband internet market in Southwest Sumba. There are only two internet service providers for fixed broadband operating in the region, IndiHome and ASTINET, both of which are subsidiaries of Telkom Indonesia. This finding is in line with the known issue of low competition in many 3T regions, despite the recent policies aimed at improving market competition in the telecommunications sector. Other than fiber optics and BTS, VSATs are used (to a lesser extent), especially in public service offices. However, VSAT is not a substitute for fiber optics and not as reliable as fiber optics because its radio signals are sensitive to disruptions from weather conditions like rain and wind (Mohamed et al., 2015). Figure 3 shows providers of internet service for each infrastructure type in Southwest Sumba district.

Figure 3.
Internet Service/Infrastructure and its Providers in Southwest Sumba



Source: Compiled from focus group discussion results.

In Wali Ate village of Southwest Sumba, Internet service channeled through Wi-Fi, enabled through fixed broadband internet, is available for one civil servant at his governmental office. Most of the villagers do not have access to fixed broadband internet. They subscribed to the same mobile data provider, provided by either Telkomsel or XL, enabled through BTS towers. They use the internet predominantly for productive activities such as collecting learning materials, performing business transactions, and managing data for public services (see Figure 4).

Figure 4.
Purpose of Internet Use of Wali Ate Villagers

Source: Compiled from focus group discussion results.

The internet is perceived as a basic necessity and so concerns over the high price of cellular data is prevalent among the villagers. They find that the subscription fees paid for the mobile internet service are expensive at a range from IDR 40,000 to IDR 80,000 a month (there is an exception of one respondent, a homemaker, who only subscribes to telephone service at IDR 35,000 a month and didn't consider internet a necessary expense). Villagers experience low and weak internet speed via their mobile broadband technology. Internet reception in the Wali Ate area is constantly interfered with by bad weather. These findings suggest demand for more stable and reliable internet connectivity to support their daily activities.

The findings from the focus group discussion shows the high cost of fixed broadband internet subscription is the main reason for not using the service despite villagers' expressed desire for faster internet connectivity. The cost of personal Wi-Fi is too high given the perceived value it delivers in terms of internet speed and reliability. Half of the villagers participating in the fieldwork stated they are willing to pay IDR 100,000 for a monthly subscription fee, while other answers vary between IDR 100,000 to IDR 200,000 for a monthly fee.

"The findings from the focus group discussion shows the high cost of fixed broadband internet subscription is the main reason for not using the service despite villagers' expressed desire for faster internet connectivity."

Uncertainty over the frequency of internet use, especially at home, makes villagers more hesitant to subscribe to an expensive service. For instance, one respondent claims that using a Wi-Fi service at public facilities, such as schools, meets his internet needs rather than installing the service at home where the internet may not be utilized as much. This condition justified the issue of low affordability of fixed broadband internet by households in 3T regions. The findings also show that the need for internet connectivity may be better provided through communal broadband facilities in which high-speed internet is available and accessible by every village resident in the given community (World Bank, 2012).

Fixed broadband internet services do reach households in villages of Southwest Sumba that can afford the cost. The village head of Pogo Tena, a village at the outskirts of the administrative capital of the district, estimated that roughly 10% (50 of 553) of households in the village subscribe to fixed broadband internet. These households are typically affluent, with white-collar professionals such as state-owned bank employees, policemen, and officials from the Indonesian National Armed Forces. As in urban areas, they can and are willing to pay a monthly subscription fee up to IDR 400,000 for Wi-Fi enabled internet.

The remaining 503 households, predominantly farming households, are left unserved by telecommunications providers even though fixed broadband infrastructure is available. The findings echoed the concerns of business associations regarding the demand-side of service provision in 3T regions, with typically lower purchasing power and population density. This discouraged businesses from entering into or expanding in the market.

The findings on demand for high speed and reliable internet in Southwest Sumba are in line with the identified user preferences for fixed broadband internet (shown in Table 1). Though demand for fixed broadband from low-income households in 3T regions is relatively lower compared to more affluent regions due to the high price, demand from certain user profiles, such as small and medium business owners, school management, teachers, and civil servants, for more reliable internet persists.

Compared to individual use, sectors such as business, education, health, and government use the internet more extensively (see Table 5). Villagers of Wali Ate village in Southwest Sumba confirmed the utmost importance of internet availability in public places as the internet is used not only for personal communication, but also for productive activities such as administering public data, searching for public information, and searching for learning materials. Because of its low capacity, mobile broadband is not satisfactory to enable villagers to conduct these activities. While mobile broadband is prone to interference, fixed broadband technology is more robust and stable to support their needs, costs aside.

Table 5.
Sectors and Activities in Rural/Remote Areas Requiring High-speed and Reliable Internet through Fixed Broadband

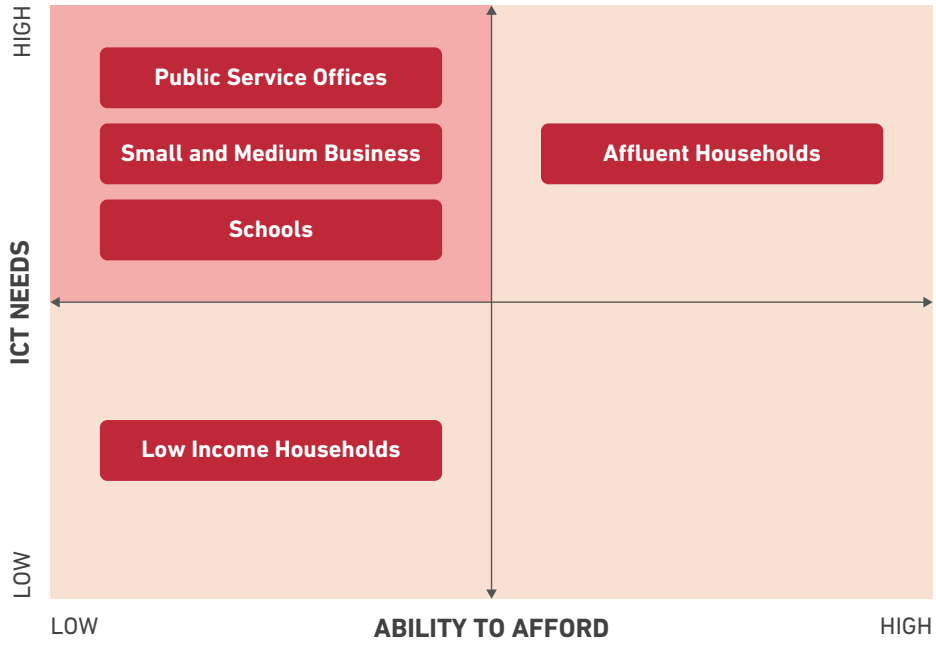
Sector	Activities/Services/Applications
Business	• Teleworking-related applications • Virtual meeting applications • E-marketing platforms • Online transactions
Education	• Online class • Video streaming • Simulation and interactive learning platforms • Downloading digital instructional materials and educational resources • Conducting research
Health	• Clinic management functions (e-mail and web browsing, electronic health records, non-real time image downloads)
Government	• E-government applications • Public information circulation

