



Telecommunications Sector Report 2017



EXECUTIVE SUMMARY

This is the Telecommunications and Radiocommunications Regulator's (TRR) first telecommunications market monitoring report (Sector report). It looks at the state of telecommunications market in Vanuatu and focuses predominantly on developments that occurred largely during the period from 2014 to 2016. The report also examines current trends in telecommunications markets as well as briefly looking at key events and developments in the industry since market liberalisation in 2008. This report is also available in electronic format on TRR's website.

Since the introduction of competition in 2008 and the establishment of TRR in 2009, the telecommunication's sector and industry has experienced healthy growth in Vanuatu, with significant increases in access, subscriber growth, and market revenue; with total telecommunication revenue exceeding 4.5 billion vatu in 2016.

This growth has been predominantly driven by the large increase in use of mobile technologies; with mobile phones becoming the primary mode of communication across the country, bringing deep social changes. This development has been stimulated by reduced access and usage costs, and greater mobile coverage created by competitive pressures as well as the ongoing reduction in handset and equipment costs driven by improvements in technology. These significant developments have caused mobile penetration to increase to 80% in 2016, from 12% in 2007.

Mobile subscriber growth even grew strongly in 2015, despite the devastating impact of Cyclone Pam in March of that year. This was

attributed to the growing demand for mobile access, and the fast recovery efforts by the mobile operators and the other supporting stakeholders to fix their damaged networks and reconnect users as quickly as possible.

The introduction of the ICN1 submarine cable in January 2014 stimulated a substantial increase in access and usage of the internet with the increased availability of higher-speed internet services on both fixed and mobile networks, and larger data download plans. International bandwidth has grown by over 650% since January 2014 demonstrating this trend.

The number of fixed internet subscribers, particularly fixed wireless subscribers, experienced a significant increase with the introduction of the cable and are now just under 10% higher in 2016 than they were 2014. Annual fixed internet market revenues have also grown considerably and are 21% higher in 2016 when compared to the total for 2014.

Competition in telecommunications markets has been most vigorous and effective in recent years in reducing prices, improving services and stimulating innovation and investment in the area of mobile data services. Such improvements have included the evolution from 2G technologies to those that support data services such as GPRS/EDGE, then later 3G, and 3G+, with 4G being recently introduced in 2016; each of which supported greater and greater data speeds. The advertised costs of prepaid mobile data bundles now typically cost 1 vatu (VT) per megabyte (MB) or less; as much as 50 times less than 5 years ago.

The increased availability of mobile data, due to significant reductions in data and handset costs, and increased network coverage, have also encouraged the uptake by consumers of over-the-top (OTT) services such as Facebook, Messenger and WhatsApp. The use of social media and OTT services has led to a significant decline in the use SMS messaging.

Total mobile call volumes continue to increase steadily. However, this has been growing slower than the growth of subscriber numbers - indicating that per user averages are going down.

International call volumes have continued to drop steadily, decreasing by 20% since

the launching of the submarine cable. This decline, contrary to subscriber and call volume trends generally, has likely been caused by subscribers switching to using OTT services to make video or voice calls internationally, such as Skype and others, which has been enabled by the improved speeds and price of internet services created by the launch of the cable.

Unlike the number of fixed internet subscribers' the number of fixed telephony subscriptions has continued to decline slowly as subscribers substitute their fixed landline for mobile. However, fixed revenues and call volumes have not experienced a similar decline which may be due to increasing use by corporate clients.

KEY INDICATORS AT A GLANCE

Indicators	2014	2015	2016
Mobile subscriptions	159,148	180,424	218,603
Mobile data subscriptions (Est.)	5,000	35,000	60,000
Fixed internet subscriptions	4,228	4,248	4,486
Fixed-line telephone subscriptions	5,382	4,632	4,555
Total domestic mobile call minutes	213,572,542	226,189,426	241,751,930
Total domestic fixed call minutes	12,198,909	12,128,721	11,847,545
Total outgoing international call minutes	4,320,780	4,247,112	3,453,917
Total SMS sent	190,509,085	116,950,064	93,467,210
Total Mobile Data Downloads (MB)	16,251,427	85,435,487	272,693,622
Market gross revenues (Billions VT)	3.89	3.95	4.48

Figure 1 Key Indicators at a Glance

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INTRODUCTION

This is the Telecommunications and Radiocommunications Regulator's (TRR) first telecommunications market monitoring report. It looks at the state of telecommunications market in Vanuatu and focuses predominantly on developments that occurred largely during the period from 2014 to 2016. The report also examines current trends in telecommunications markets as well as briefly looking at key events and developments in the industry since market liberalisation in 2008. This report is also available in electronic format on TRR's website.

TRR expects to now develop a Sector Report on an annual basis.

The collection, analysis and dissemination of accurate and timely market information plays a vital role in the design of effective, proportionate and efficient market regulation of a competitive telecommunications sector.

