GSMA Intelligence

5G and the tech economy in Malaysia: tapping the untapped

February 2025

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Executive summary

Malaysia has long been regarded as showing promise as an advanced tech hub in Southeast Asia. Telecoms in Malaysia has transitioned to 5G, with network rollout and customer adoption accelerating.

The recent announcement that the government has granted a second nationwide 5G licence removes what was in effect an infrastructure monopoly and paves the way for a dual network model. The second licence has been awarded to U Mobile, an operator with around 20% market share in Malaysia.

The move to a 5G dual-network (DN) model is the right one for customer choice, long-term financial sustainability and Malaysia's competitiveness as a tech and services economy. However, challenges remain, including the need to ensure market stability, regulatory clarity and long-term investment incentives. Guaranteeing market stability and certainty should be the number one priority to unlock substantial investments and drive Malaysia towards a successful digital future.

1. In context: high tech, high growth

Transitioning to the 5G era

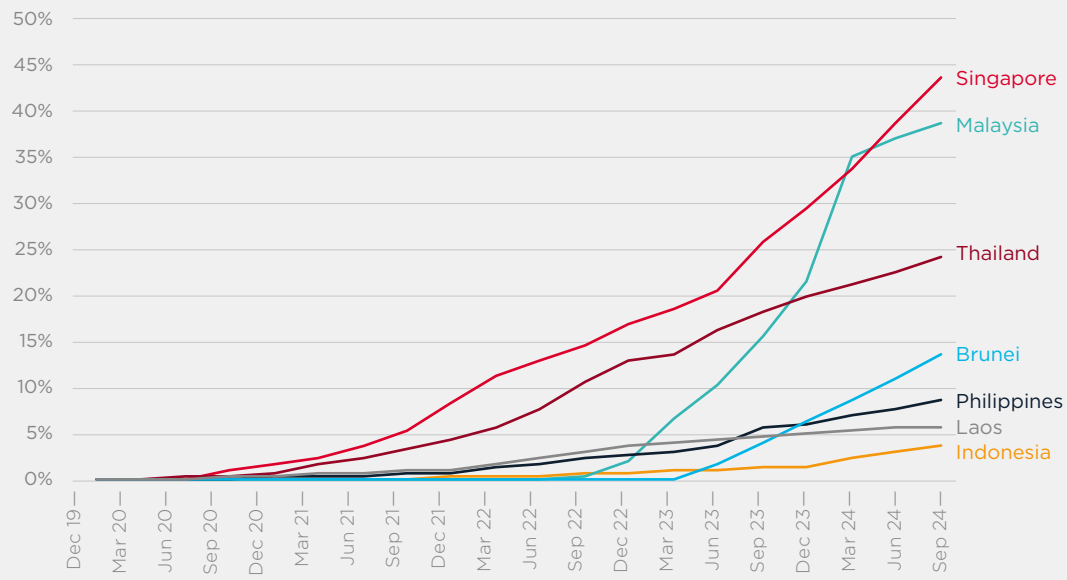
Malaysia has long been regarded as showing promise as an advanced tech hub in Southeast Asia. Malaysia is also a fast-growth economy. GDP grew at 8.7% and 3.7% in 2022 and 2023, respectively. It also has a youthful, tech-savvy population (around 70% of people are under the age of 40). Singapore is Southeast Asia's main hub for foreign investment, equivalent to 30% of its GDP and driven by its financial services sector. However, Malaysia is among the next highest, at 3.6% – above Thailand and Indonesia in the ASEAN cohort, and above India, which competes for similar investment in technology and manufacturing.

Telecoms in Malaysia has transitioned to 5G, with network rollout and customer adoption accelerating. This follows a relatively slow start as a result of delays to 5G licensing and the eventual creation of the single wholesale network (SWN) originally provisioned to Digital Nasional Berhad (DNB) – the state-owned entity.

5G adoption in Malaysia has now reached around 40% of mobile connections (see Figure 1). China, Japan and South Korea remain the vanguard nations in Asia; all record penetration rates of more than 50%, in line with the US and a handful of European countries. Malaysia's run rate of incremental 5G subscriber growth – around 5 percentage points (pp) per quarter in 2024 – has been in line with Singapore, and faster than Thailand and India, where mobile operators have made concerted efforts to migrate 4G subscribers at pace. While some of the growth reflects playing catch-up following initial delays to rollouts, it also signals bona fide consumer demand – typically a positive indicator for subsequent monetisation.

Figure 1 5G adoption in Malaysia: strong growth, with some recent tapering off

5G as a percentage of mobile connections (ASEAN comparison)



Source. GSMA Intelligence

A changed outlook with the dual-network model

The recent announcement that the government has granted a second nationwide 5G licence has changed the outlook in Malaysia. The decision removes what was in effect an infrastructure monopoly and paves the way for a dual-network (DN) model. The second network licence has been awarded to U Mobile, which has a market share of around 20% in the country. The market structure in Malaysia comprises five players, but three companies – CelcomDigi, Maxis and U Mobile – account for more than 90% of subscribers and revenues (see Table 1).

Table 1: Malaysia: telecoms market structure

	Percentage of mobile subscribers	Percentage of total revenue	Percentage of total spectrum**
CelcomDigi	47%	42%	22%
Maxis	26%	35%	13%
U Mobile	20%	Not reported	26%
Yes	4%	4%	7%
Telekom Malaysia	2.6%	1.3%	8%
DNB*	N/A	N/A	16%
Other	0.4%		8%

*The national entity created to operate the first 5G national network in 2022. It only operates as a wholesaler of capacity to the other operators, and does not compete on a retail level.

**Figures on spectrum holdings based on publicly available information. Excludes the mmWave spectrum holdings of DNB. Includes the expected 5G spectrum holdings of U Mobile.

Source: GSMA Intelligence

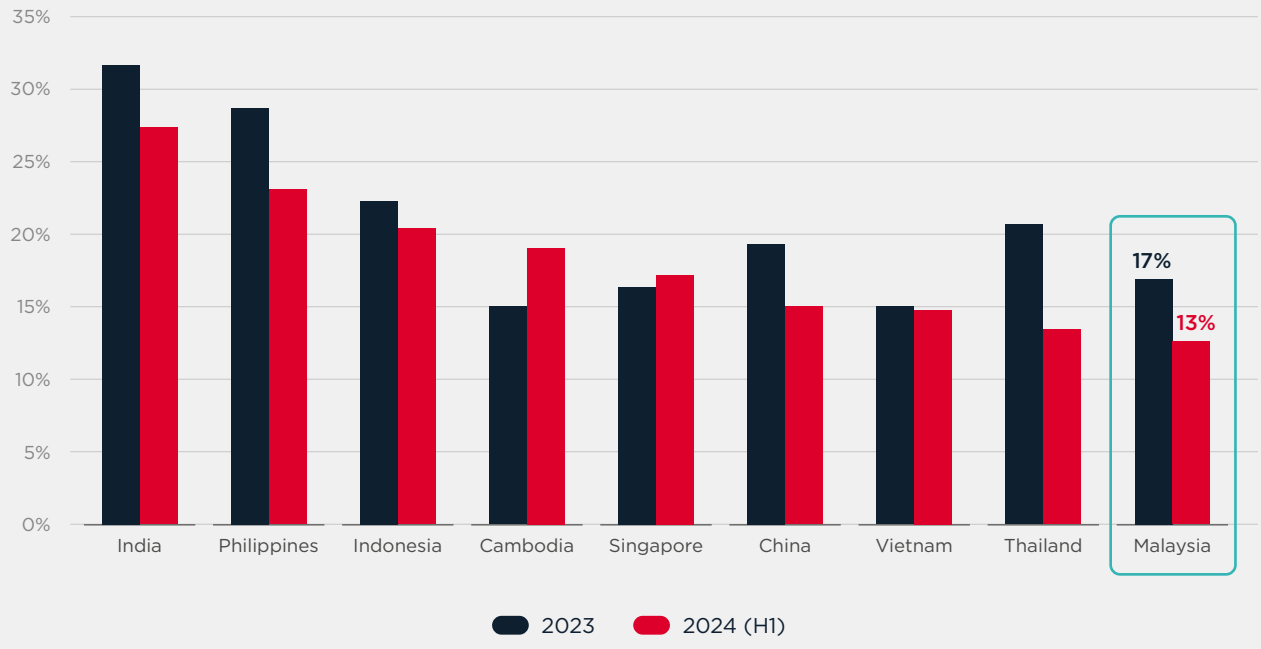
The implications of a pivot to a DN include the following:

