



CONNECTIVITY

+ **Lifting-The-Barriers Roundtables**

PRELIMINARY PAPER

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BRINGING ASEAN CLOSER

1. The ASEAN telecommunications market

ASEAN as a region is characterized by the diversity of its membership countries, with a wide range on levels of economic development and cultural influences, but deeply interconnected at the core. Connectivity and telecommunications play a critical role in bridging this diversity, driving levels of connectedness across nations and further uplifting ASEAN economies as a key economic enabler.

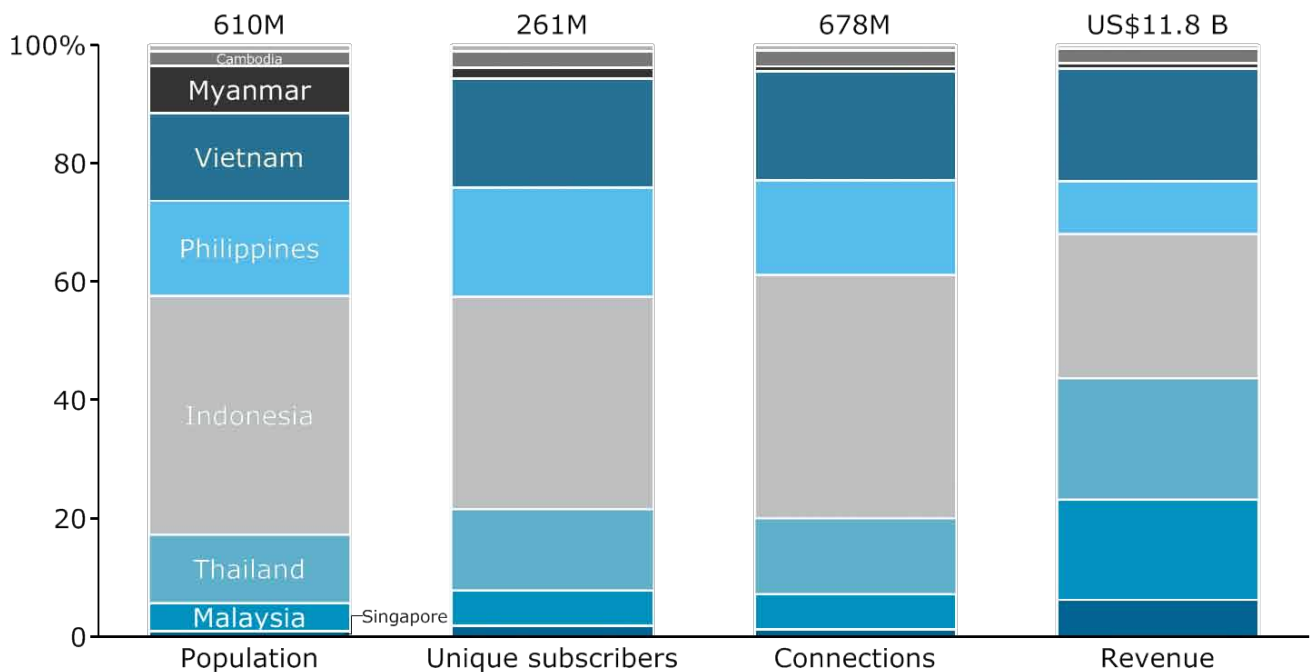
1.1 Mobile market

ASEAN's connectivity market is dominated by strong mobile revenue pools, with mobile

contributing >2/3 of revenue in most markets except Singapore (where ~50% of revenue is mobile). The ASEAN mobile market generated ~\$12B in Q1 2013 alone, with continued positive growth momentum through growing penetration rates and an increase in data/internet usage (many of these mobile-first internet users). All markets still show healthy growth rates in number of connections owing to rising consumer spending power and demand for improved bandwidth. At a country level however, the dynamics of the mobile market are very different, with markets like Singapore beginning to show signs of maturity, a dominant role of postpaid and ARPU's approaching 30 USD/month, while neighbouring Indonesia is dominated by prepaid and ARPU's hovering closer to 3 USD/month. Exhibit 1.1 and 1.2 show mobile market indicators in different ASEAN countries.

Exhibit 1.1

Mobile: The Southeast Asian Mobile market is worth ~US\$12B in 2013 Q1
Key indicators by country (2013 Q1)



Source: International Monetary Fund (IMF), World Economic Outlook Database April 2013; World Health Organization (WHO), World Health Statistics 2013

Exhibit 1.2

Mobile: Most SE Asian markets have grown subscribers and connections in moderate to high single digit rates