TRR has continually sought to collect statistics for this purpose and, since 2015, has increased its collection of regular detailed data from telecommunications service providers for awareness, to understand trends in the Vanuatu telecommunications markets, and to enable transparent information to be available to the Government, industry and the public.

We thank all the operators for honouring their commitment and have submitted data for this report and look forward to their continued cooperation. TRR would also like to thank all licensees for the information provided, and looks forward to their continued collaboration in the future; for the benefit of all stakeholders.

We welcome any comments or feedback on any aspect of this report. For that, or should you require any more information about this 2017 Sector Report, please contact the TRR via:

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DATA SOURCES & DISCLAIMERS

Under Section 8 (Information Gathering) of the Telecommunications and Radiocommunications Regulation Act, No.30 of 2009 (Act) TRR has specific powers to request the provision, by telecommunications service providers, of information relevant to the exercise of any of the Regulator's powers or functions.

The data in this report originates from various sources however the analyses presented are predominantly based on data collected in TRR's bi-annual collection of market statistics from the industry, under TRR's Order No. 1 of 2015 (Order 1) or information that is collected, ad-hoc, under the powers contained in the Telecommunications Licences or Exceptions and the TRR Act.

The data collected under Order 1 covers the previous 6 month period, from 1 January to 30 June and 1 July to 31 December respectively. Where this report indicates a value for a period prior to 1 January 2015, this information has typically been provided to TRR under prior reporting frameworks or through an ad-hoc request for information by TRR under Section 8(1) of the Act. TRR is unable to confirm or deny the accuracy or consistency of data referring to periods prior to 1 January 2014, and has included any such information for context only.

For information collected under Order 1 of 2015 when the data is a measure of volume, such as revenues and minutes, the information relates to the volume utilised or accrued during a specific monthly period. Where the information describes a variable that is a snapshot in time, such as subscriber numbers, then this tends to relate to the number of subscribers counted on the last day of the calendar month. For example, in relation to the number of mobile subscriptions, then this number represents the number of users that have initiated a chargeable event during the preceding 90 day period.

In instances where data relating to a measure of volume (e.g. a volume of usage such as total SMS sent, call minutes made, or revenues earned) is presented as a quarterly, half-yearly or annual value, TRR has, at times, sought to combine specific values to provide more workable and useful insight on longer term trends. On occasions where a variable is a snapshot in time, such as for subscriber numbers, then TRR has provided the value at the end of the calendar month that the stated period relates to; e.g. at 31 December for any annual subscriber values presented or the 31 March for the value for the first quarter of the year (i.e. Q1).

The Act, however, provides restrictions on the use and disclosure of information collected by TRR under Section 8. Sub-section 8(7) states:

- “(7) Information furnished or documents provided under this section must not be disclosed by the Regulator except:
- (a) with the written permission of the person from whom the same was obtained; or
 - (b) in the course of proceedings under Part 9; or
 - (c) was required by a court order; or
 - (d) where, in the opinion of the Regulator, the information comprises, or will be reproduced in, aggregated data so that it does not identify any particular service provider; or
 - (e) where such disclosure is required by this Act or any other law.”

TRR is currently under no obligation under the Act to report on specific statistical indicators or to produce this telecommunications sector report; and is only compelled to release its Annual Report. Therefore, the TRR is currently restricted to only disclosing information which we have sought prior approval from the provider of that information, or where the information provided is in aggregated form.

In some instances, TRR has chosen not to report on specific indicators so as not to compromise its adherence to Section 8(7)(d) and which might allow the disclosure of the specific service provider to which it relates.

The data used may be revised by the respondents or the TRR when it appears inaccurate, an error has been made, or it was an estimate. Consequently, some prior year figures used previously, in other publications, have been revised. We also note that not all respondents were able to provide sufficient information in order for TRR to appropriately compare or segregate or report on specific indicators, in such instances, TRR has sought to combine or estimate specific indicators or values in order to display relevant information. In the case of estimated values, TRR has indicated and/or attempted to provide further reasoning, if appropriate, where such estimations have been made.

In light of such challenges, TRR does not make any warranties that the information in this report is free from inaccuracies, errors or omissions, is exhaustive, is of merchantable quality and fit for a particular purpose, and is not liable for any inaccuracy, error or omission in the information contained in this document.

KEY TRENDS

A summary of some of the key trends picked from TRR’s analysis of the market are listed below:

- The total annual revenues of the telecommunications market has grown by 124% in the last decade with the introduction of competition and the establishment of TRR.
- Total telecommunications market annual revenues have grown by 22.4% since 2013.
- Mobile penetration has grown to 80%, from 58% in 2013 and around 12% in 2007.
- Mobile subscriptions grew 37% between 2014 and 2016.
- Annual mobile voice revenues have increased 5.9% from 2014 to 2016.
- Total international internet capacity has increased to over 1 Gigabytes per second (Gbps) in June 2017, increasing over 650% since January 2014.
- The number of fixed internet (wired and wireless) customers has increased by 6.1% from 2014 to 2016.
- Annual fixed internet revenues have increased by 20.9% during that same period.
- Mobile data subscriptions are estimated to have grown by 1100% during the same period, 2014 - 2016.
- Advertised mobile data pricing has dropped considerably with daily bundle 1/50th of the price per unit (VT/MB) it was in 2012.
- The total annual number of megabytes (MB) of mobile data downloaded has grown by 1500% between 2014 and 2016.
- Total annual outbound international call minutes decreased 20% from 2014 to 2016.
- Total annual domestic SMS messages sent has decreased by 51% between 2014 and 2016.
- Fixed telephone subscribers have decreased by 15.4 % between 2014 and 2016.
- However, noting the above dot point, annual fixed voice revenues have grown by 1% during that time.