- Competition should increase at the wholesale and retail levels.
- It should release additional pent-up/latent network investment.
- By extension, it should spur a boost to the apps, digital services and enterprise markets that can leverage 5G connectivity to drive innovation and economic growth.

The investment implication is particularly important. The telecoms sector records, on average, 15–20% capex intensity overall over a 10-year infrastructure cycle. The rate moves to the high end in the early stages (as base stations are built and fibre is laid for backhaul) and to the low end in the latter stages, once the infrastructure is in place and before the next cycle (6G) begins. Although Malaysia has grown 5G adoption, infrastructure investment in 5G networks has been lower than among its peer group. In 2023, Malaysian operators spent around 12% of their revenues on capex. DNB's estimated investment brings the sector total to 17% overall (see Figure 2). Capex has tapered off in 2024, with the incremental rate of population coverage slowing and a commensurate slowdown in the growth of 5G adoption. The underinvestment limits what would otherwise be faster 5G adoption in a multi-network model, together with service innovation that plays on the 5G network capabilities and (ultimately) economic diversification.

Figure 2 5G investment levels among operators in Malaysia have been limited by the SWN model

Capex intensity (percentage of revenue)



Note: Figures for Malaysia include capex from operators and estimates for investment from DNB in 2023 and 2024.
Source: GSMA Intelligence

2.
Driving towards a digital nation

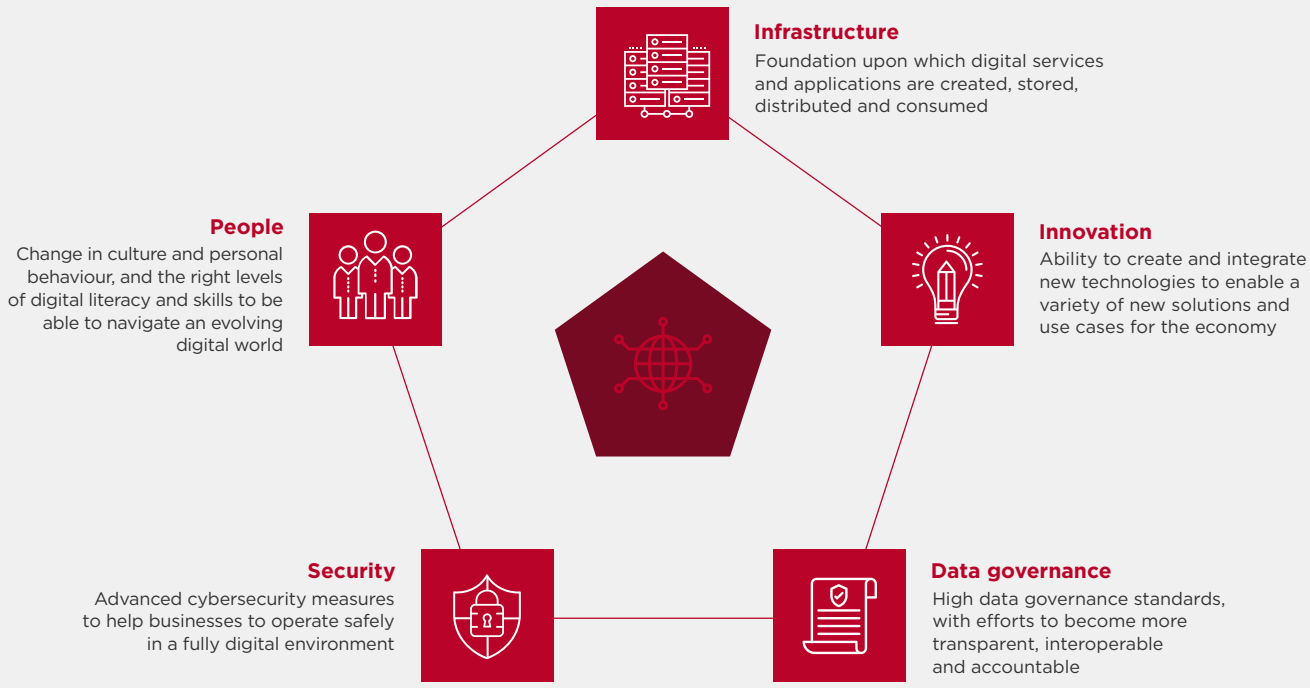
Putting the initiatives and policies in place

This decade will be characterised by efforts from countries in Asia Pacific and beyond to become 'digital nations'. This describes a scenario where digitalisation is at the heart of nation building, with a coordinated effort to fully integrate digital technologies into every sector of the economy to achieve sustainable, resilient and inclusive economic growth amid scarce resources and uncertainties around traditional supply chains.

Like many other countries in the region, Malaysia is pursuing a strategy to become a high-income, digitally driven economy. This is encapsulated in several initiatives and national development policies. These include the Malaysia Digital Economy Blueprint, the National Fourth Industrial Revolution (4IR) Policy, and Malaysia Digital. Malaysia has also introduced the Artificial Intelligence Roadmap and the National Guidelines on AI Governance & Ethics. In December 2024, the government launched the National AI Office (NAIO), a new agency under the Ministry of Digital (MoD), to drive investment, innovation and collaboration in the AI space as part of the country's overall ambition to become a digital nation.

Realising these aspirations is a function of the five key components of a digital nation (see Figure 3). These are interconnected and must be developed together to avoid potentially costly gaps and delays in the implementation of digitalisation initiatives.