Source: ITU (2020b); ITU (2021b); and compiled from fieldwork results.

Fieldwork findings also highlighted the need for prioritization of locations in 3T regions. As illustrated by Figure 5, small and medium businesses and public service offices have high ICT needs but low ability to pay, making them potential target recipients of BAKTI programs.

According to heads of district offices, fiber optics development should be prioritized for commercial and productive locations such as tourism villages and smart villages. These areas are the center of economic activity driven by small and medium businesses with more established public amenities. Moreover, communal broadband access, such as free hotspots, developed in priority locations may support low-income individuals performing their productive activities such as schooling and making online transactions. This is in line with inputs from the Chairman of Association of Telecommunications Network Operators, who suggests that operators and ISPs will be attracted to invest in economically viable areas. In turn, increased internet penetration will boost the economy of the region and create an inflow of investments. The findings also showed that the internet has been used for various productive purposes despite the shortcomings of mobile broadband and the limited availability of fixed broadband internet. Therefore, the penetration of fixed broadband that provides high-speed and stable connections will support economic activities and public services in Southwest Sumba.

Figure 5.
Mapping of Fixed Broadband Internet based on ICT Needs and Affordability



Source: Compiled fieldwork results, author's analysis.

BAKTI's Program on Internet Provision

BAKTI's program in Southwest Sumba has not focused on the provision of fiber optic networks. Aligned with MOCI's Strategic Plan, ICT infrastructure programs in the region were mainly the construction of BTS towers (mobile broadband) and VSAT (fixed wireless broadband enabled through satellite communication networks) as part of BAKTI's *Akses Internet* program.

"BAKTI's program in Southwest Sumba has not focused on the provision of fiber optic networks. Aligned with MOCI's Strategic Plan, ICT infrastructure programs in the region were mainly the construction of BTS towers (mobile broadband) and VSAT (fixed wireless broadband enabled through satellite communication networks) as part of BAKTI's *Akses Internet* program."

According to the Head of District Informatics and Communications Office, Southwest Sumba, there is little transparency in BAKTI's BTS provision program. Across the Sumba Island, Southwest Sumba only received one BTS tower from BAKTI, while other regions, such as East Sumba and West Sumba, received 21 and four BTS towers respectively. According to the respondent, Southwest Sumba should be entitled to the same number, if not higher, of BTS towers with East Sumba based on its population (see Table 6). There is a perceived bias against certain regions since BAKTI could not provide clear justification.

Tower distribution might also be based on economic potential. When compared to the District Gross Domestic Product (GDP) of each district in 2022, East Sumba generated the highest annual GDP, suggesting higher economic potential among the three districts. However, West Sumba produced lower GDP value than Southwest Sumba within the year but the latter received only one tower compared to the four towers in West Sumba. The allocation of BTS towers based on economic potential may be unfounded.

The Head of the District Informatics and Communications Office, Southwest Sumba, proposed the construction of 19 new BTS towers in Southwest Sumba since 2020, but BAKTI had yet to respond or follow-up on the proposal.

Table 6.
Comparison of Total Population and BAKTI BTS Towers Provision across Sumba Districts

Region	Total Population[A]	District GDP (in billion IDR)[E]	BAKTI BTS Towers
Southwest Sumba	308,106[B]	4,175.05	1
East Sumba	252,704[C]	6,825.70	21
West Sumba	145,097[D]	2,583.33	4

[A] year-surveyed varies depending on data availability.
[B] data collected by Statistics Indonesia for the year 2022.
[C] data collected by Statistics Indonesia for the year 2017.
[D] data collected by Statistics Indonesia for the year 2020.
[E] provisional data of Gross Domestic Product (current price) for the year 2022.

Source: Statistics Indonesia Southwest Sumba District (2023), Statistics Indonesia East Sumba District (2023), Statistics Indonesia West Sumba District (2023), and compiled from interview results.

In regards to BAKTI's internet access program, about 80 internet locations through VSAT have been built to support public facilities, such as health centers and elementary schools. This was considered insufficient, leaving a number of public facilities unserved. One of BAKTI's VSAT stations in Pogo Tena village was used as a public good. The Head of Pogo Tena village opens the VSAT connection at a particular location to all users to study or conduct teaching activities. The village head also disclosed that he underwent an application process in order for the village to be a recipient of BAKTI's program, possibly through BAKTI's PASTI Portal.

The information shared by district officers on the number of BAKTI's BTS and VSAT projects in Southwest Sumba is not in line with information provided on the BAKTI website. Figure 6 and Figure 7 show data from BAKTI's public database to illustrate location points of BTS BAKTI towers and *Akses Internet* (enabled through VSAT and fiber optic cables) across Sumba Island.

Figure 6.
Location Points of BTS BAKTI

Source: BAKTI Infrastructure Program Infographic (2023).

Figure 7.
Location Points of Akses Internet

Source: BAKTI Infrastructure Program Infographic (2023).