TELECOMMUNICATIONS MARKET REVENUES

The gross revenues collected by the entire telecommunications market industry has been growing since the first kept records, in 2006, which have been made available to TRR. The introduction of competition in 2008 and the establishment of TRR in 2009 had a noticeable increase in total market revenues. This is likely due to the substantial increase in mobile coverage and the large increase in the number of subscribers; particularly those for mobile.

Although mobile subscriber numbers tended to fluctuate over the period from 2011 to 2014, the market continued to experience marginal overall revenue growth. There was more significant revenue growth experienced in 2014 and this may be due to the combined influence of the launching of the submarine cable, which stimulated significant growth in the fixed internet market, and the renewed growth in the market for mobile telephony.

The telecommunications market sustained significant damage to infrastructure as a result of Tropical Cyclone Pam and the disruption caused had a long-lasting effect on the country's economy as a whole. Telecommunications revenues continued to grow, however, and still reached a record total, at that time.

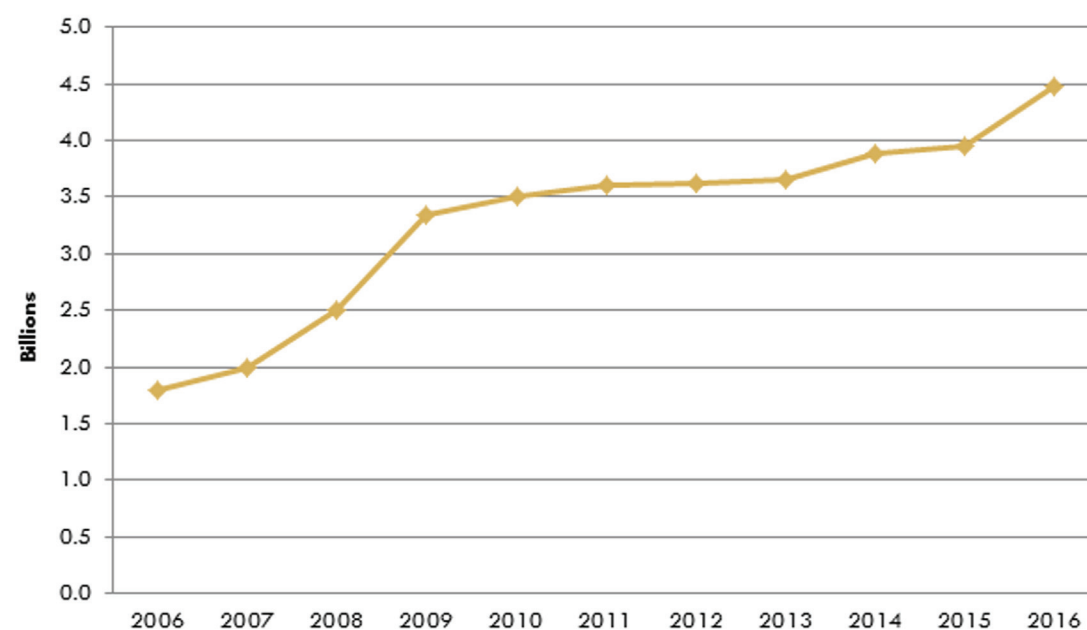


Figure 2 Historical Telecommunications Revenues (Vatu)

Although it may have been surprising for the industry to have achieved positive growth in 2015, despite suffering the effects of the cyclone, the strong underlying market growth was demonstrated in 2016 with a significant increase to a total of 4,479,794,173 VT gross revenues collected.

MOBILE TELEPHONY

Since the liberalisation of the telecommunications market by the Government of Vanuatu in 2008 and the introduction of competition through the issuance of new telecommunications licences¹ and the establishment of TRR as the competition Regulator and Watchdog, the market in Vanuatu has been predominantly characterised by the uptake in wireless and, in particular, mobile technologies.

The initial growth of mobile subscribers from 2008 to 2010 demonstrates the significant positive impact on the industry from the introduction of competition and the subsequent increase in mobile coverage led to the opening up of access to telecommunications services to a large portion of the Vanuatu population.

Subscriber numbers reached an initial peak in 2010 and experienced a decline in 2011 followed by several years of fluctuation in which the total number failed to meet the prior peak. This apparently uninspiring statistic of subscriber numbers contrasts against a period of ongoing growth in coverage of the mobile networks, and of the Vanuatu population more generally. This unusual trend is believed to have been caused by customers who had been using two SIM cards, one from each mobile provider, during the initial years of competition electing to only retain one once they have determined their personal preference.