Figure 3 A digital nation comprises five key components



Source: GSMA Intelligence

Tracking progress

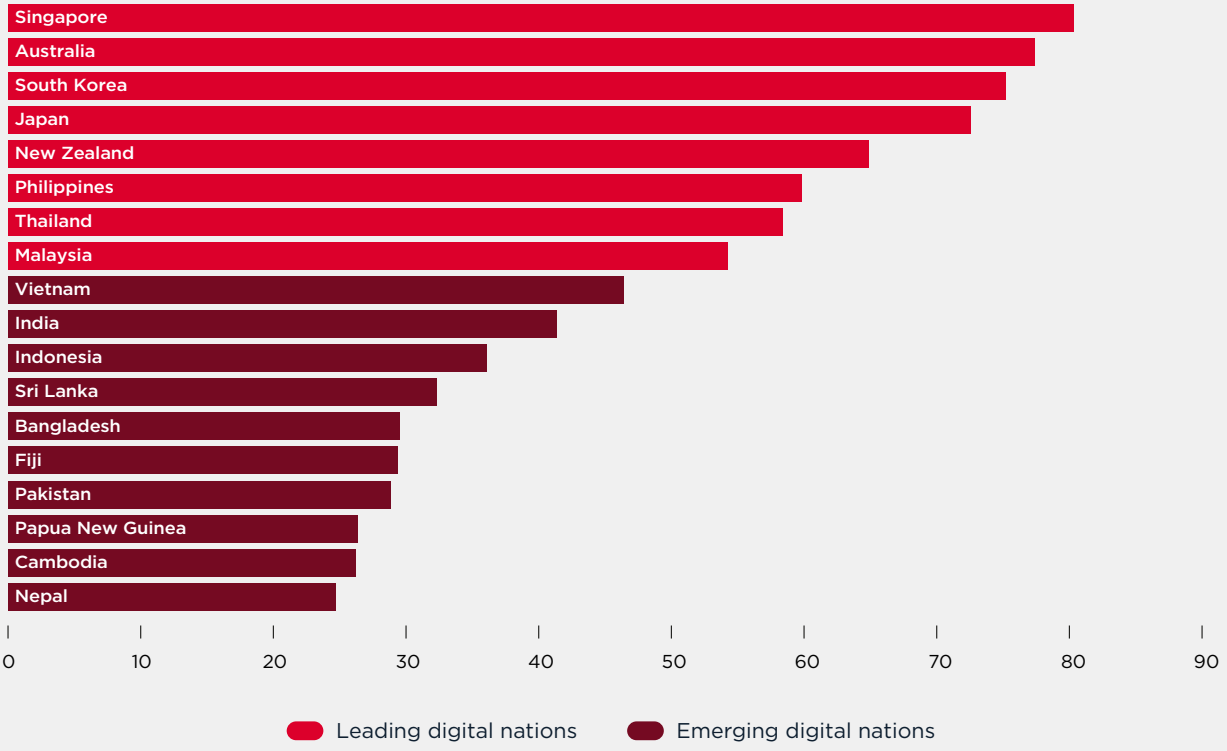
GSMA Intelligence has developed an index to help countries in Asia Pacific track their progress with the digital nation components. The index uses a combination of quantitative and qualitative metrics to determine where each country is on their digital nation journey, and identify areas requiring improvement. Based on the aggregate scores, the 18 countries in the 2024 index are categorised into two groups (see Figure 4). Leading digital nations have an aggregate score of 50–100, while emerging digital nations have an aggregate score of 0–49.

In the 2024 index,[1] Malaysia registered an aggregate score of 54 out of 100, making it one of eight leading digital nations in Asia Pacific.

The countries in the index are ranked based on the aggregate of their scores on each of the five components of a digital nation. However, to get the most from the Digital Nations Index, countries should focus on their internal performance and identify areas that require improvement, as opposed to viewing the index as a competition with peers.

Figure 4 Digital Nations Index: Malaysia ranks as one of eight leading digital nations in Asia Pacific

Aggregate scores, 2024



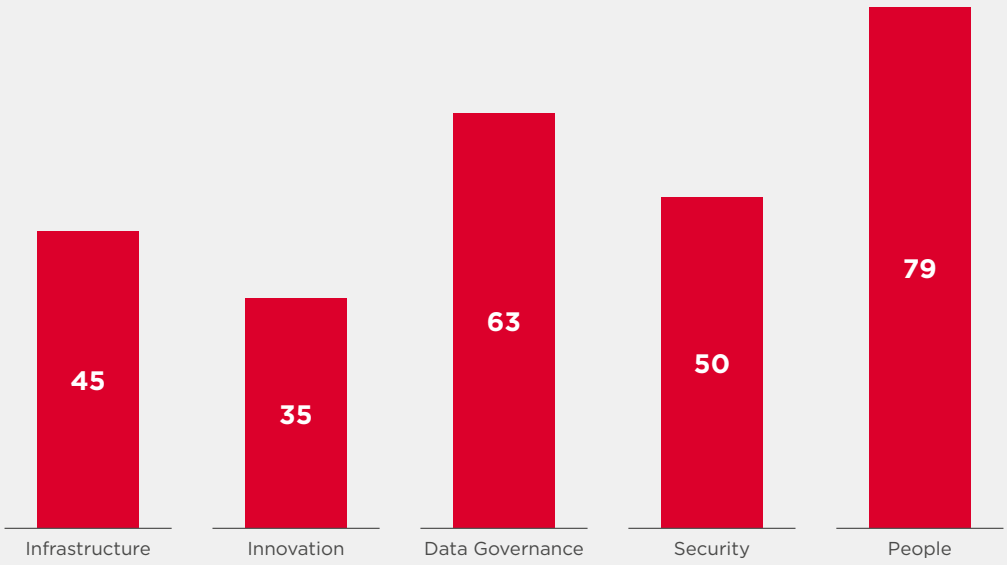
Source: GSMA Intelligence

1 Digital Nations in Asia Pacific: preserving digital trust, GSMA Intelligence, 2024

Figure 5 shows Malaysia's performance on the individual components of the Digital Nations Index. It registers scores of 50 or above in the Data Governance, Security and People components. Scores below 50 in Infrastructure and Innovation underline the scale of improvement required in both components for Malaysia to realise its digital nation ambitions. In this context, the establishment of the NAIO is a significant step towards enhancing digital innovation in the country.

Figure 5 Malaysia scores below 50 on innovation and infrastructure

Digital Nation Index – component scores, 2024



Source: GSMA Intelligence

Infrastructure: maximising the 5G opportunity

Infrastructure is the bedrock of a digital nation and the foundation upon which other components are built. It includes hard digital infrastructure (e.g. mobile networks, fibre and other fixed networks, satellite connectivity, data centres and data exchange systems) and soft digital infrastructure (e.g. digital ID systems and electronic payments). The pace of transition to a digital nation correlates directly with available digital infrastructure. It is therefore imperative for the right policies to be put in place to attract investment in the development of that infrastructure.

In recent years, Malaysia has made notable progress developing digital infrastructure, particularly by attracting significant investment from global players. For example, in 2023, Nvidia announced that it will partner with YTL Power in a $4.3 billion AI infrastructure project in Malaysia. More recently, US tech giants have announced plans to invest more than $10 billion in cloud infrastructure in Malaysia. Specifically, Amazon, Microsoft and Google have announced plans to invest $6.2 billion, $2.2 billion and $2.0 billion, respectively, in data centres and cloud services to support AI initiatives. Meanwhile, DC Byte's 2024 Global Data Centre Index recognised the state of Johor Bahru as the fastest growing data centre market in Southeast Asia. Malaysia is also a global leader in the transition to IPv6, underscoring the government's efforts to future-proof its digital infrastructure and accommodate an increasing number of connected devices and applications. As of December 2024, Malaysia was fourth in the Google IPv6 Country Rank, after France, Germany and India.

Despite these developments, Malaysia's score of 45 out of 100 in the infrastructure component indicates considerable scope for improvement if the country is to realise its digital nation aspirations. There is significant room for improvement in the development of 5G technologies for consumers and enterprises. Malaysia's SWN, operated by DNB, has extended 5G network coverage to around 80% of the population. However, the true potential of 5G lies beyond the network – in its ability to power innovative digital solutions for consumers and enterprises.