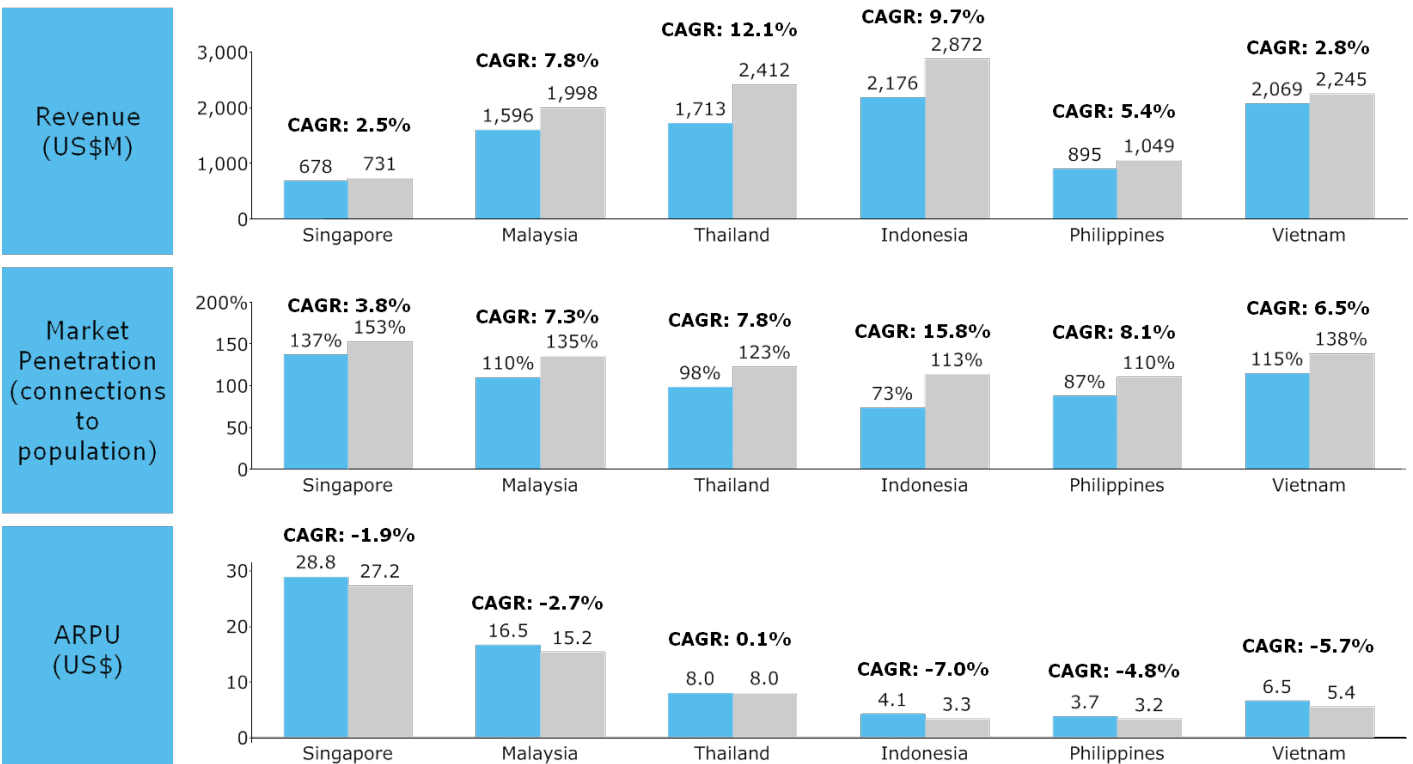
Note: Includes mobile telecommunications
Source: Wireless Intelligence

While the overall revenue has been driven up by increasing mobile penetration, the average revenue per customer (ARPU) has decreased across all markets. Exhibit 1.3 shows this phenomenon. Connection-

based penetration levels have crossed 100% in all markets over the last few years and increasingly added connections are driven by underpenetrated rural areas or multi-SIM users.

Exhibit 1.3

Mobile: Revenue growth led by an increase in market penetration while ARPU has declined across all markets



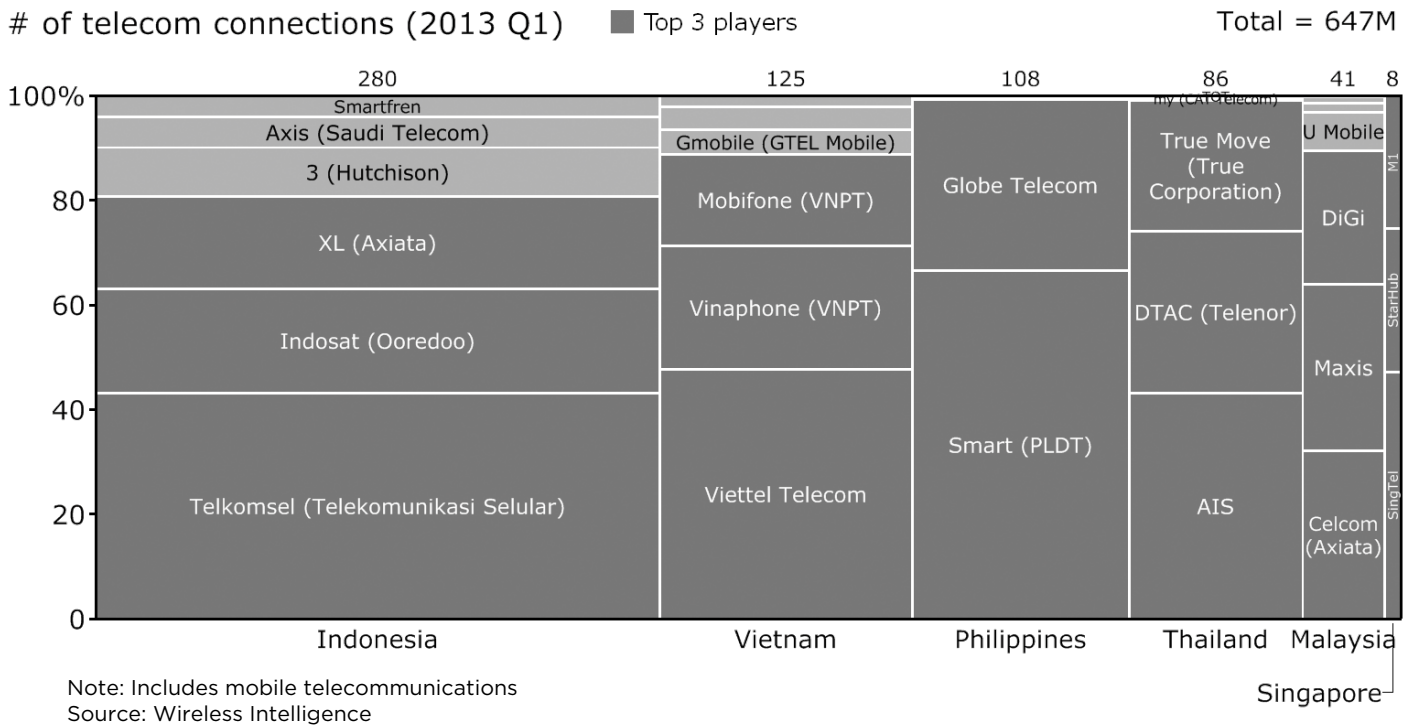
Note: Includes mobile telecommunications
Source: Wireless Intelligence