The total number of mobile subscribers has bounced back, however, and reached new national records in 2015 and then again in 2016, despite such difficulties as the devastating Tropical Cyclone Pam in March 2015; which caused significant damage to telecommunications networks in many parts of Vanuatu. A number of factors are likely to have contributed towards this renewed growth including increased competition between mobile providers, and is likely due to a resurgent TVL, and increasing mobile network coverage under the Government's Universal Access Policy (UAP)² opening up new areas, and people, to access services. Other factors are likely to include the growing availability of data services, making mobile a more attractive proposition to users, and the decreasing costs associated with using these services due to the decline in equipment costs, improvement in technologies and the increasing efficiencies of scale of the mobile networks.

The mobile penetration rate is calculated by taking the total number of mobile subscriptions and dividing this by the total population of the country, which gives an approximate value for the percentage of the population with a mobile subscription. This indicator can be a useful benchmark to study the number of mobile subscribers in a country over time or to compare between different countries as it takes account for the relative size of a countries population.

The mobile penetration rate in Vanuatu grew considerably with the introduction of competition, and then tended to decline as subscriber numbers fell between the years 2011 to 2014. As subscriptions later rebounded, so too has Vanuatu's penetration rate; indicating that this growth has been greater than the natural rate of growth of the population.

¹ with the first being issued to Digicel in 2008, to supply mobile services, and later additional licences issued to Telsat, Interchange and CAN'L (now Wantok)

² Universal Access Policy, Government of the Republic of Vanuatu, December 2013

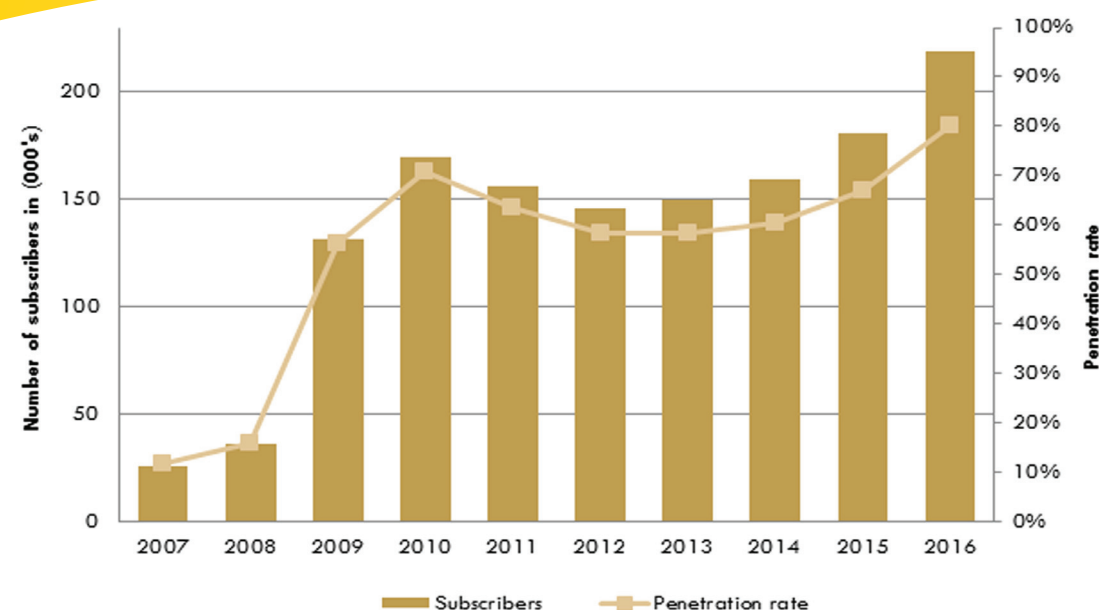


Figure 3 Mobile Subscriptions and Penetration

Penetration rates do not, however, tell the whole story. They only measure the number of subscriptions and not individuals who are using them, so a person who has a mobile phone with two SIM cards would be recorded as two subscriptions. This relationship makes it difficult to effectively calculate exactly how many individuals in Vanuatu actually own and regularly use a mobile phone and it is likely that there are substantially less than 80 in 100 individuals who actually own a mobile phone. The number of users who own two SIM cards is quite high in Vanuatu, as users seek to make best use of the benefits from both mobile providers, and this may suggest that actual phone ownership is substantially less than the penetration rate; however, there is no clear data to measure the extent of this trend.

Although there are some difficulties in calculating the number of mobile users in the country, there are some positives factors to consider and that can be observed. As the population of Vanuatu is heavily made up of younger people, with 39% of the population aged 15 years and younger³, and it typically is uncommon for children in Vanuatu to own a mobile phone, this tends to indicate that a large proportion of the adult population owns a mobile phone.