5G will drive digitalisation across key economic sectors, enabling diverse use cases with advanced technology. Achieving this requires significant investment in application development and collaboration within the digital ecosystem. Recent developments show progress in this area:

- In January 2025, U Mobile signed an agreement with the Federal Land Development Authority (FELDA) to implement enterprise-grade connectivity solutions to all FELDA offices and branches across Malaysia. The operator expects 5G to play a key role in supporting FELDA's digital transformation drive.
- In December 2024, DNB hosted the third in a series of workshops aimed at encouraging manufacturers in Malaysia to adopt 5G and other digital solutions, in collaboration with China Mobile, ZTE, Ericsson and the Federation of Malaysian Manufacturers.
- In October 2024, Maxis partnered with the Malaysia Retail Chain Association to drive 5G adoption in the domestic retail sector. It aims to leverage 5G and cloud connectivity to support digital solutions such as retail analytics, AI-powered computer vision, managed network services, XR experiences and supply chain enhancements.
- In August 2024, Maxis and Huawei announced plans to collaborate on a Joint Innovation Centre in Malaysia focused on developing 5G-Advanced solutions for industry use cases.
- In July 2024, U Mobile and FGV Prodata, an ICT service provider, announced a memorandum of collaboration aimed at leveraging U Mobile's 5G network and solutions to enhance FGV Group's connectivity and digital infrastructure, as part of its business transformation objectives.
- CelcomDigi Berhad, through its CelcomDigi MY5G Series, is working to accelerate 5G and AI adoption among enterprises and the public sector in Malaysia with over 45 uses cases across eight verticals, including healthcare, law enforcement, education and city councils.

The transition to a DN model for the deployment of 5G networks represents another significant milestone in Malaysia's journey towards becoming a digital nation. It has the potential to attract new investment and expand the country's infrastructure capacity. In January 2025, U Mobile announced it had signed a MoU with CIMB Bank to extend financing support for its upcoming 5G network rollout. The operator intends to complete the rollout by mid-2026.

The true measure of success will be an increase in 5G adoption among consumers and enterprises, and a boost to the country's technology exports, aligning with the government's objectives. As Malaysia's 5G market evolves, it is crucial that stakeholders prioritise improving its competitiveness relative to regional and global peers, maximising the opportunities 5G presents to advance Malaysia's digital nation aspirations.

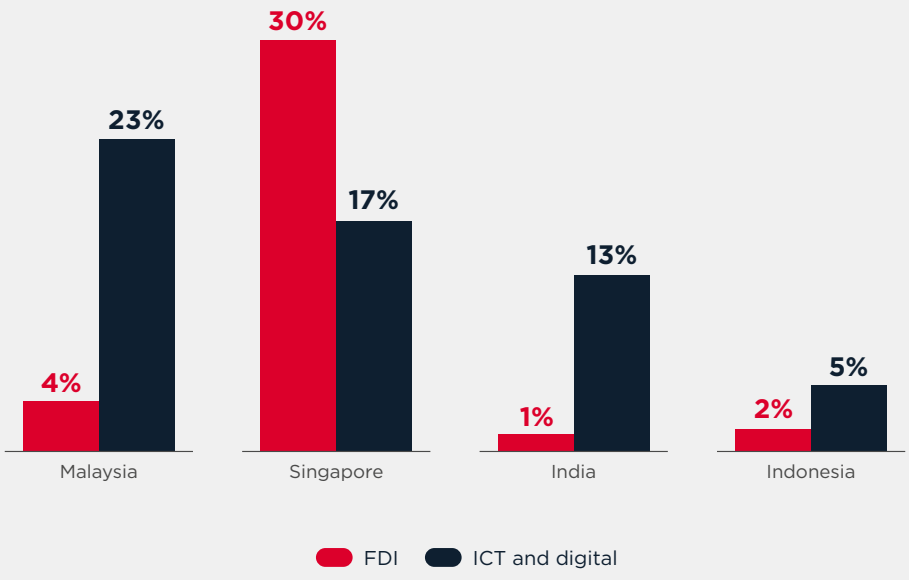
3
Malaysia's tech economy and diversification

Diversifying to digital, mobile and fintech

The expansion of 5G infrastructure in Malaysia is likely to accelerate growth of what is already a strong startup and tech hub in Malaysia. Figure 6 shows the extent to which Malaysia and a set of comparators attract foreign direct investment (FDI) and the size of their technology sectors relative to GDP. While Singapore is the regional leader in foreign investment (largely driven by its banking and financial services industry), Malaysia has the biggest digital economy relative to GDP. On the latter measure, ICT and digital account for just under 25% of GDP in Malaysia, with Singapore and India the next highest (both aspire to be tech hubs in their own right).

Figure 6 Malaysia has one of the biggest technology sectors relative to its economy in Asia

Percentage of GDP

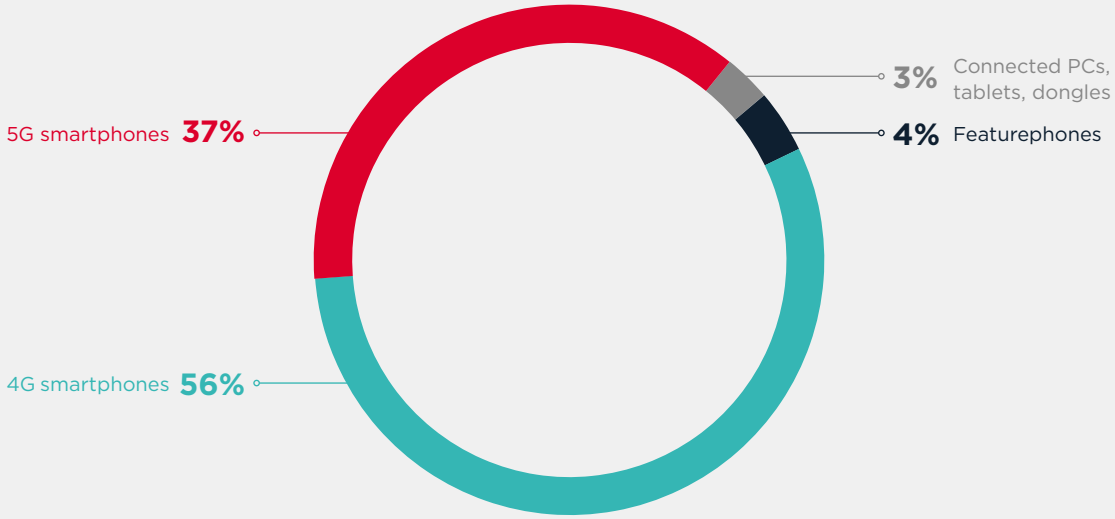


Note: FDI data is for 2022; ICT data is for 2023
Source: International Trade Administration, Singapore Department of Statistics, UNCTAD

Investment capital into Malaysia in the 1990s and 2000s centred on manufacturing, with the country a mini hub for consumer electronics assembly, plastics and other goods, in competition with China and Vietnam. This has changed and diversified towards digital, mobile and fintech, backed by a youthful and entrepreneurial population, network infrastructure and government financial support. The smartphone economy has itself been enabled by the transition to 4G and now 5G. Breaking down consumer connections in Malaysia, almost 60% are 4G and nearly 40% are 5G; a strong majority of people have access to most of the video and higher bandwidth applications emanating from digital startups. As 5G percolates into the customer base, a higher share of people will have faster speeds at their fingertips.