The exact number is not provided in BAKTI's database. Location points of BTS towers built by BAKTI (see Figure 6) are not in line with the number of BTS towers disclosed by the district governments. Similarly, location points of *Akses Internet* in Southwest Sumba do not tally with the numbers given by district governments. This suggests a disparity between publicly-available data collected by BAKTI and the actual number of BAKTI location points in Southwest Sumba.

The case from Southwest Sumba illustrates the lack of transparency from BAKTI regarding its strategy and priority locations in 3T regions, contradicting the best practices of the governance body of Universal Service Access and Funds by failing to apply the highest level of transparency, visibility, and accountability (ITU, 2019).

Business association representatives stressed the need for an open discussion and review of BAKTI's strategy holistically with other stakeholders, including telecommunications operators and local governments. Information ranging from the progress of ongoing projects to USO funds collected and disbursed should be published on the BAKTI website and distributed to relevant stakeholders. A participatory approach is another key element in ensuring success of USO funded programs in which all stakeholders involved, including operators and local governments, are consulted in the decision making process of USO programs.

"A participatory approach is another key element in ensuring success of USO funded programs in which all stakeholders involved, including operators and local governments, are consulted in the decision making process of USO programs."

Implementation of Regulations by District Governments

"The district government of Southwest Sumba has not prioritized ICT Infrastructure as part of their district development plan. The Head of District Informatics and Communications Office and the Head of District Development Planning Agency indicated that the limited local budget led to the local government's decision to prioritize other sectors over telecommunications in Southwest Sumba."

The district government of Southwest Sumba has not prioritized ICT Infrastructure as part of their district development plan. The Head of District Informatics and Communications Office and the Head of District Development Planning Agency indicated that the limited local budget led to the local government's decision to prioritize other sectors over telecommunications in Southwest Sumba. Southwest Sumba relies heavily on support from the central government to drive ICT infrastructure developments, including investments to support fixed broadband access.

District officers highlighted the lack of digital literacy and human capital in Southwest Sumba, which likely affects the demand for internet access. In addition, local governments in Southwest Sumba consider themselves to be end-users rather than promoters of ICT developments, as disclosed by the Head of District Public Works and Public Housing Office. This kind of mentality and outlook helps to explain the passive role taken by the local government regarding internet penetration to underserved areas. Local government

passivity contradicts MOCI's regulations and strategic plan, which rely on support and initiatives from local governments to ease investments of ICT technologies in 3T areas.

> District officers highlighted the lack of digital literacy and human capital in Southwest Sumba, which likely affects the demand for internet access. In addition, local governments in Southwest Sumba consider themselves to be end-users rather than promoters of ICT developments, as disclosed by the Head of District Public Works and Public Housing Office. This kind of mentality and outlook helps to explain the passive role taken by the local government regarding internet penetration to underserved areas.

In terms of the implementation of MOCI Regulation No. 5/2021, The district Informatics and Communications Office has not been able to independently utilize or to co-fund BAKTI's programs due to its limited local budget. This was validated by the chairman of APJATEL's experience of sharing of passive infrastructures with municipalities in 3T regions. Development of fiber optic connections is not considered necessary, so local governments have not opened sharing of passive infrastructure in extending fiber networks or cables. Policies about passive infrastructure sharing and the municipal role in the provision of infrastructure under MOCI Regulation No. 5/2021 cannot be fully leveraged by the Southwest Sumba government.

Moreover, the tariff policy whistleblowing mechanism may not be applied since no complaints were made regarding pricing of internet services, according to the Head of District Informatics and Communications Office. Given the high fees for fixed and mobile broadband internet, it seems end-users in Southwest Sumba either accept the current rates or are unaware of the tariff whistleblowing process. The tariff policy in Ministerial Decree No. 576/2022 and MOCI Regulation No. 5/2021, thus far, is not implemented by local governments and end-users due to it possibly deemed unnecessary in Southwest Sumba.

Figure 8 shows that fiber optic cables and passive infrastructure such as ducts, manholes, and poles, are not listed under the latest regulation governing retribution in Southwest Sumba.[22] Underdeveloped areas like Southwest Sumba rely on local revenue generated from fees and leasing, which discourages them from relaxing local retribution rates or providing tax incentives for infrastructure development. A combination of freedom for local governments, a lack of guidelines from the central government, and poor coordination and planning between Southwest Sumba government bodies resulted in murky implementation of retribution collection, especially for telecommunications objects. In practice, only several objects of local retribution for ICT infrastructure are governed by local regulations.

[22] The latest regulation that governs local fees for the use of government-owned ICT facilities is East Nusa Tenggara Provincial Regulation No. 1/2022 about Fourth Amendment of PR No. 9/2011 about Business Service Retribution (*Retribusi Jasa Usaha*).

Table 7.
Retribution Objects of ICT Infrastructure under East Nusa Tenggara Provincial Regulation No. 1/2022

No.	Description	Unit of Use	Fare (IDR)
9	Regional Communication and Informatics Office		
	Levy on the Use of Regional Wealth		
	1. Lease an Ad Board	Per Month	2.500.000
	2. Lease Videotron	Per Month	10.000.000
	3. Lease ICT (Information and Communication Technology) Equipment	Per Day	500.000
	4. Lease Tower	Per Year	5.000.000