Most mobile markets in ASEAN are highly concentrated, often with a dominant incumbent and the top 3 players controlling >80% market share on connections. Most players are centered on their domestic market, with only Axiata, Singtel and Telenor

playing in a variety of regional markets in ASEAN, predominantly through minority shareholdings. Exhibit 1.4 shows the ASEAN market by countries and telecom players by their market shares.

Exhibit 1.4

Mobile: In most SE Asian markets, the top 3 players hold at least 80% of the market



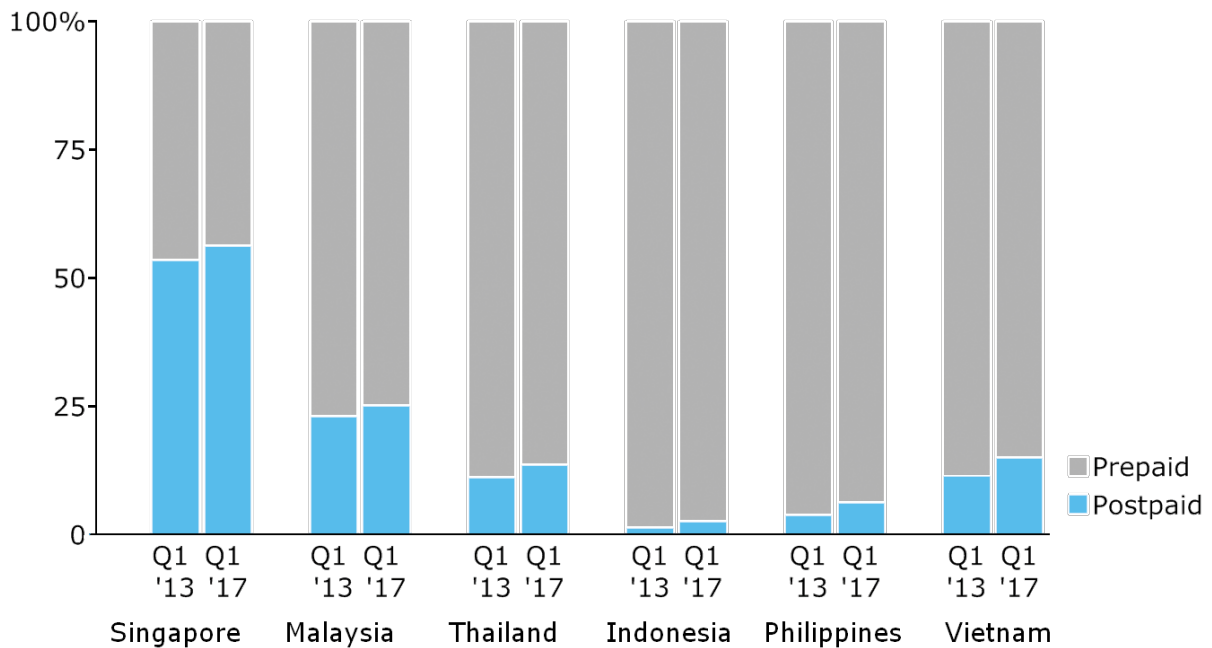
Across ASEAN prepaid connections dominate on numbers basis, with postpaid playing a role mostly in Singapore and somewhat in Malaysia (where also parts

of the prepaid market show semi-postpaid structures). This has led to high churn rates in all markets driven by the dominant prepaid segment.

Exhibit 1.5

Mobile: With the exception of SG, all ASEAN markets have <25% postpaid connections