Figure 7 Smartphones are the basis of the consumer digital economy

Percentage of connections by device type in Malaysia

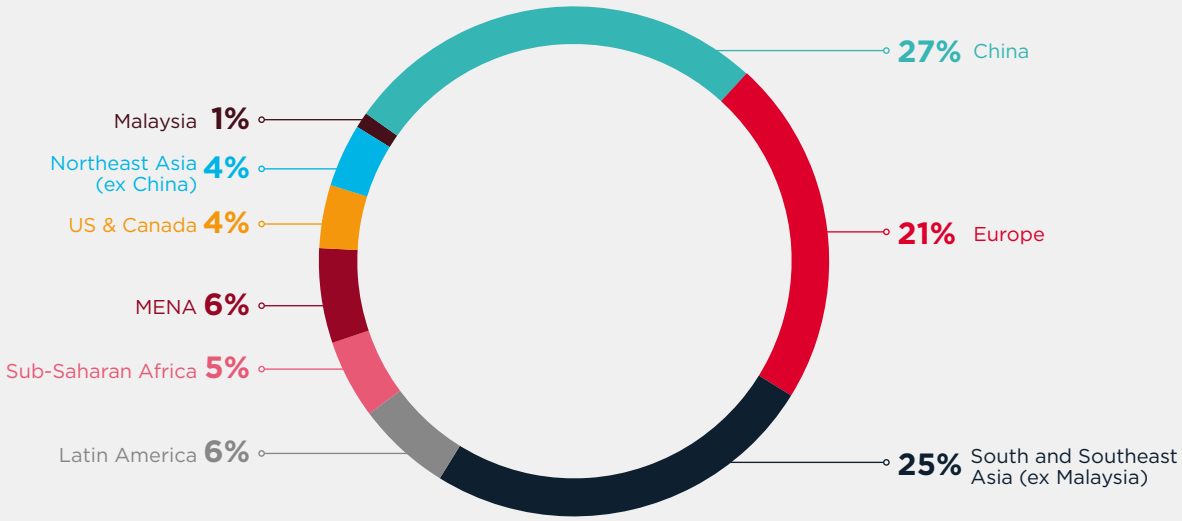


Source: GSMA Intelligence

On the enterprise side, the integration of open gateways and APIs is pivotal to fostering technology-led innovation leveraging 5G capabilities in Malaysia. Open APIs facilitate seamless connectivity between different software applications, allowing technology companies to build on existing platforms and create more sophisticated and integrated digital solutions. This capability is crucial for the development of new products and services, particularly in sectors such as fintech, e-commerce and security, where interoperability and real-time data exchange are key. Operators in Southeast Asia are among the global leaders in commitments to GSMA Open Gateway, accounting for 25% of the operators committed worldwide by market share. Malaysia is at 1% in its own right.

Figure 8 Operators in Southeast Asia are among the leaders in participation in the GSMA Open Gateway initiative

Percentage of operators committed by market share



Source: GSMA Intelligence

Financial backing from government: in it to win it

The Malaysian government has been supporting tech start-ups through various initiatives and financial incentives. Key programmes include the Malaysia Digital Economy Corporation (MDEC), which provides grants and funding to innovative tech entrepreneurs, and the Cradle Fund, which offers early-stage funding and commercialisation support. Additionally, tax incentives and regulatory reform have been introduced to create a more conducive environment for tech businesses to thrive. The 2024 budget introduced new incentives, targeted primarily at smaller startups and scale-ups and designed to attract private capital via co-investment. Examples include the following:

- A tax exemption of up to MYR20 million (around $4 million) for companies majority Malaysian owned (51% or more) and with annual revenue of less than MYR25 million ($5 million).
- Government co-investment with private venture capitalists or other investors of up to MYR500,000 or 50% of capital (whichever is lower) per round, using community financing means such as equity crowd funding and peer to peer (P2P).

The government has also established several technology parks and innovation hubs, such as the Cyberjaya Global Technology Hub, to foster collaboration and innovation among startups, researchers and established technology companies. These hubs offer state-of-the-art facilities, access to funding and mentorship programmes to help startups scale their operations and bring products to market.

The government has set a target of 5,000 startups to be operational by 2025, with at least five in the 'unicorn' club (a valuation of more than $1 billion). Prominent examples so far include Aerodyne (drone service provider and analytics), Carsome (second-hand car sales), Fave (e-commerce), iFlex (Netflix-style streaming player with content catered to the Asian market) and Socar (ride sharing). The metaverse is also in play. CelcomDigi and Virnect have partnered to explore an experiential learning platform to be sold into universities. Pilots started in September 2023.

Continued government finance support and a policy environment conducive to attracting venture and scale-up funding will be key in Malaysia's technology ecosystem growth. 5G network investment is a core underpinning to service development in the digital economy, with the DN model in a stronger position than the SWN to drive capex.

4.
From single to dual network: outlook and implications

The known risks associated with Malaysia's SWN approach

In 2021, the Malaysian government decided to advance 5G rollout with a non-market-led, single wholesale network (SWN) approach. The SWN strategy was seen by the government as the most economical means of extending 5G coverage at pace, particularly to low-density, rural areas.

The decision was finalised in March 2022. DNB would take full responsibility for infrastructure rollout. Four of Malaysia's mobile operators eventually signed share subscription agreements to take equity stakes in DNB, with the government retaining a 30% stake with veto power.

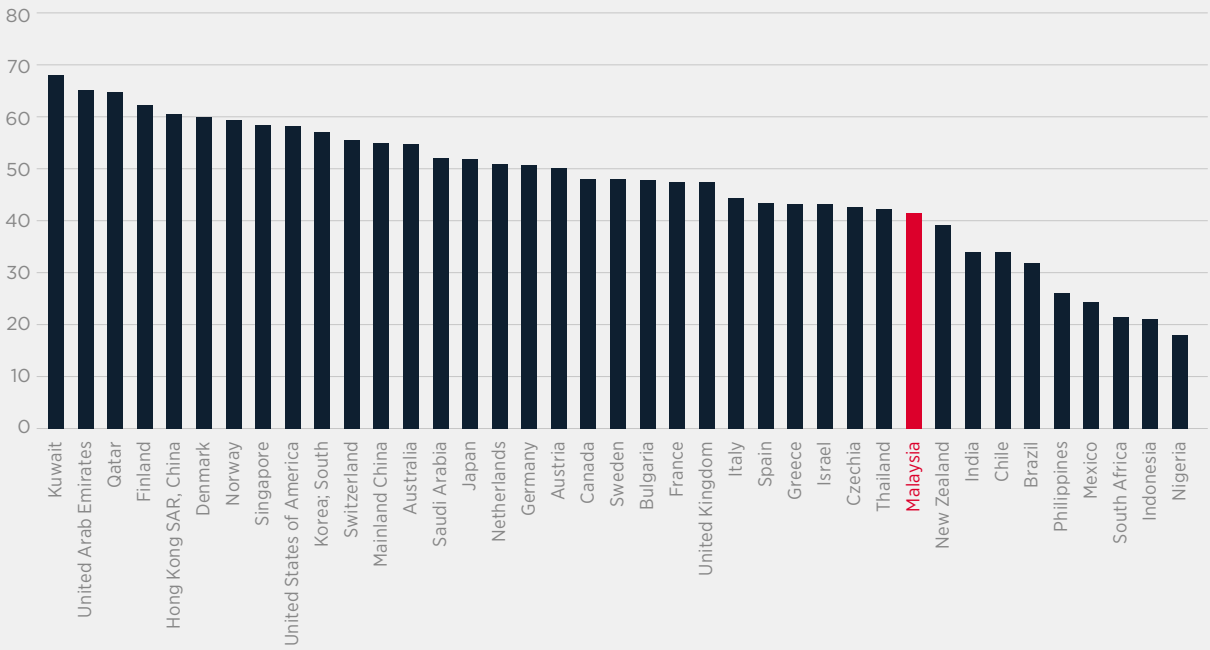
Most of the SWNs implemented globally to date have failed to achieve universal coverage and have resulted in significant delays in the adoption of new technologies. In Mexico, coverage targets were not met and had to be extended by the government twice, with the SWN filing for bankruptcy in 2022, impacted by low network use. In South Africa, after the SWN was announced in 2016, a lack of interest from investors led to policy reversion in 2022.[2] In both cases, the SWN led to significant delays to the launch and adoption of new services, with subsequent negative outcomes for consumers.[3]