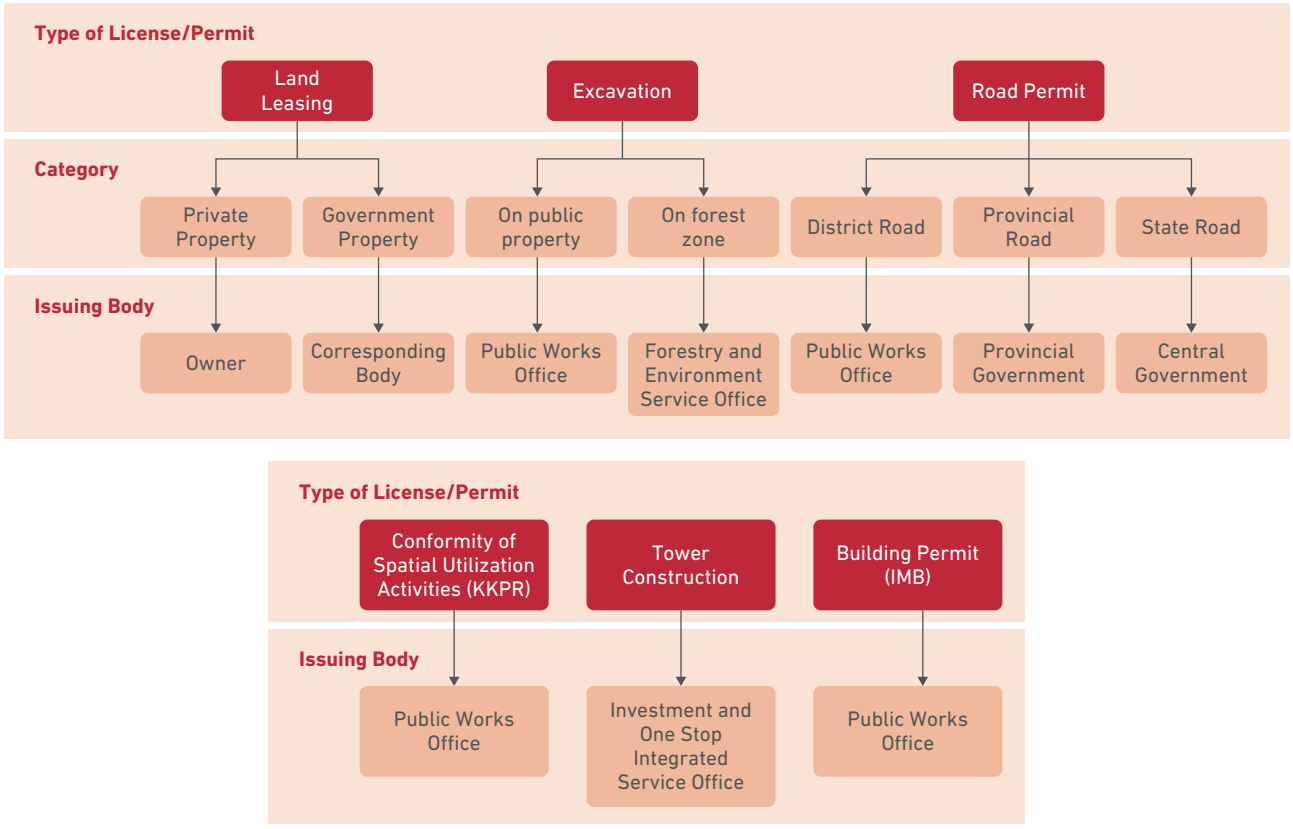
Source: East Nusa Tenggara Provincial Regulation No. 1/2022

This approach is not in line with the central government's provision on the facilitation of telecommunications infrastructure, as stated in the Article 21 of Government Regulation No. 46/2021, which encourages central and local governments to facilitate and support telecommunications providers by granting and easing access to land, buildings, and passive infrastructure.

The OSS system itself is not yet operational in Southwest Sumba and requires support from the Indonesian Investment Coordinating Board to integrate OSS with other permit applications. However, the provision of internet networks and services is categorized as high-risk business by the classification for business licensing (KBLI), and the OSS system is only considered effective in managing small-scale and low-risk business licenses (KPPOD, 2021). As a result, internet providers have to go through lengthy licensing processes and repeatedly engage with multiple agencies to obtain permits.

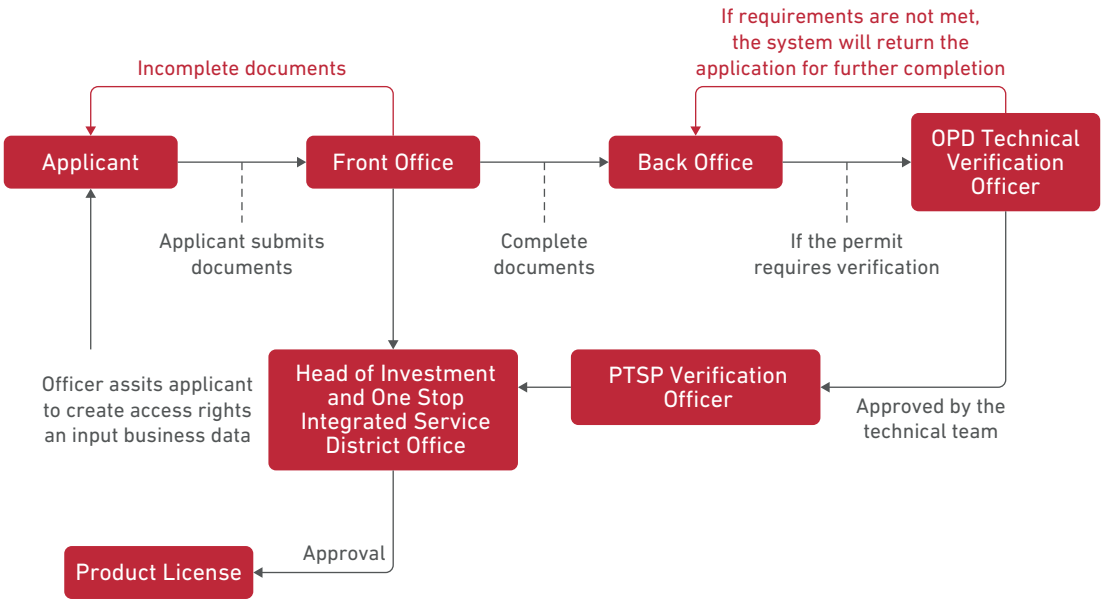
In addition, complicated and unclear licensing and permit procedures are problems in Southwest Sumba. The Head of District Investment and One Stop Integrated Service Office, the designated district office in Southwest Sumba to establish OSS, clarified that the current process for issuing telecommunications infrastructure permits requires meetings with the corresponding district offices. Telecommunications operators and internet providers must collect the required documents from these offices and submit to the One Stop Integrated Service Office. Across the district, offices operate in silos when they refuse to cooperate or overlapping authority makes roles unclear. Offices do not ease regulatory requirements by local governments as encouraged through MOCI's policies. Figure 9 portrays the complicated and unsystematic procedure for operators to develop fiber optic and other telecommunications infrastructure in Southwest Sumba.