Prepaid vs Postpaid Connections



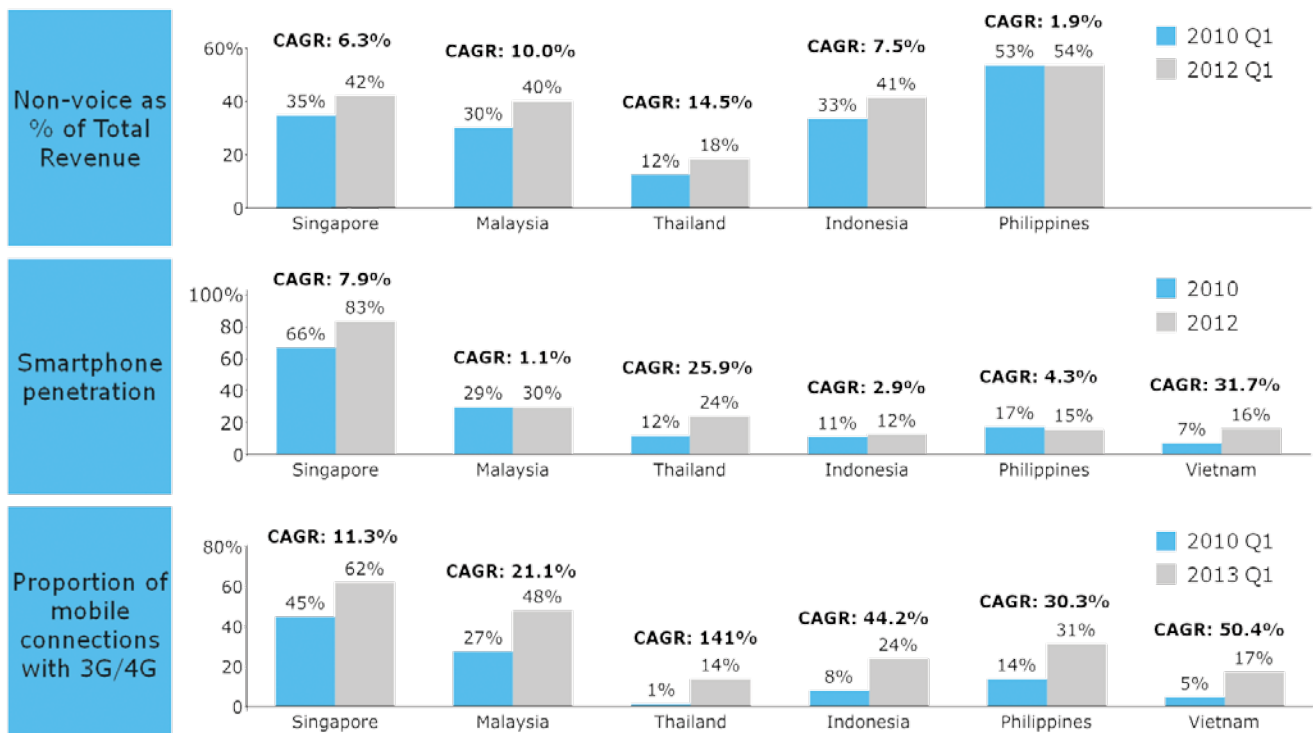
Source: Wireless Intelligence

A critical recent phenomenon in ASEAN is a strong shift to data on mobile (with many mobile-only/mobile-first internet users). This has happened on the back of strong 3G rollouts by operators in most markets and

rapidly declining prices for smartphones or high-end feature phones, where touchscreen devices can now be had for ASPs <75 USD.

Exhibit 1.6

Mobile: In most ASEAN markets, consumers are moving towards heavier data usage on smartphones



Note: Non-voice revenue includes data, messaging and VAS revenue
Source: Wireless Intelligence; IDC

1.2 Fixed voice and broadband

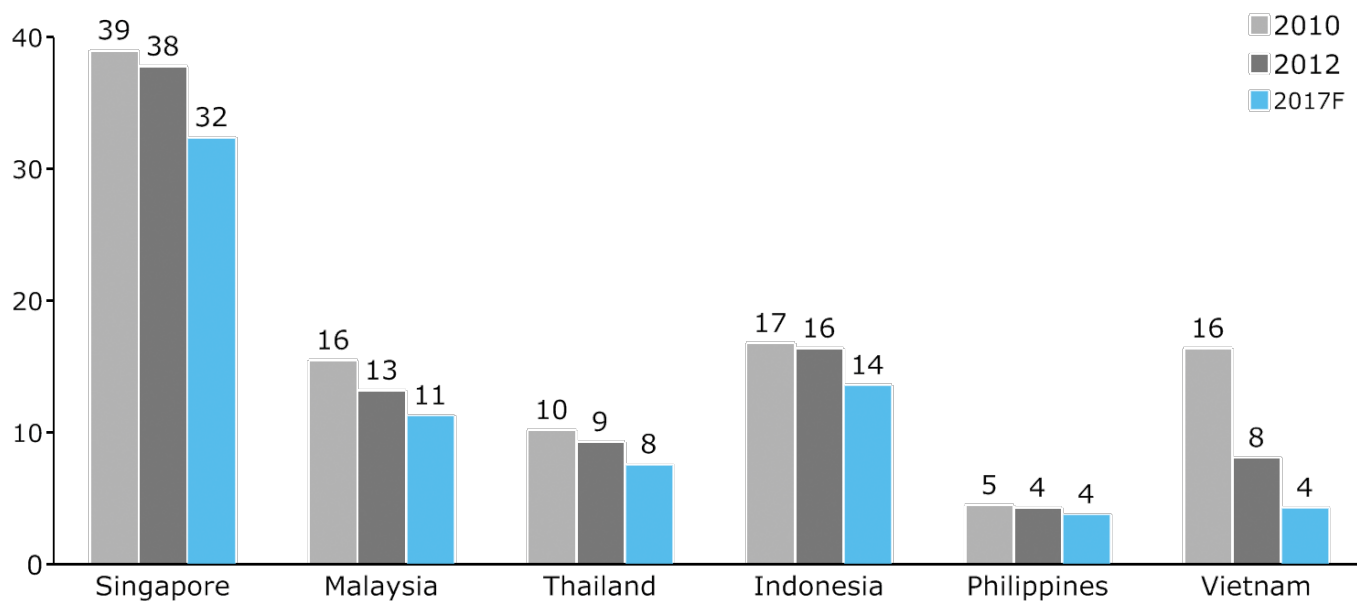
Fixed line penetration is on a continuously declining trend across ASEAN, driven by strong mobile adoption rates and in many markets limited legacy

last-mile infrastructure to residential homes.