The 2013 Vanuatu Demographic and Health Survey (VDHS)⁴ included questions on household possessions in which ownership of a mobile telephone consistently outperformed the majority of the other household items, in both urban and rural areas, with a total of 83% of the sampled population stated as owning a mobile telephone; this was equivalent to 80% of households⁵. It is clear, however, that a large disparity still exists between urban areas (97.7% of the population owning a mobile) and rural areas (76.1% of the population owning a mobile). Additionally, the VDHS further

³ Vanuatu National Statistics Office, 2016 POST – TC PAM Mini Census Report, Vol 1, 2017

⁴ VNSO (Vanuatu National Statistics Office) and SPC (Secretariat of the Pacific Community). 2014. Vanuatu Demographic and Health Survey, 2013.

⁵ This difference, between mobile ownership, and TRR's penetration rates may be due to individuals having more than one phone, but only one SIM card, or owning a mobile phone without an active SIM leading to these not being recorded in TRR's statistics collection from mobile service providers.

separated the rural population into two distinct groups: Rural 1, covering households surrounding urban areas (i.e. within easy access to Port Vila and Luganville) and all households living in all administrative centres of all other provinces, and Rural 2 covering the remaining rural Vanuatu population. In respect of mobile phone ownership, there were significant disparities between these populations with 92.3% of Rural 1 population owning a mobile phone and only 73.1% of Rural 2.

The mobile telephony market segment is dominated by prepaid subscriptions, with 97% of mobile users on a prepaid plan. This proportion of total subscribers is relatively unchanged across the 2014, 2015 and 2016 years - which are the primary focus of this report - and this is reflective of some underlying characteristics of the telecommunications market and the wider economy in Vanuatu.

From the consumers' perspective, prepaid plans tend to be the more affordable and convenient option to the majority of users, as they tend to be more suited to the economic reality experienced by many people. Such influences could be the relatively low individual income levels, inconsistent cash flows, due to the high proportion of the population without salaried employment, and a preference to only pay for what they use; all of these contribute to the general preference towards the flexibility of prepaid Pay-As-You-Go (PAYG) plans.

MOBILE CALL TRAFFIC VOLUMES

However, this overall growth masks a number of underlying trends in traffic volumes with total postpaid minutes declining as a result of the declining number of on-network (on-net)⁶ mobile-to-mobile minutes, outbound international minutes and particularly mobile-to-fixed call minutes.

Total domestic prepaid call minutes has continued to grow year on year from 201,703,436 minutes in 2014, to 215,055,599 minutes in 2015 and to a total of 230,731,908 minutes in 2016. This growth appears to be predominantly due to the growing number of prepaid mobile subscribers as average call minutes per user has tended to decline.

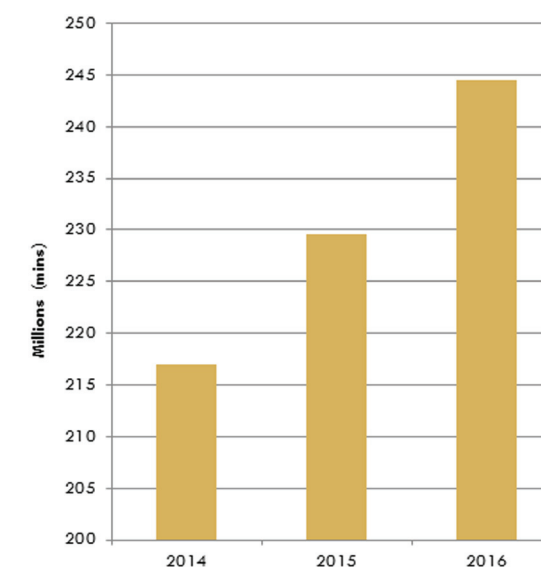


Figure 4 Annual Mobile Call Minutes (Inc. International)

The increase in total prepaid minutes is due predominantly to the increase in call traffic to on-net numbers, with this increasing 15.7% from 188,628,354 in 2014 to 218,155,103 minutes in 2016, as well an increase in calls to fixed numbers of 14.6% over the same period, reflecting the general growth in prepaid mobile subscriptions.

In contrast, the volume of call traffic to off-network (off-net) numbers has decreased over the period analysed from a total of 10,735,079 minutes in 2014, down to 10,047,932 minutes in 2015 and again to 9,895,506 minutes in 2016, a decrease of 7.8% on 2014 levels.

⁶ An on-net call is a call within the same network e.g. a call from a TVL number to another TVL number. Whereas an off-net call is a call to a user on another network e.g. a call from a TVL number to a Digicel number.

MOBILE REVENUES

Total revenues for mobile calls have continued to increase from 2014 to 2016 from total of 1,622,261,988 VT in 2014, to 1,716,519,544 VT, maintaining mobile telephony's position as by far the largest revenue segment in the Vanuatu telecommunications market.

Prepaid revenues for domestic calls have continued to increase year-on-year with a 7.8% growth in 2015 and 2.4% for 2016 respectively to total of 1,411,825,895 VT total revenues for 2016. This continued growth has maintained prepaid's influence as the major driver in the market in Vanuatu and increased its share of total mobile call revenues. This dominance is demonstrated in *Figure 5* which gives a breakdown of total mobile call minutes by call type.