Figure 8.
Mapping of License/Permit Type to Issuing Bodies of Southwest Sumba Government



Source: compiled from interview results.

Figure 9.
Process of Business License Application in OSS System in Southwest Sumba



Source: compiled from fieldwork results.

Representatives from district offices of Southwest Sumba were concerned about the siloed manner of governing licensing and local retribution but also stated that their systems remain "flexible." A lack of formal governance or unified ownership left room for unfair and unclear levies of permits and fees, a concern raised by business associations. A clear guideline from the central government on local retribution for telecommunications might help to reduce the loopholes. Centralizing licensing issuance across sectors through the OSS system would reduce variations across local governments.

Fieldwork in Southwest Sumba illustrates that local governments lack the coordination and capacity to ease regulatory costs of telecommunications operators as intended by MOCI Regulation No.5/2021 on Telecommunications Provision. Central government guidance and supervision is required, especially for National Strategy Projects.

POLICY RECOMMENDATIONS

Three steps should be taken to encourage the central government, local governments, and industry players to improve high-speed internet penetration in underdeveloped regions: develop an integrated investment roadmap for 3T regions, create ICT working groups to implement the roadmap, and eliminate the ease of doing business barriers for licensing and local retribution. Figure 11 provides an overview of how these recommendations would affect key actors.

Figure 10.
Policy Recommendations and Key Actors

	Key Actors of the Policy Recommendations			
Policy Recommendations	**MOCI/ other Ministries**	**BAKTI**	**Local Govt.**	**Telecom Operators**
Integrated Investment Roadmap	Establish Integrated Investment Roadmap for ICT Sector	Align USO Budget and other Investments with Regional Roadmap	Create Regional Roadmap	
ICT Working Group	Formalize Working Groups as part of BAKTI's Work Plan	Drive Public-Private Dialogues	Advocate for investments in Priority Locations	Invest in Priority Locations
		Socialize USO realization and projects		Voice and align with business plans
		Establish Regional BAKTI Officer to oversee debottlenecking	Debottlenecking issues on the ground	Report bottlenecks
Eliminating ease of-doing-business barriers	Establish Guideline and Centralize OSS for Licensing		Operationalize OSS based on guideline	Whistle-blow indications of maladministration and illegal practices
	Develop Local Retribution Limit Policy and Guideline		Align with central local retribution and leasing policy	

Formulate an Integrated Investment Roadmap to meet the digital needs of 3T regions

To increase internet penetration in 3T regions in a strategic and cost-efficient manner, MOCI and BAKTI as digital leaders must establish a roadmap to increase investment in fixed broadband and broaden high-speed internet access in underserved 3T regions. Development of the roadmap should be participatory and bottom-up, in which governments at district levels formulate their own district digital transformation roadmap based on local digital needs, ICT readiness, regulatory gaps, and fiscal capacity. This approach would reorient local governments' role as enablers rather than end-users of any ICT interventions. Local roadmaps should be able to identify priority locations in 3T regions, such as smart villages, tourism sites, and public facilities, that are more commercially attractive for ICT infrastructure development and investment. The district roadmaps should then be consolidated at the national level, and should align with investments in ICT interventions from USO budget and other sources of financing.

Establish ICT Working Group to carry out collaborative implementation of the roadmap

To undergo an effective implementation of the roadmap and to attract investment in 3T regions, an organized and formal ICT Working Group between BAKTI, industry players and/or associations, and local governments of the 3T regions should be established. The working group is both a network and a form of collaborative public-private policy dialogue to ensure the implementation of the roadmap is operationalized and streamlined on the ground. The working group should serve as a forum where local governments of 3T regions and industry players advocate for investments in a region, negotiate on terms and conditions, and divide roles and responsibilities for projects. For example, an ISP might request a tax holiday in return for providing internet service in one of Southwest Sumba's tourist attractions. In turn, district heads could request lower internet fees from ISPs or subsidies from USO to cover a proportion of the fees.

BAKTI should act as the lead institution of the ecosystem and co-chair with business associations and Wantiknas representatives.[23] Wantiknas is an existing executive coordinating and advisory body in the ICT sector that can, along with business associations, act as facilitators to collect reports from industry and local government stakeholders. They would act to formulate recommendations and solutions for debottlenecking[24] issues such as lack of infrastructure sharing, conflicts in right of way, and lengthy licensing procedures. Assigned district officers from BAKTI could be deployed to oversee and perform ongoing monitoring of debottlenecking efforts at 3T regions.

To address BAKTI's poor transparency and low institutional capacity, the ICT Working Group should require MOCI to formalize the organization structure and dialogue mechanism as part of BAKTI's work plan or MOCI Regulation No. 3/2018 on BAKTI Organization and Work Structure.

[23] As detailed in Section 1, Wantiknas is an existing executive coordinating and advisory body in the ICT sector that can, along with business associations, act as facilitators to collect reports from industry and local government stakeholders. Wantiknas is tasked with setting the strategic direction of national ICT development, as well as evaluating and providing input on cross-ministerial ICT programs to ensure effectiveness and efficiency.

[24] Debottlenecking is defined as the process of removing obstacles or constraints to improve performance (The Project Definition, 2023). In a government project context, debottlenecking can be applied to stalled infrastructure projects in various sectors such as transportation, energy, and telecommunication.

An important element of the dialogue is to perform a regular socialization of the current USO monies realization detailed in projects, and recipients to improve transparency and accountability. Through the regular socialization, BAKTI should convey its reasoning to target the selected 3T locations and garner inputs and/or objections from other stakeholders.