Exhibit 1.7

Fixed line: As a result of mobile access, fixed line subscriptions have declined across all markets

of fixed line subscriptions per 100 inhabitants



Source: BMI

However, in parallel many governments in ASEAN have realized the need for advanced fiber infrastructure to further create growth and drive a more knowledge-centric economy. Increasing data usage is being supported by programs like Singapore’s ‘Next Generation National Infocomm Infrastructure’, Malaysia’s National High-Speed Broadband (HSBB) Project, both of which have been implemented. Indonesia is pushing their National Broadband Network development for implementation until 2015. A further

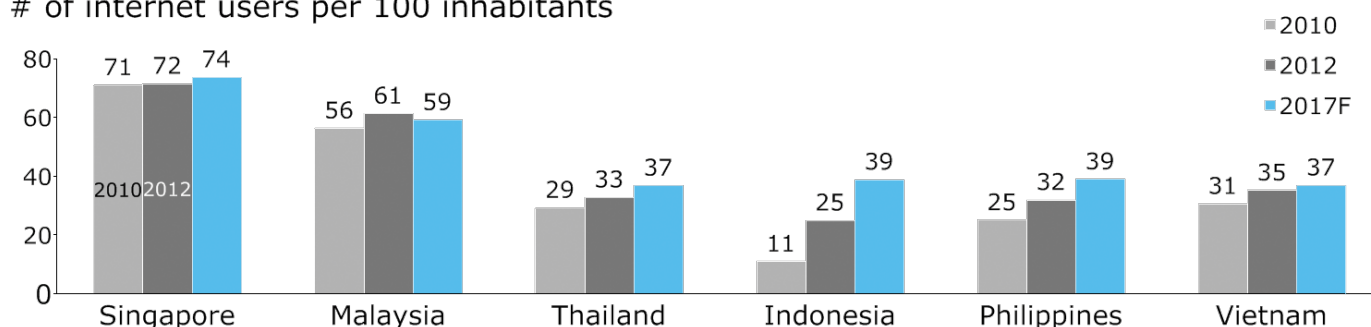
push on advanced LTE networks across ASEAN is likely to complement these efforts (with Singapore leading the charge on LTE rollouts).

Going forward, internet and data usage are expected to continue to grow, but with many consumers likely to prefer mobile access rather than via fixed line, driven by improved efficiency levels of mobile access. Exhibit 1.8 shows analyst forecasts of internet and broadband usage.

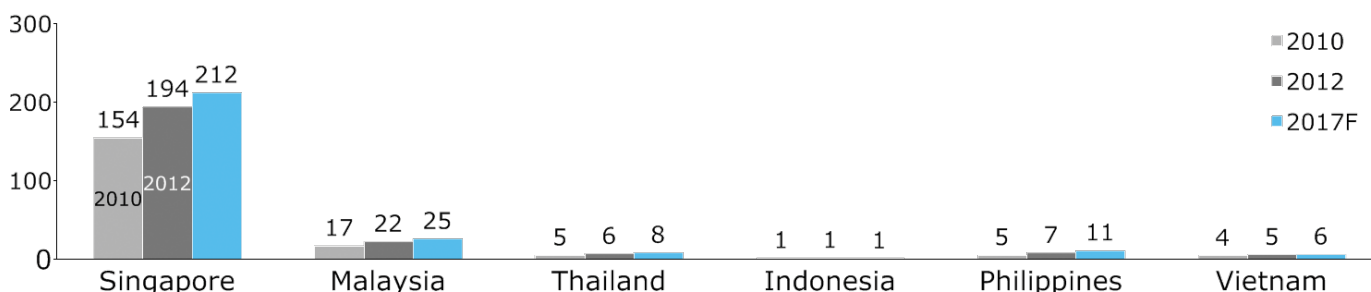
Exhibit 1.8

Internet: Internet usage expected to grow, however broadband access still low in most countries

of internet users per 100 inhabitants



of broadband internet subscribers per 100 inhabitants



Note: Singapore includes multiple subscriptions per user (3G mobile connections, WiMax and wireless hotpots)
Source: BMI

2. OPPORTUNITIES FOR ASEAN IN CONNECTIVITY

In preparation for the roundtable discussions, the chair and co-chair have identified four topics to explore more deeply – all of which have the potential to significantly impact ASEAN economic activity in the connectivity space and further reduce barriers across ASEAN. Those are (1) International roaming, (2) OTT services in ASEAN, (3) New services in particular mobile financial services and (4) Regulatory evolution across ASEAN.