Postpaid, by comparison, has tended to fluctuate in recent years with revenue growth in 2015 of 4.1% and a small decline in 2016 of 2.1% to a total of 157,133,353 VT for that year.

AVERAGE MOBILE CALL PRICING

Price typically tends to be the main component that contributes to a user's choice of service, and although there has been no change in the advertised per minute PAYG prepaid call rates from each provider in recent years, there has been ongoing competition for customers through the release of promotional offers and bundles.

The effect of these promotions and bundles can be observed in the average prepaid price paid by consumers which at 6.1 VT is substantially lower than the average of the advertised PAYG rates of both mobile providers. This demonstrates how value-seeking prepaid users tend to prioritise their usage to times when there are promotional rates or under bundled usage which offer much larger volumes at lower unit cost.

From TRR's analysis, in the graph (*Figure 6*) below, the average postpaid price per minute has increased over the period but peaked during 2015. This increase has not been due to any increase in headline prices from service providers, however, with both TVL and Digicel releasing new more generous postpaid plans in 2015, but due to a decrease in call minutes made by customers' which has brought the average price up.

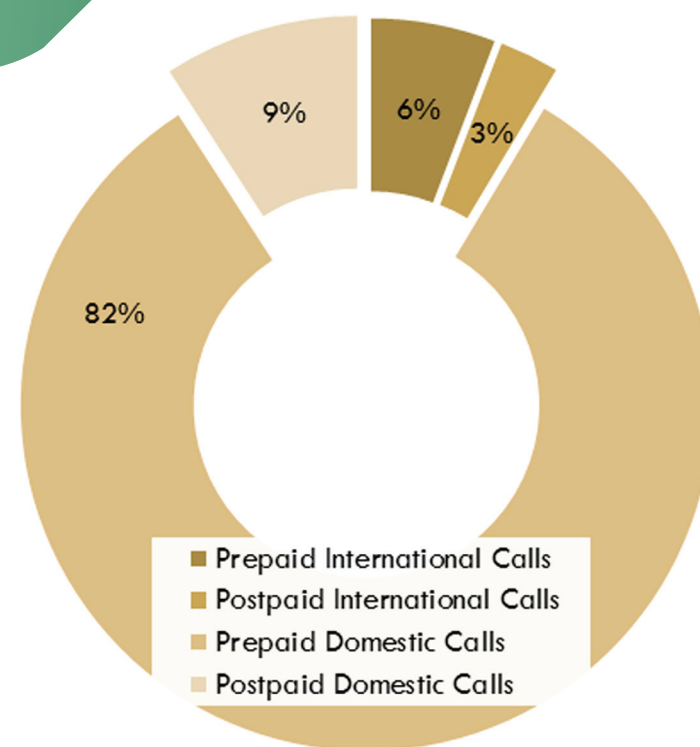


Figure 5 2016 Mobile Call Revenues By Call Type

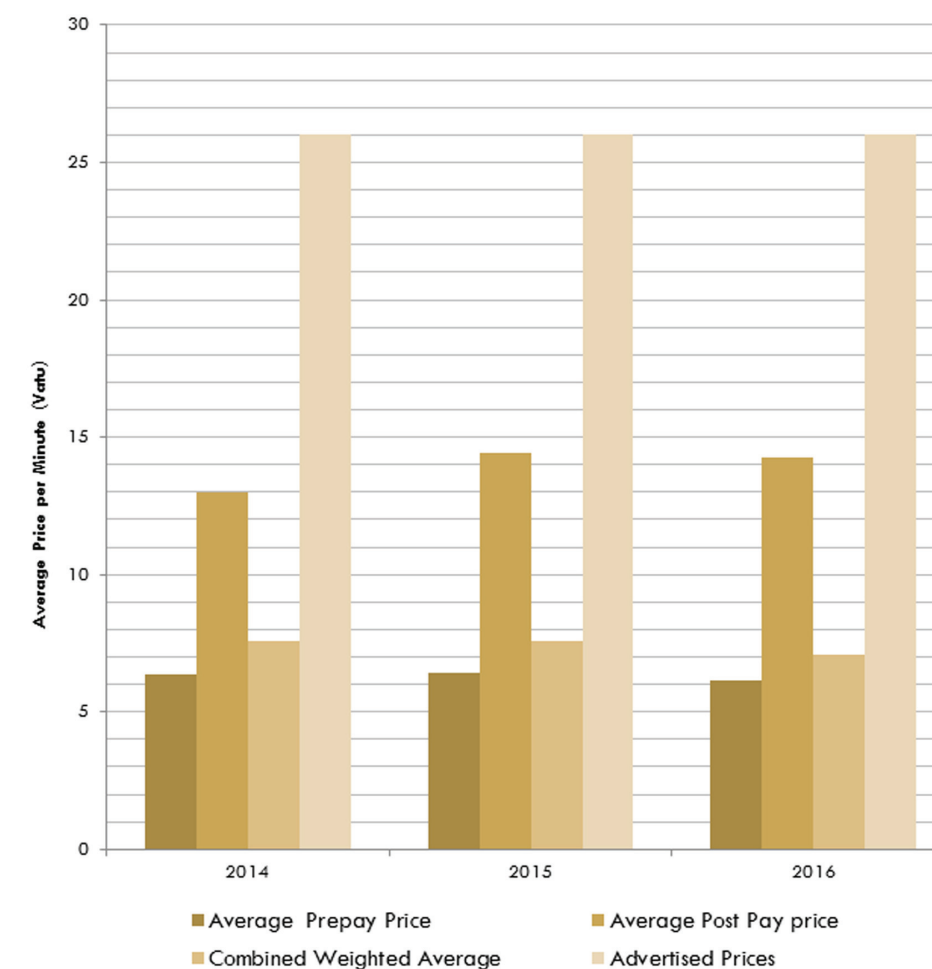


Figure 6 Average Per Minute Call Pricing In Vatu By Year

Interestingly, although average pricing increased for both prepaid and postpaid customers in 2015, the combined weighted average price, the price paid by the average mobile user in the market, went down. This is caused by the underlying effect of increasing prepaid call minutes and decreasing postpaid minutes, leading to prepaid making up a larger proportion of the total domestic mobile call minutes in that year and causing the average price to shift downwards closer towards the average prepaid price.