Eliminate ease-of-doing business barriers for licensing and local retribution

To help standardize retribution policies across regions, MOCI, in coordination with the Ministry of Finance (MOF), should create guidelines for local retribution affecting telecommunication objects. In line with Law No. 1/2022 on Financial Relations between the Central Government and Local Government about national strategic projects, MOF and MOCI should set an upper and lower limit for all telecommunications-related retribution objects that local governments must abide by in order to improve the ease-of-doing-business.

MOF should issue a ministerial decree delineating a guideline to calculate fair and transparent retribution costs that are not burdensome to telecommunications operators' operational expenditure, taking into account the sufficient amount for local revenue generation. Mirroring MOCI Ministerial Decree No. 576/2022, the decree on local retribution should outline a whistleblowing mechanism for cases that indicate unfair fees levied by local governments. A ministerial decree should also accelerate adjustments of local retribution rates and objects in district policies. The process would require amendments on Government Regulation No. 10/2021 to allow issuance of ministerial decrees.

To accelerate the business licensing process for internet network and service industries, sectoral licensing systems must be centralized within the OSS system. This is crucial because the licensing verification process involves multiple parties, including the MOCI, other relevant ministries, the OSS Agency, and local governments. In addition, the central government, in particular the Indonesia Investment Coordinating Board as the implementing body of the OSS system, should establish standardized guidelines for implementing internal and supporting licensing systems owned by local governments. This can be achieved by issuing an implementing regulation that sets norms, standards, procedures, and criteria for these supporting systems at the local government level.

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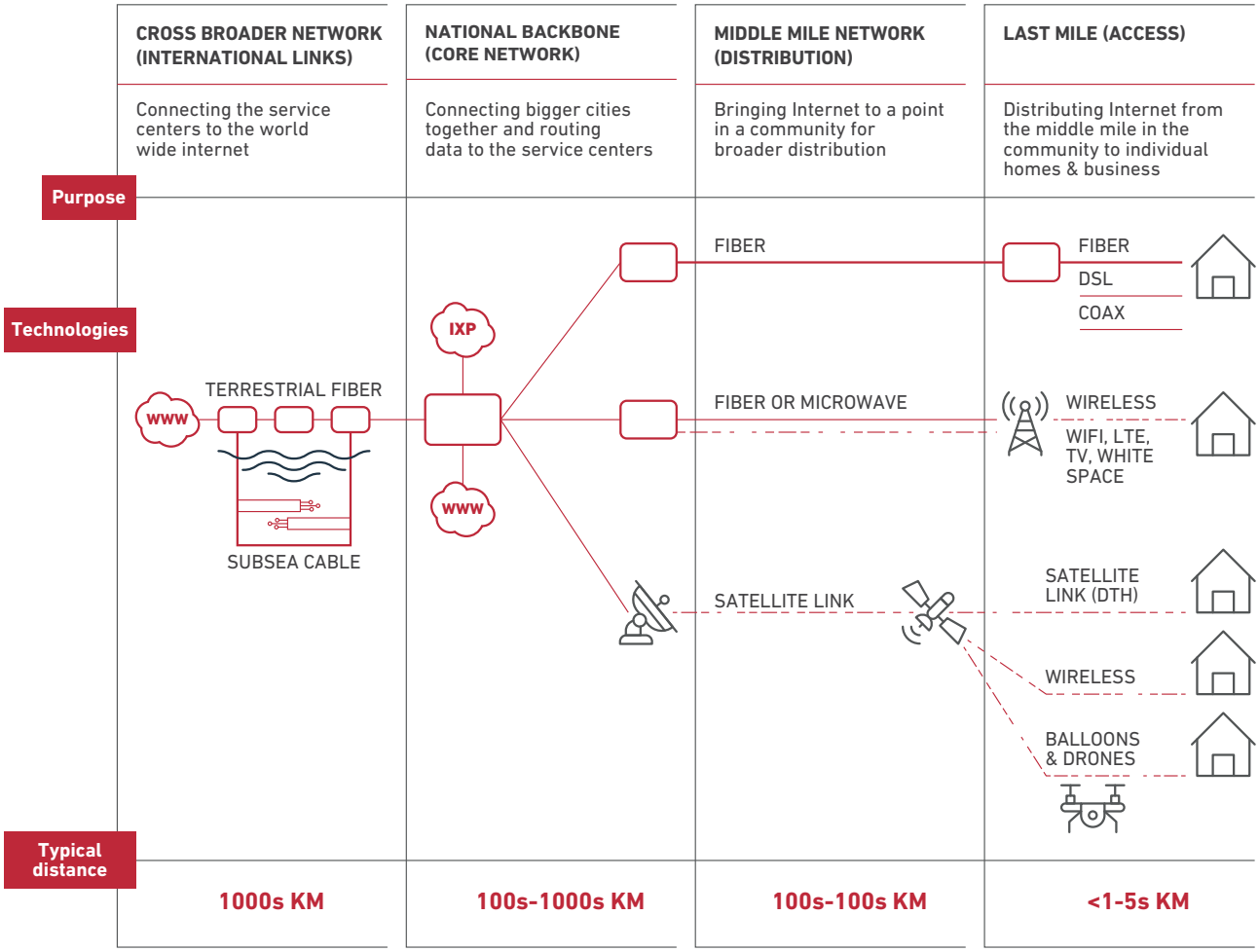
ANNEX

Annex I

Figure 11.
Broadband Infrastructure Value Chain



Source: Extracted from Beyond Unicorns: Harnessing Digital Technologies for Inclusion in Indonesia (World Bank, 2021, 107).

Annex II

Telecommunication industry players in the fixed broadband market are typically classified as network operators or Internet Service Providers (ISPs) based on the types of services they provide in the infrastructure supply chain. Although they operate separately, some companies operate in both provision of internet service and development of network or cables. Hence, the companies that have undertaken the dual-role or either one would generally be referred to as telecommunications operators in this paper. Table 7 details the distinctions between network operators and ISPs.