2.1 International roaming

International roaming costs in ASEAN are much higher as compared to similar economic zones like the European Union. From the operators’ perspective, roaming is an attractive profit pool, but also highly constrained due to affordability challenges, and is one likely reason for strong uptake of OTT services in ASEAN. In the EU, holistic regulations have played a key role in reducing roaming costs and opening markets to cross-border competition. Regulations were enforced in 3 steps between 2007 and 2011 [1]:

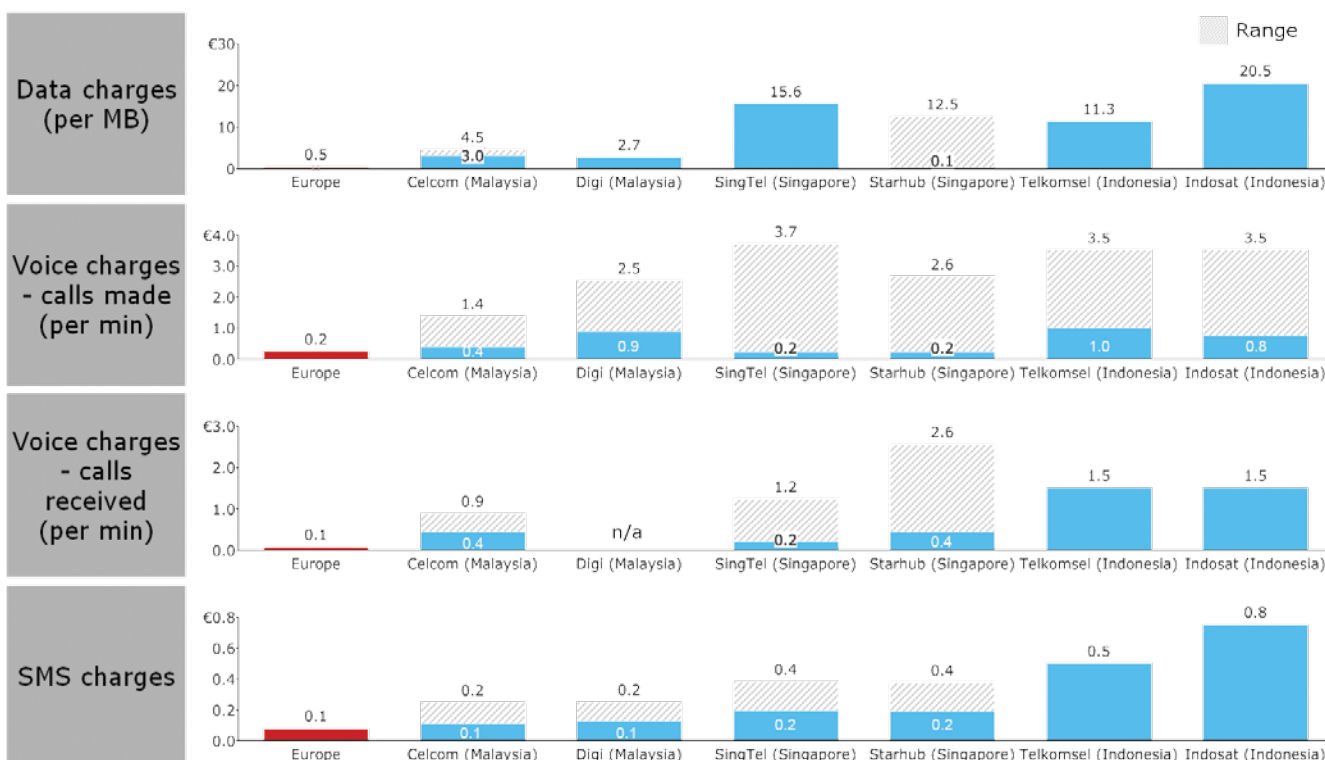
- Roaming I in 2007 – Cap wholesale and retail charges for all voice calls
- Roaming II in 2009 – Cut in SMS and wholesale data roaming charges
- Roaming III in 2011 – Cap retail prices for data roaming

However in Asia, there is no common body enforcing such initiatives and so far they have thus been less impactful. ATRC (ASEAN Telecom Regulatory Council) has adopted an ‘Addendum ATRC Intra-ASEAN Mobile Roaming Rates’ which was aimed at reducing roaming charges but hasn’t been enforced in all member countries. Further there are several bi-lateral initiatives but no common ground at an ASEAN level. Other bodies like APT and APEC are aimed at addressing transparency and to remove regulatory barriers but none is focused specifically on reducing roaming rates in the region.

Legislative bodies around the world have begun to see the EU approach as something of a blueprint for their own actions towards roaming and there may well be the impetus to drive down roaming costs in ASEAN as well. Reduced roaming rates are likely to have broader positive economic effects given the improved ease of ASEAN-wide communications, and, given demand elasticity, may not necessarily be detrimental to mobile operator profitability. Further, it may help to level the playing field for national-only carriers, who are increasingly seeing competition from Singtel, Axiata and Telenor on attractive regional roaming propositions on their linked operators.

Exhibit 2.1

Roaming charges in ASEAN countries are significantly higher than in Europe and vary across Telcos



Note: Charges are for usage within/across ASEAN countries; charges vary based on call or usage destination; charges exclude VAT
 Source: Telco websites

2.2 Over-the-top (OTT) services in ASEAN

Today's mobile communication options have gone beyond phone calls and SMS. Connectivity on data networks now includes options like email, voice/video over IP (e.g., Skype), status updates (e.g. Facebook, Twitter) and internet-based message services (e.g., Whatsapp, BBM). All these Over-the-Top services rely on data access only and benefit users due to the asymmetric pricing for data- vs. voice/SMS usage on mobile operator networks. SMS revenues have been strongly declining across ASEAN as a result, as depicted in Exhibit 2.2. Most of these services are provided by global MNCs with few ASEAN telcos having the relevant scale to push locally controlled OTT services in the region successfully.