ON-NET AND OFF-NET CALL PRICING

As indicated above, the total number of prepaid on-net calls has continued to experience healthy growth, whereas the volume of off-net calls has decreased - even as mobile subscriptions have continued to experience strong growth. The underlying reason for these trends may seem unclear, but appears explained by the average prices paid by consumers to make these different types of calls.

Most prepaid users in Vanuatu are generally aware of the improved benefits offered by mobile service providers for on-network communications due to the discounts available on specific bundles or promotions, but what effect do these discounts have on the real cost of usage?

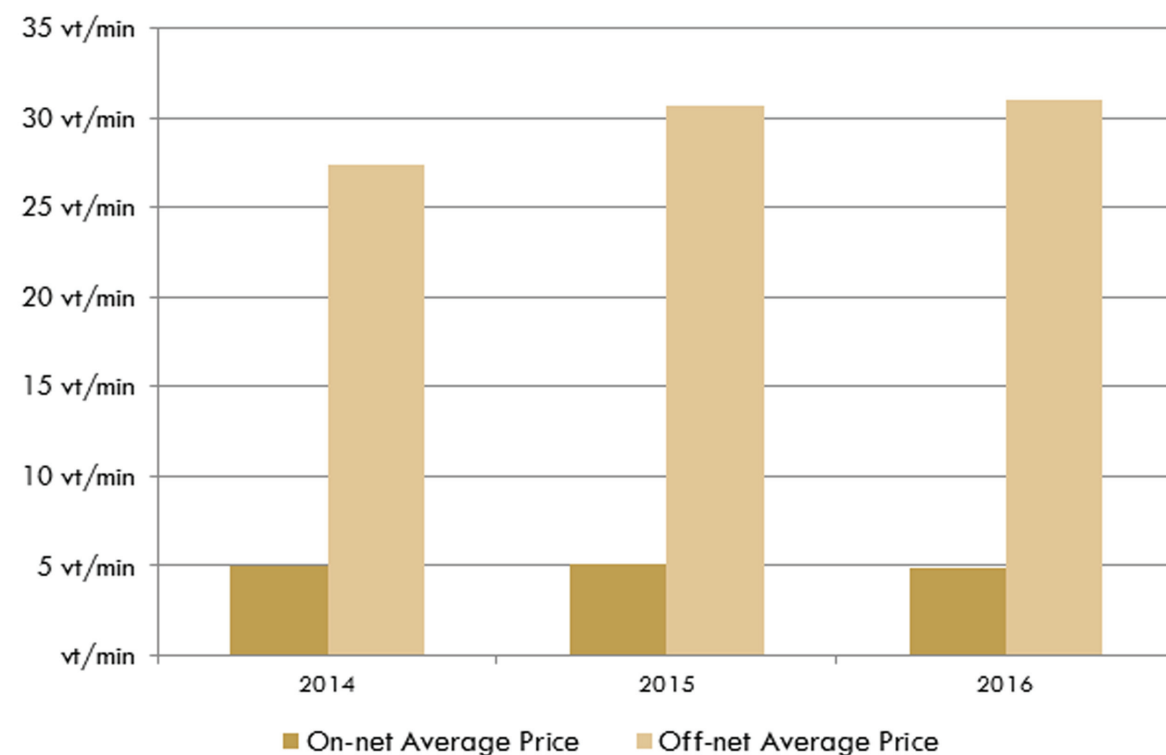


Figure 7 Prepaid Mobile Average Per Minute Call Pricing

As demonstrated in Figure 7 there is a significant disparity between the average price of an on-network call minute to an off-network call minute. This primarily arises from the significant number of on-net only call bundles. Long-running examples include TVL's WAO TOK and Digicel's TOKTOK bundles, which offer several hours of call time for the equivalent cost of around 10 minutes at the standard PAYG rate. Interestingly, from TRR's analysis, it appears that the price of prepaid off-net average prices, which have increased, appear to be higher than the highest prepaid PAYG per minute rate of 27 VT per minute. Such a result appears to be highly irregular, however, a possible explanation may be due to the method applied by both mobile providers when charging prepaid calls.