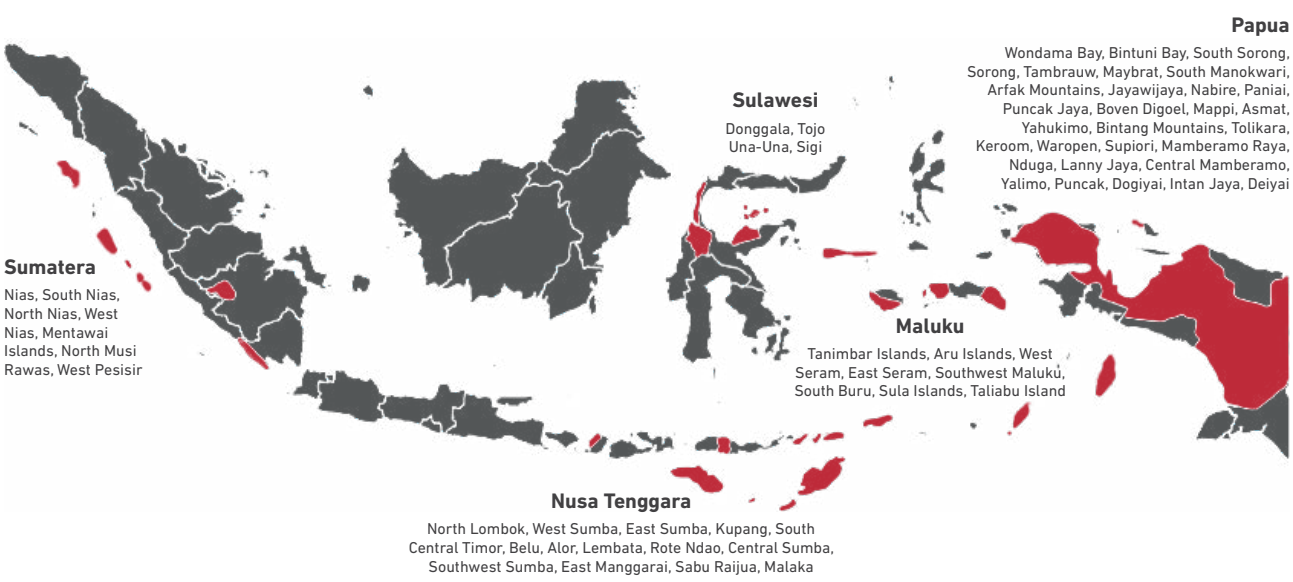
Table 8.
Distinction between Network Operators and Internet Service Providers

	Network Operators	Internet Service Providers (ISPs)
Scope of Work	State owned enterprises (SOEs), private business entities, or cooperatives providing *network infrastructure* that enables internet and telecommunications services.	SOEs, private business entities, or cooperatives providing *end-user internet and telecommunications services* using existing network infrastructure.
	Network operators may also operate as ISPs in a sense that they do end-to-end jobs from building infrastructure to providing commercial internet services.	
Company Examples	Indonusa, Fiberstar, Moratelindo	Oxygen
	Telkom, Biznet, MNC, Link Net (First Media), PLN (Iconnet)	
Association in Indonesia	Association of Telecommunications Network Operators (*Asosiasi Penyelenggara Jaringan Telekomunikasi* or APJATEL)	Association of Indonesian Internet Service Providers (*Asosiasi Penyelenggara Jasa Internet Indonesia* or APJII)

Source: MOCI Regulation No. 1/2021; International Telecommunication Union (2018); APJATEL (n.d.); APJII (n.d.).

Annex III

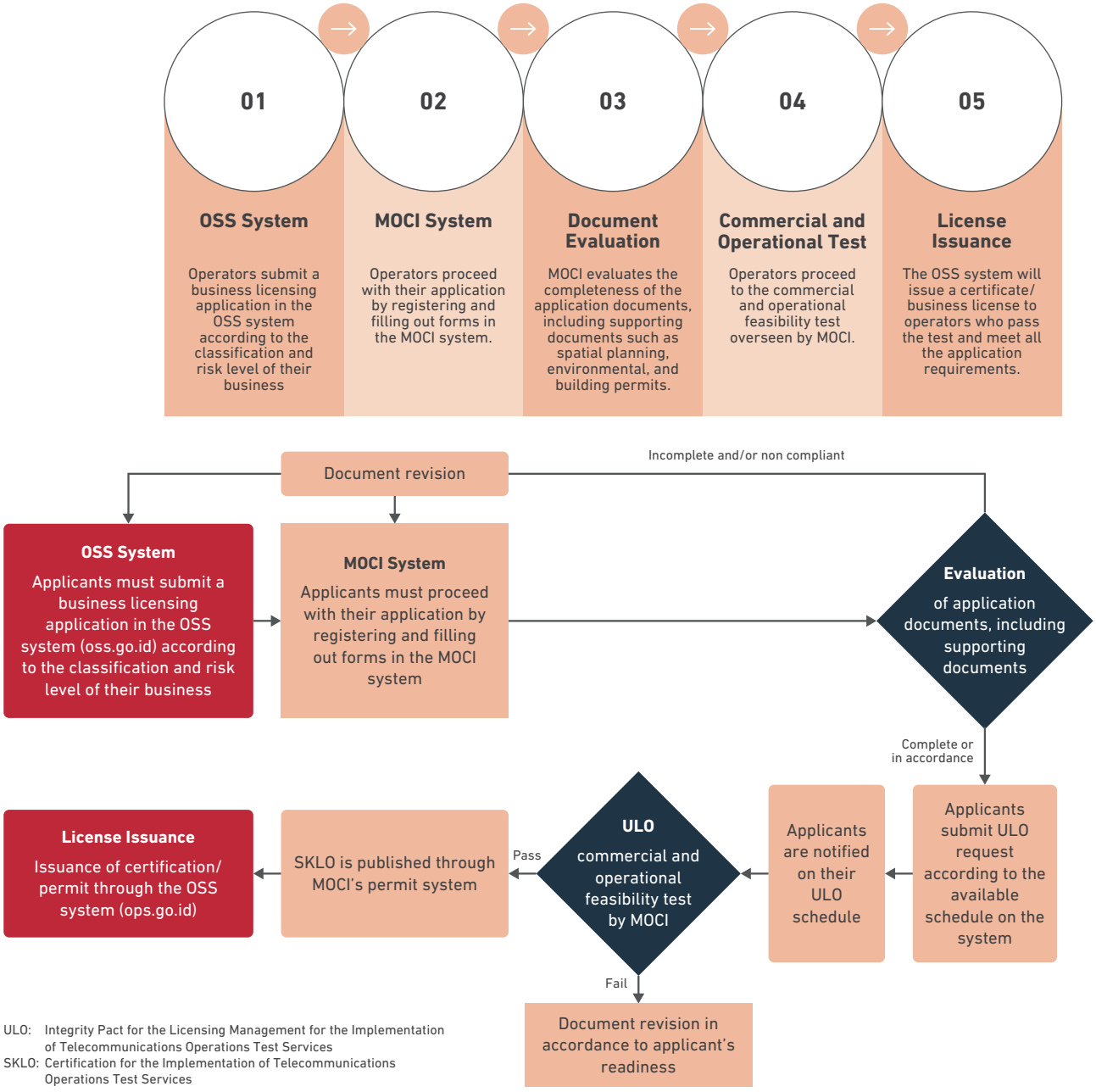
Figure 12.
Mapping of Underdeveloped Regions of Indonesia