SWNs have also generally faced challenges in the need to ensure private sectors work in the public interest but can maintain a long-term return on investment. In the case of Malaysia, some of these challenges have impacted 5G outcomes to date, with the country lagging behind peers. For example, Malaysia is 30th in GSMA Intelligence's 5G Connectivity Index (5GI), which provides a comprehensive assessment of 5G in 39 markets, offering valuable insights for informed decision-making and investment by the mobile ecosystem and policymakers.[4]

2 For a review of SWN cases globally, see Policy Trends in the Aftermath of Single Wholesale Networks, GSMA, 2024
3 Other examples of SWNs that failed to achieve their objectives or even launch can be found in Policy Trends in the Aftermath of Single Wholesale Networks, GSMA, 2024, and Single Wholesale Networks: Lessons From Existing and Earlier Projects, GSMA, 2019
4 https://data.gsmaintelligence.com/5g-index

Figure 9 Malaysia ranks 30th in 5G Connectivity Index scores

Q3 2024



Source: GSMA Intelligence

What to expect from the move to a dual network

Improved incentives to invest through infrastructure-based competition

While market-led, infrastructure-based competition is not fully re-established with a DN, the move takes the Malaysian market some way towards that.

The market-led model with voluntary infrastructure sharing is the most popular around the world because it allows operators to compete using their own spectrum or by pooling it. Sharing networks can generate cost savings. At the same time, the market retains key competitive differentiators on elements such as network coverage and quality.

In theory, SWNs deliver similar advantages by pooling resources such as towers, antennas and spectrum, but face the challenges of coordination with private-sector partners, and generally lack the right incentives to invest that are generated by competitive forces.

The DN move addresses some of these challenges. It will re-introduce competition, which can drive 5G investment and coverage. The market will therefore have a greater incentive to invest in advanced network infrastructure, enhancing the quality and reach of 5G services. Other benefits include increased potential for innovation and differentiated quality of experience.

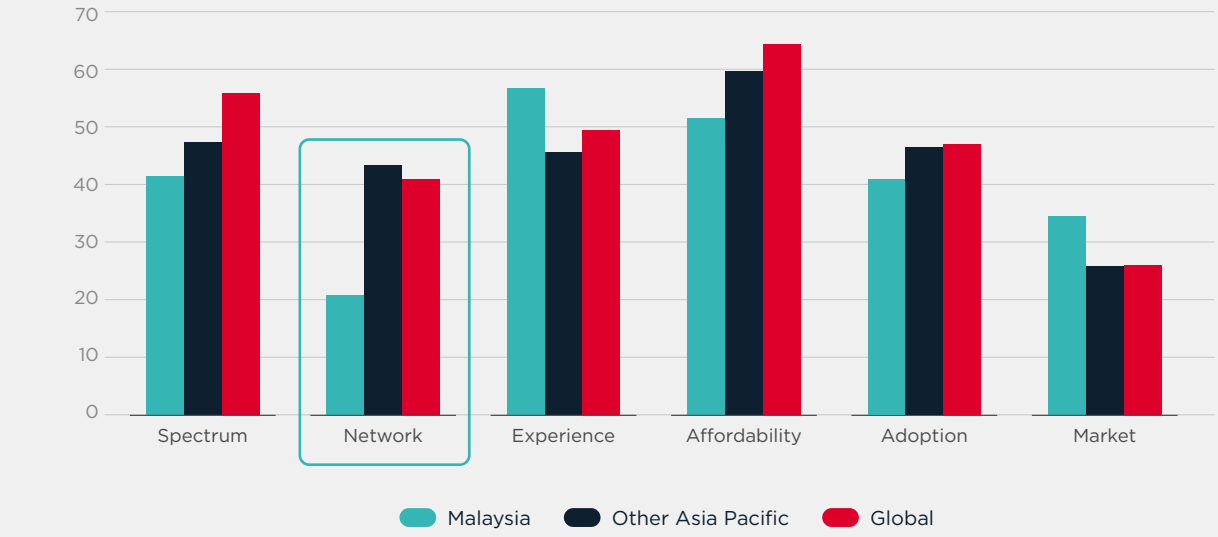
Examining Malaysia's performance in the latest GSMA Intelligence 5G Connectivity Index, it significantly lags other countries (both in Asia Pacific and globally) on the Network pillar (see Figure 10). It also performs below average on spectrum assigned, affordability and adoption.

Digging further into the Network pillar, Figure 11 shows that Malaysia lags behind most of its Asia Pacific peers in base station deployment, coverage[5] and the deployment of 5G standalone (5G SA). Infrastructure-based competition could spur more rapid deployment of 5G base stations, even in less densely populated areas, as well as 5G SA, which is important to realise the full benefits of 5G (for example, in terms of extended slicing, low latency and massive IoT capabilities which are crucial for enterprise service requirements).

5 Coverage in the 5G Connectivity Index incorporates both population coverage and the availability of 5G where consumers are using their devices.