Globally, Telcos have shifted their perspectives on OTT services increasingly from 'threat' to 'opportunity' – given the ongoing market disruption OTT services can help capture new customers or provide new sources of revenue when deploying

own platforms. For example in the US, Sprint has collaborated with Google Voice, while Telefonica in Europe acquired Jajah to launch its own mobile VoIP app.

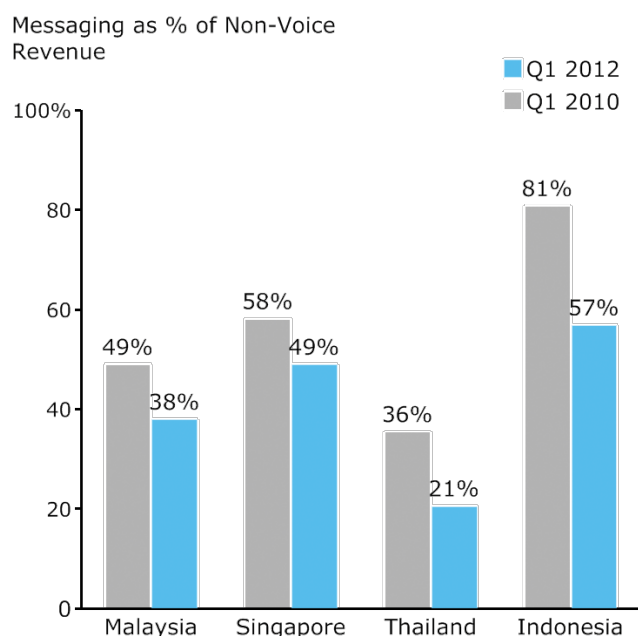
In ASEAN, telcos have started to partner with OTT players and pushing the usage of apps – selected examples include:

- Telkomsel in Indonesia upgraded its infrastructure and managed OTT through partnerships (for example with Skype) and own app stores
- Starhub in Singapore is expanding its LTE network and is working with Vodafone group on an inter-operable 'rich communications services' platform which provides rich-features messaging services in addition to providing VAS services like NFC movie ticketing service, e-bookstore etc.
- Digi in Malaysia is focused on content bundling to promote wireless data services, offering deals with OTT players like Skype and Deezer (music streaming service)

Exhibit 2.2

OTT services in ASEAN markets are growing; likely a threat to SMS revenue

SMS AS A SOURCE OF REVENUE HAS BEEN DECLINING...



Note: Non-voice revenue include data, messaging & VAS; does not include all Telcos in each countries
Source: Wireless Intelligence; Gartner; Ovum; Informa

...LIKELY DUE TO GROWTH IN OTT SERVICES

Many market drivers supporting substitution to OTT services

- **Increasing Smartphone penetration**
- **Low price** compared to regular voice
- **Ease of access**
 - Apps and app marketplaces
 - Telcos start to bundle VoIP (in particular smaller Telcos in fragmented markets)
- **Technological development**
 - Improved sound quality on 3G networks
 - Deployment of high capacity all-IP networks (e.g. LTE)
 - Availability of alternative networks (Wi-Fi)
 - Features e.g. video conferencing
- **Net neutrality regulation** undermine attempts to block VoIP in certain markets
- **Increase in consumer demand** as users of dedicated VoIP expect mVoIP

2.3 New services: Mobile financial services, mobile advertising, M2M, others

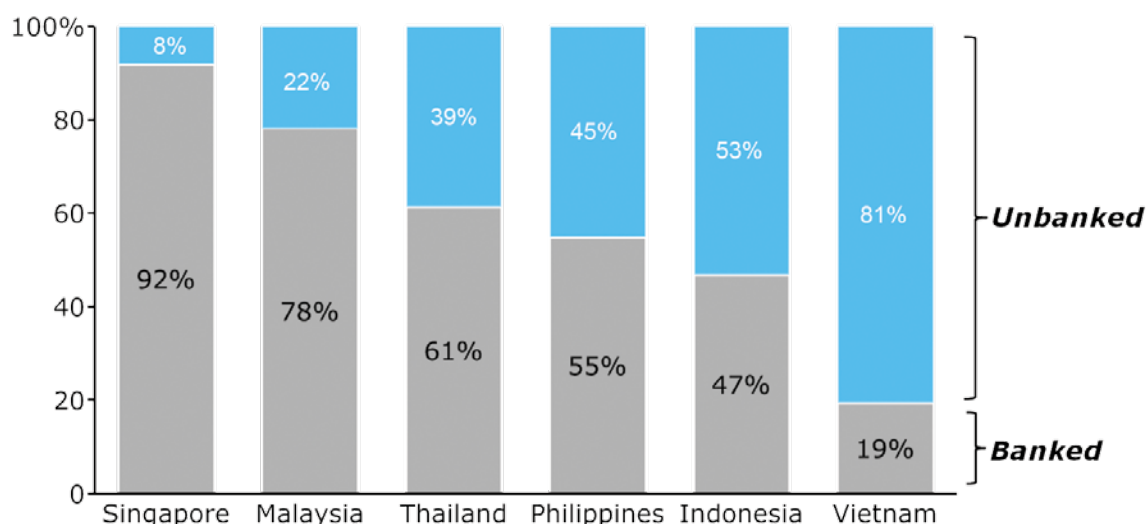
With penetration levels hitting >100% in most markets on a connection basis and ARPU in continuous decline driven by an erosion of voice and SMS profit pools, ASEAN operators are following other markets in exploring a push on new services, with some unique market potentials given the ASEAN environment. Mobile financial services in particular provide a huge opportunity in creating a win-win situation for both telcos & financial

services institutions and customers. Mobile money, mobile wallets and mobile payments systems can help facilitate financial inclusion of customers especially in ASEAN countries with high un-banked population. Other attractive new fields include an increasing stake in mobile advertising, machine-to-machine communications (with a particular opportunity in Smart Grids) and an extension to new content and services (like digital music and app marketplaces).