Source: Presidential Regulation No. 63/2020 on Designation of Underdeveloped Regions for the Period of 2020–2024.

Annex IV

Figure 13.
Procedure for Telecommunication Network and Service Licensing through the OSS System



ULO: Integrity Pact for the Licensing Management for the Implementation of Telecommunications Operations Test Services
SKLO: Certification for the Implementation of Telecommunications Operations Test Services

Source: Decree of Telecommunication Directorate (2023); OSS Agency (2023).

Annex V

The ICT Development Index score is categorized as high (7.51–10.00), medium (5.01–7.50), low (2.51–5.00), and very low (0.00–2.50). In its assessment, there are three main indicators: ICT access and infrastructure, ICT usage, and ICT skills.

Table 9.
ICT Development Index Scores by Province, 2020–2021, from Western to Eastern Indonesia

Provinsi		Indeks Pembangunan TIK	
		2020	2021
(1)		(2)	(3)
11	Aceh	5,27	5,54
12	Sumatera Utara	5,44	5,75
13	Sumatera Barat	5,52	5,92
14	Riau	5,74	5,90
15	Jambi	5,49	5,73
16	Sumatera Selatan	5,30	5,64
17	Bengkulu	5,50	5,85
18	Lampung	5,15	5,58
19	Kep. Bangka Belitung	5,54	5,71
21	Kepulauan Riau	6,46	6,58
31	OKI Jakarta	7,46	7,66
32	Jawa Barat	6,00	6,08
33	Jawa Tengah	5,74	5,82
34	DI Yogyakarta	7,09	7,14
35	Jawa Timur	5,73	5,85
36	Banten	5,99	6,13
51	Bali	6,57	6,49
52	Nusa Tenggara Barat	5,08	5,39
53	Nusa Tenggara Timur	4,49	5,00
61	Kalimantan Barat	5,08	5,46
62	Kalimantan Tengah	5,54	5,68
63	Kalimantan Selatan	5,67	5,86
64	Kalimantan Timur	6,34	6,43
65	Kalimantan Utara	5,98	6,08
71	Sulawesi Utara	5,69	5,93
72	Sulawesi Tengah	5,27	5,52
73	Sulawesi Selatan	5,59	5,80
74	Sulawesi Tenggara	5,58	5,73
75	Gorontalo	5,37	5,61
76	Sulawesi Barat	4,73	5,33
81	Maluku	5,27	5,65
82	Maluku Utara	4,78	5,03
91	Papua Barat	5,32	5,46
94	Papua	3,35	3,35
Indonesia		**5,59**	**5,76**

Source: (Statistics Indonesia, 2021).

Figure 14.
Mapping of ICT Development Index Scores, 2021

Source: (Statistics Indonesia, 2021).

Annex VI

Two Focus Group Discussions (FGD) were employed with local residents of Wali Ate village, a village in Southwest Sumba with very slow internet connection/reception with no more than one service provider present. The FGDs are complemented with five in-depth interviews with local government officials of Southwest Sumba to gain insights on local regulatory dynamics, as well as coordination with MOCI and BAKTI. In-depth interviews with representatives of telecommunications operators and businesses at the central level were also conducted to capture the supply-side of fixed broadband internet and business aspects of the wider 3T market.

List of Interview Respondents:

1. Head of District Informatics and Communications Office, Southwest Sumba
2. Head of District Development Planning Agency, Southwest Sumba
3. Head of District Public Works and Public Housing Office, Southwest Sumba
4. Head of District Investment and One Stop Integrated Service Office, Southwest Sumba
5. Village Head of Pogo Tena Village, Southwest Sumba
6. Chairman of Association of Telecommunications Network Operators
7. Head of Interagency Relations, Association of Indonesian Internet Service Providers

Table 10.
List of Focus Group Discussion Respondents

Respondent Group	Sample
Students of Wali Ate Village	3
School Teachers of Wali Ate Village	3
Office Employees based in Wali Ate Village	2
Business Owners based in Wali Ate Village	2
Homemakers/housewives in Wali Ate Village	2

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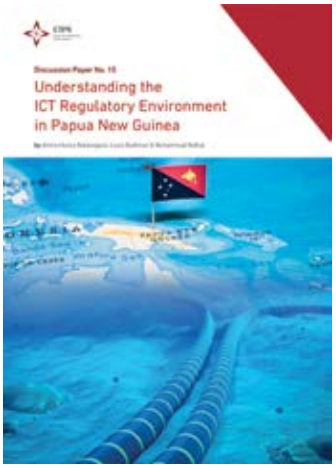

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