Figure 10 Malaysia lags behind others in scores for the Network pillar

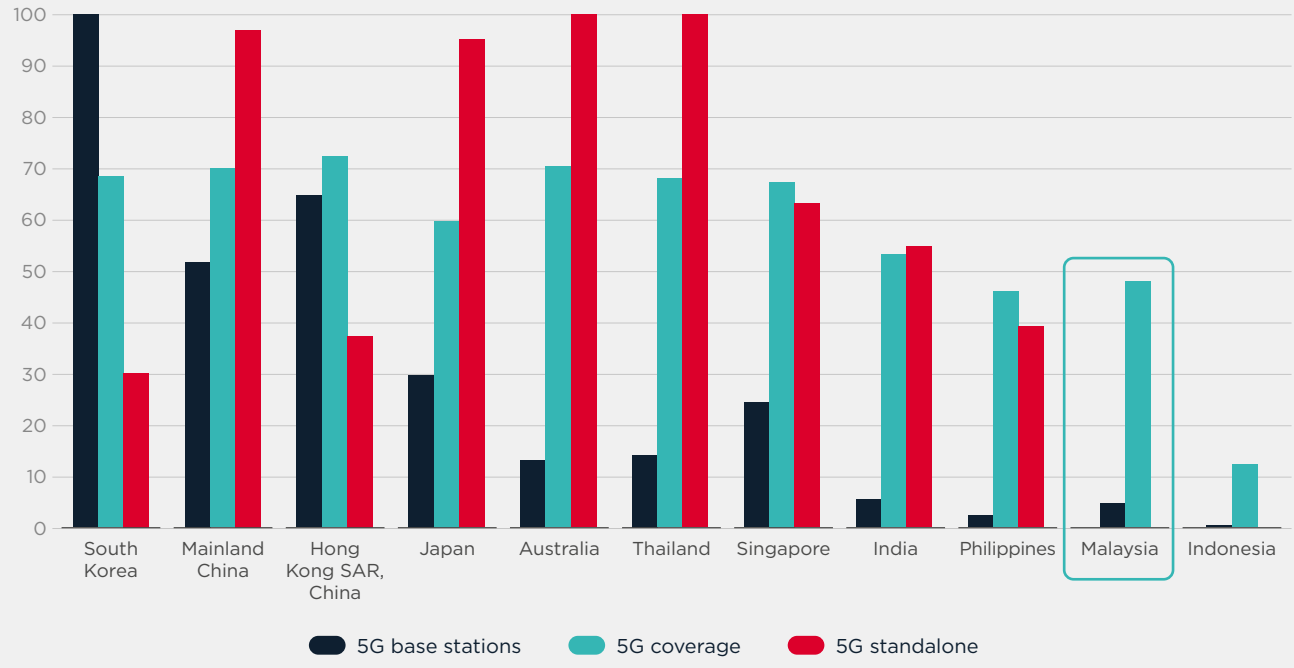
5G Connectivity Index scores, Q3 2024



Source: GSMA Intelligence

Figure 11 Malaysia lags behind most of its Asia Pacific peers in base station deployment, coverage and 5G SA

5G Connectivity Index indicator scores for Network pillar, Q3 2024



Source: GSMA Intelligence

A key objective to establish a competitive, market-led 5G network sharing model

The government in Malaysia could relinquish its veto power on DNB and sell its remaining position, now that a second 5G network has been established. That would also allow operators to decide who stays with DNB and who moves over to the other network.

Eventually, the market could transition to a more conventional (and more proven) model that involves two market-led network sharing agreements, with two private sector-led joint ventures offering competing 5G infrastructures. This ensures good levels of both infrastructure and retail competition, and differentiation between players, while permitting cost savings and efficiencies that can translate into greater coverage, lower prices and better network quality.

If the Malaysian market moves in this direction, it will also become more closely aligned to the competition dynamics observed in many other leading 5G markets. In the UK, for example, two active mobile network sharing agreements directly owned by market players compete with each other. In Sweden, four mobile operators provide services over two shared active networks, and one of the agreements includes spectrum sharing.

More generally, recent economic research[6] highlights how market-led network sharing agreements drive positive outcomes for both operators and consumers. Operators that entered into network sharing agreements have been able to reduce prices (proxied by ARPU) and increase network coverage and quality. This has been driven by capex reductions, higher returns on investment (providing operators with both the ability and incentive to invest) and increased competition.

Addressing existing market rigidities

The shift to a DN can also address some of the existing market rigidities with an SWN, enhance overall market responsiveness and drive better customer outcomes.

A DN could generate stronger incentives for operators with equity stakes on either of the two 5G networks to migrate their 4G users to 5G. This migration would enhance customer experience but also reinforce the need for all players to accelerate their 5G rollout efforts. The competitive environment would likely encourage all players to innovate and offer superior services to retain and grow their user base.

Lessons from Rwanda

An interesting example of how a shift away from an SWN can generate the right dynamics and improved consumer outcomes comes from Rwanda. Though it is a very different market, it offers useful lessons for Malaysia.

In 2013, Rwanda established a mandated SWN, issuing a 25-year licence through a partnership between the government and Korea Telecom – Korea Telecom Rwanda Networks (KTRN). The agreement granted KTRN exclusive spectrum rights in the 800 MHz band to deploy 4G nationwide. The intent behind the SWN was to accelerate 4G rollout and increase accessibility, while aiming for 95% coverage.

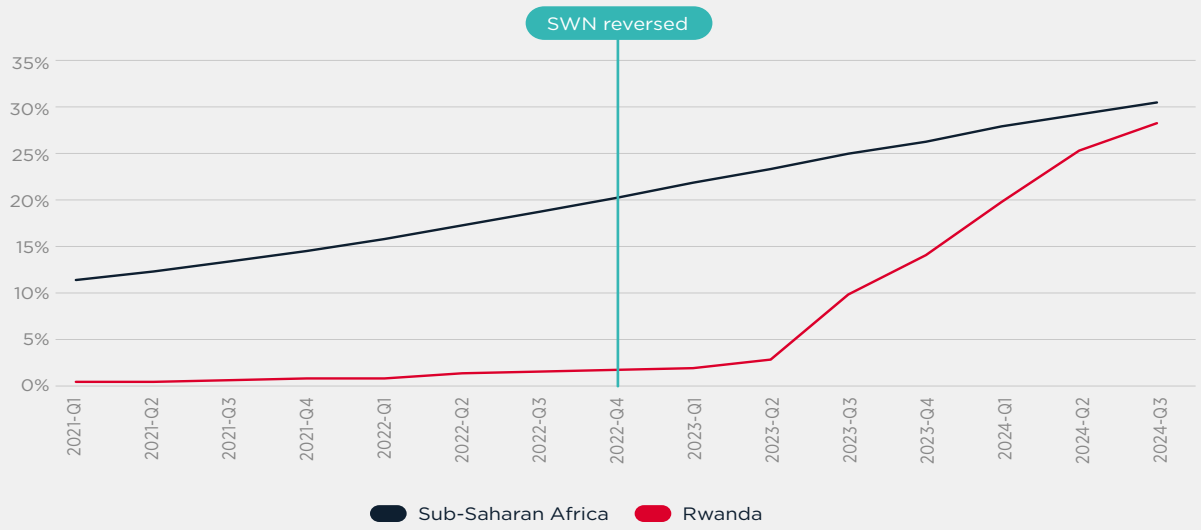
Overall, the results of this monopoly-based network were mixed. While KTRN reached almost complete 4G coverage by 2019, actual 4G adoption rates in Rwanda lagged considerably, standing at just 2% at the end of 2022 – far below the average for Sub-Saharan Africa. The SWN model, intended to improve accessibility, had paradoxically caused a bottleneck. Operators were restricted from deploying their own 4G or 5G networks, relying solely on KTRN's wholesale services. This lack of competition kept 4G prices high, limiting adoption and stifling the market for faster mobile internet.

Recognising these challenges, the Rwandan government updated its National Broadband Policy and Strategy in 2022, reversing its commitment to the SWN approach. This shift included introducing technology neutrality, allowing mobile operators to refarm spectrum bands so they are used simultaneously for several technologies (including 4G and 5G) in a way that maximises the efficient use of spectrum and meets demand for new services. Additional spectrum was also allocated so operators could deploy advanced networks with more capacity. The adoption of 4G subsequently increased significantly after 2022, as mobile operators entered the market with competitive offers. Rwanda's mobile broadband adoption rates began climbing towards the average for the region, indicating clear demand for affordable 4G services in the market.

6 To share or not to share? The impact of mobile network sharing for consumers and operators, sciencedirect.com, 2023

Figure 12 4G adoption in Rwanda increased significantly after the SWN reversal in 2022

4G adoption (percentage of connections)



Source: GSMA Intelligence

A reduction in the need for wholesale market regulation

With a single provider of 5G wholesale services, the need for stringent regulatory oversight, including price regulation, was always clearly on the table.

With the introduction of a DN, the regulator will need to continue to oversee the effective functioning of both the wholesale and retail markets, but there might be less or no need for the regulator to directly establish wholesale offerings and prices. With both wholesale networks competing with each other and including retail operators as both owners and retail customers, the incentives for low prices should be more clearly aligned.