Exhibit 2.3

A significant portion of the ASEAN population is still not served by the formal financial sector

Banking penetration across SE Asia, 2012



Note: Banked population defined as percentage of the population 15 years and older that has a formal relationship with a bank or other financial institution via a current savings account, checking account, credit card or a combination of these products”
Source: Euromonitor

Mobile penetration in ASEAN countries has overtaken the banking penetration and presents a unique opportunity to target both the banked and the unbanked segments in innovative ways. Opportunities in mobile money are along three categories of usage:

- Transaction services like M-wallet which gives access to a stored value account, mobile top-ups and mobile wallet-to-wallet transfers (P2P), enable traditional payments (e.g., paying utility bills, remittances)
- Mobile commerce services through new mobile payment technologies (e.g., QR codes), mobile merchant payment technologies (e.g., mobile POS, P2P on the spot), mobile shops / portal services (e.g., online shopping, online games, virtual products etc.) and mobile marketing services (e.g., customer loyalty, mobile ads, coupons offers etc.)
- Mobile banking offerings like banking enquiries, accessing accounts, mobile loan applications or disbursements, seeking insurance

Globally, adoption of mobile financial services is still in progress, with early pockets of success, but also highly entrenched existing options and strong competitors, plus a complex ecosystem to work in (including a large set of regulatory hurdles). Experience from credit cards and debit cards shows that scale adoption of new payment channels takes about 20-30 years. In ASEAN, the current adoption of mobile financial services is still in early stages, but most operators have launched initiatives in this space – Singtel’s M Remit and Indosat’s Dompetku are just two examples. The market potential remains unique given the large untapped population, but challenges remain – security and authorization concerns are still prevalent, regulatory hurdles need to be overcome and a complex ecosystem aligned around a common goal. A dominant standard is unlikely to emerge in the next 5 years given the current market fragmentation, which will further hinder adoption.

2.4 Regulatory evolution in ASEAN

Regulators play a key role in telecommunications markets and set the playing field for operators to compete in – differing policies can favour incumbents or level the playing field and lead to the rise of challengers, significantly impacting market dynamics. ASEAN regulators have taken a variety of stances which have driven very different outcomes and may hold opportunities to harmonize across the regions or learn from other experiences. Five examples are listed below:

- Spectrum:** Spectrum allocation in ASEAN countries is a key regulatory activity and significantly impacts competition – the number of spectrum blocks put up for auction, the number of players accepted and the price levels for spectrum all impact market dynamics. A good example is the recent Malaysian decision to award nine LTE licenses, which will lead to new mobile data challengers in the market. Spectrum remains a key competitive asset for mobile operators, as it is a key driver of network performance. Recent efforts have kicked off to harmonize mobile broadband between Singapore, Brunei, Indonesia and Malaysia which are looking to run 4G services on airwaves that will be freed up when analog TV broadcasts are switched off in the region by 2020. This ‘digital dividend’ will allow the use of a common 700MHz frequency band in the region which could enable travelers to easily roam with their smartphones in the future.
- Interconnect:** Regulators set a variety of interconnect rates (mobile-to-mobile, mobile-to-fixed, SMS) to compensate telcos for using each other’s networks – this is often a key lever to reduce the benefits of incumbency and enable competition. While the fees paid differ across markets, a general trend to reduce interconnect charges is emerging, with Thailand being the latest example, where AIS, DTAC and True Corp have agreed to lower their fees supported by their regulator NBTC.
- Local content requirements:** To drive economic activity in specific markets, there’s increasing debate and activity around local content requirements particularly related to telecom services. Indonesia is the latest example of this, where in order to be awarded a government procurement contract or to operate wireless broadband services equipment, local value-add must at least be 30% for subscriber stations and 40% for base

stations, while wireless equipment (2.3GHz radio frequency) needs to have 50% local content within 5 years.

- Fiber rollout:** Next generation national broadband networks are a key priority for most ASEAN countries and rollout paths differ significantly. Given the significant costs in upgrading/building fiber networks (beyond the level where it is economically attractive for telcos outside of high value geographies), varying forms of public/private partnerships can be taken. Examples include Singapore, which opted for structural separation and the government paying for the rollout (driving stronger levels of retail competition), or Malaysia, which provided subsidies to Telekom Malaysia, who in turn is offering wholesale access at regulated rates (however is perceived to enjoy an advantage).
- Mobile number portability:** Number portability is a key hurdle for fair competition in premium customer segments (which are often locked in with existing operators due to their numbers) and only selectively implemented to date. Full alignment on this across ASEAN could enable better competition in a variety for markets.

Regulators across ASEAN can play a critical role, balancing the need to (1) breaking down barriers to intra-regional competition and enabling innovation, (2) allocating valuable scarce resources (e.g. spectrum, licenses) efficiently and effectively, (3) protecting consumer rights and (4) allowing companies in the space to earn sufficient returns to allow them to continue to make the required investments into infrastructure. Getting this balance right is critical to the sectors ongoing development and will require long term thinking and policy setting as well as regulatory clarity. The industry’s participants have a key role to play by helping to shape the policy and regulatory agenda.

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