Competitive dynamics will naturally lead to more efficient pricing and service offerings, potentially accelerating 5G adoption. Reduced regulatory intervention should follow, as this can foster a more open and dynamic market environment, conducive to rapid technological advancements and better consumer outcomes.

What does not change (yet) with a dual network

Regulatory uncertainty

There remains significant regulatory uncertainty regarding how the DN model would function in practice, including the specifics of what can and cannot be done. Clear guidelines and a transparent regulatory environment are necessary to mitigate uncertainties and provide a stable foundation for operators to plan their investments and strategies.

While the move to a DN model might help initiate a transition towards market-led competition between privately owned shared networks, the risk remains of overregulation limiting the ability to reach a market-led outcome that is beneficial for Malaysia's 5G ambitions. For example, issues such as long-term strategic planning and investment beyond initial 5G deployment still need to be addressed. The current regulatory structure does not naturally lend itself to fostering long-term innovation. Investments in technologies such as 5G-Advanced and 6G in the future, as well as combined fixed-mobile plays involving fibre investments, require a stable and forward-looking regulatory environment. Ensuring that the regulatory framework evolves in tandem with technological advancements is crucial for sustained innovation.

Spectrum rights and refarming incentives

Efficient spectrum management is vital to maximise the potential of 5G and future technologies. However, two critical challenges remain in relation to the management of spectrum in Malaysia.

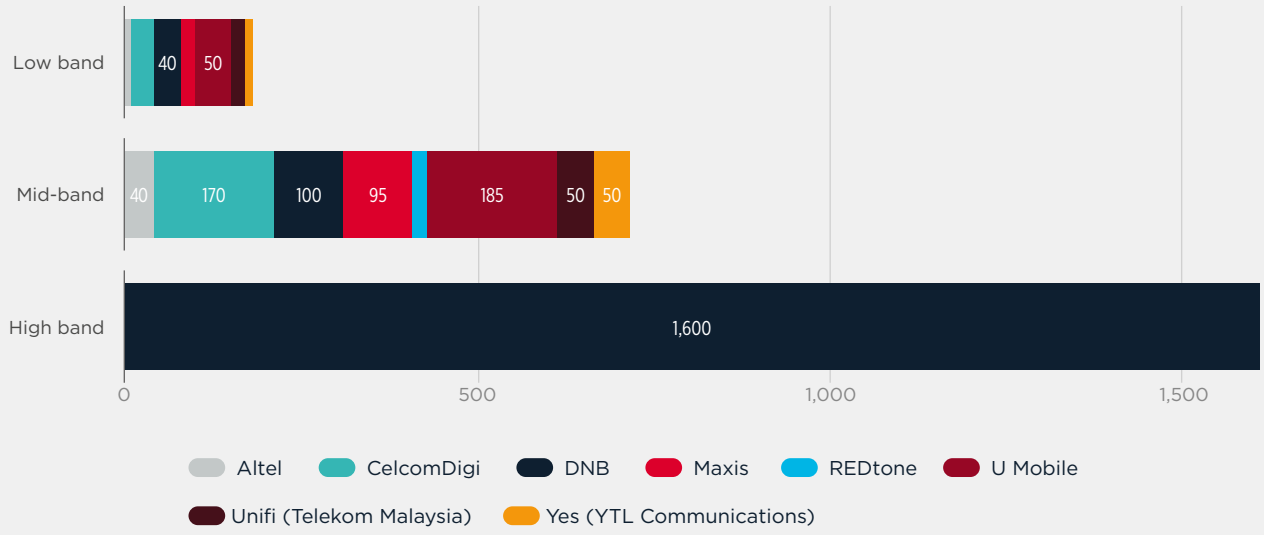
In the short term, the conditions under which spectrum is assigned to each of the 5G networks should be established as soon as practicable. More generally, spectrum should be assigned under terms that reflect market conditions and generate the right incentives for investment by market players.

While Malaysia has assigned most of the available IMT bands for mobile use, DNB was awarded access to 200 MHz of spectrum in the 3.5 GHz band range, as well as spectrum in the 700 MHz and mmWave bands. In order to effectively compete and provide 5G services, the second wholesale network will also require spectrum, in low bands and especially the 3.5 GHz range, which has been used as the basis for the first implementations for 5G in most countries. U Mobile is expected to receive 100 MHz in the 3.5 GHz band and 40 MHz in the 700 MHz band as part of its 5G licence.

While a total of 200 MHz is not wholly uncommon in other ASEAN countries,[7] many other countries that have launched 5G have assigned at least 300 MHz in the 3.5 GHz range, and most of the advanced 5G markets (for example, in the Gulf) have assigned 400 MHz or more. The conditions under which spectrum will be moved to the second 5G network will determine whether the right environment for effective market dynamics and consumer outcomes is established. A clear roadmap that supports long-term planning and investment will be also needed, including consideration of the upper 6 GHz band for future capacity expansion.

Figure 13 Spectrum assignments in Malaysia, as of 2024

MHz total by frequency band group and organisation



Note: Includes the spectrum holdings of DNB as well as the expected 5G spectrum holdings of U Mobile.
Source: GSMA Intelligence

7 Philippines, Singapore and Vietnam have also assigned only 200 MHz in the 3.5 GHz range.

A second but equally important challenge in the medium to long term is linked to the lack of technology neutrality introduced with the assignment of spectrum specifically for 5G use. Technology neutrality empowers operators to replace older equipment in a frequency band with equipment of a newer standard to upgrade from legacy network services to 4G or 5G as demand develops.

Under the current spectrum licensing regime in Malaysia, there is no clear path for existing spectrum licence holders (mobile operators operating 2G, 3G and 4G networks) to refarm existing spectrum bands for 5G use in the wholesale networks. The ability to refarm existing spectrum on these frequencies to 5G networks is an important part of the transition to 5G. Private 5G networks provide one example of the lack of clarity regarding how spectrum assignments would work even in a DN model. Without technology neutrality that allows the mobile operators to refarm existing spectrum for 5G use, it would presumably fall to the two national wholesale networks to provide the spectrum for private networks – a situation prone to commercial inefficiency. Technology neutrality is also necessary for dynamic spectrum sharing (DSS), which allows operators to use the same spectrum band for different radio access technologies such as 4G and 5G.

Without technology neutrality, the efficient use of spectrum is not guaranteed, as spectrum that might be able to generate the most societal impact by being deployed to expand 5G capacity/coverage will continue to be used in legacy networks.

The need for clear regulatory rules, financial sustainability and other considerations

The market could and should transition to a more conventional and proven model that involves two market-led 5G network sharing agreements. However, any additional investments are unlikely to materialise until there is a sufficiently clear framework that provides certainty for market players to undertake the necessary commercial and financial commitments involved. This framework should outline the mandates and requirements for 5G wholesale network providers, ensuring fair competition and efficient network operations.

Other regulatory considerations include the relevance of existing quality-of-service (QoS) requirements, ensuring robust cybersecurity measures, fostering innovation through regulatory incentives, and maintaining open communication channels between government, operators and stakeholders.

Moving in the right direction

The transition from an SWN to a dual network represents a move in the right direction for Malaysia's 5G strategy, and brings market dynamics back to the well-known benefits of infrastructure-based competition models.

However, many challenges remain, including the need to ensure market stability and regulatory clarity, and provide long-term investment incentives.

Guaranteeing market stability and certainty should be the number one priority to unlock substantial investments and drive Malaysia towards a successful digital future.

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