Although the PAYG per minute call rate is advertised as a per minute rate, both providers charge in 15 second billing increments. In practice, this means that when a customer makes a phone call they are immediately charged for the first 15 seconds of a call, if or when the call carries on for more than 15 seconds then they will be charged for another 15 second increment, etc ⁷, irrespective of

whether they utilize those "full" 15 seconds or not. The result of such billing practices means that customers can be charged for a full 15 second increment of call time when they may have made a phone call of less than 15 seconds. When all the minutes and revenues are aggregated, such as during TRR's analysis above, then these discrepancies can lead to average call charges amounting to more than the standard per minute call rate.

By comparison, a similar trend has not been observed in postpaid off-net call traffic with volumes experiencing only slight fluctuations over the 2014-2016 period. Such fluctuations reflect a number of other trends experienced in the postpaid mobile segment, and off-net call volumes have tended to buck the trend of declining volumes in other postpaid mobile call segments. The likely reason for this is due to the bundled nature of postpaid packages and the preferences of postpaid customers.

Typically, postpaid packages involve a substantial monthly commitment ranging from a minimum of 3,000 VT, and these tend to be taken up predominantly by business customers attracted by the all-inclusive package and the set monthly amount. Postpaid customers do not have any limitations on the possible destination of the domestic calls included in their allocated bundles, and tend to make calls based on their own needs or preferences. These customers also do not experience any additional price signals to discourage them from making calls off-net or to limit their usage to times when a particular promotion may be in place, as they have already paid for their bundle.

The apparent divergence in the trends for on and off network call traffic is concerning, and may reflect wider trends of dual SIM ownership in which customers tend to exclusively communicate to others on the same network to take advantage of on-network only bundles and deals.

Although consumers experience the benefits of cheaper services to on-network numbers, these trends may tend to restrict or limit effective competition and may be worthy of further analysis and discussion with industry by TRR.

⁷ i.e. 0-15 second call costs = (per minute rate)/4; 16-30 second call costs = 2 x (per minute rate)/4; 31-45 sec call = 3 x (per minute rate)/4; 46-60 second call = 1 x (per minute rate)

INTERNET SERVICES

Demand for access to the internet continues to grow globally as users seek to engage in the ever-growing range of products and services that become available through their computer, mobile or tablet devices, and Vanuatu is no different.

Due to our remote location and relatively small population, Vanuatu historically only had access to the internet through international satellite connections. These connections tended to be prohibitively expensive for local service providers to access which in turn made internet services unaffordable to the majority of people, and provided a significant barrier to the long-term growth in subscriber numbers in Vanuatu.

With the liberalisation of the market in Vanuatu in 2008 as well as the issuance of 6 new telecommunications licences and the amendment of Digicel’s Telecommunications Licence⁸ in 2009, this encouraged and introduced significant competition into the market for the provision of internet services⁹. This competition amongst providers has stimulated growth and innovation, and led to the larger range of services, packages and access technologies available, catering to an ever-broader range of customer segments, that we see in the market today.

A significant majority of this competition has, however, been limited to the main commercial centres, particularly the capital Port Vila and, to a lesser extent, in Luganville. Most Internet Service Providers (ISPs) fixed internet infrastructure is located in Port Vila and, historically, users in rural areas may only have had very limited access to the internet either via slow and expensive mobile technologies, through Digicel and TVL, or through the purchase of a dedicated personal satellite service, which was either limited to only being available in a few specific areas or very expensive; even for a slow connection.

The high international connection costs and limited bandwidth provided via satellite ultimately led to the need for the construction and provision of the ICN1 international submarine cable by Interchange Ltd; which was completed in January 2014, and started supplying capacity in March 2014. The launching of the submarine cable immediately led to a significant increase in available bandwidth at much lower pricing to the ISPs, which in turn stimulated strong internet subscriber growth and greater competition in retail internet markets with the entry of new market players Global Pacific Telecom (GPT), and the re-launching of CAN’L as Wantok.

The significant increase in the international bandwidth being used in Vanuatu, stimulated by the launching of the ICN1 submarine cable, is demonstrated in *Figure 8*, which shows both the immediate dramatic increase in bandwidth initiated by the launching of the cable and the subsequent ongoing growth in usage.

⁸ The amendment allowed Digicel to provide telecommunications services other than only mobile telecommunication services.
⁹ The 6 new telecommunications licences were restricted to only supplying “internet-related” services applied for a period of around 2 years until 31 March 2011.

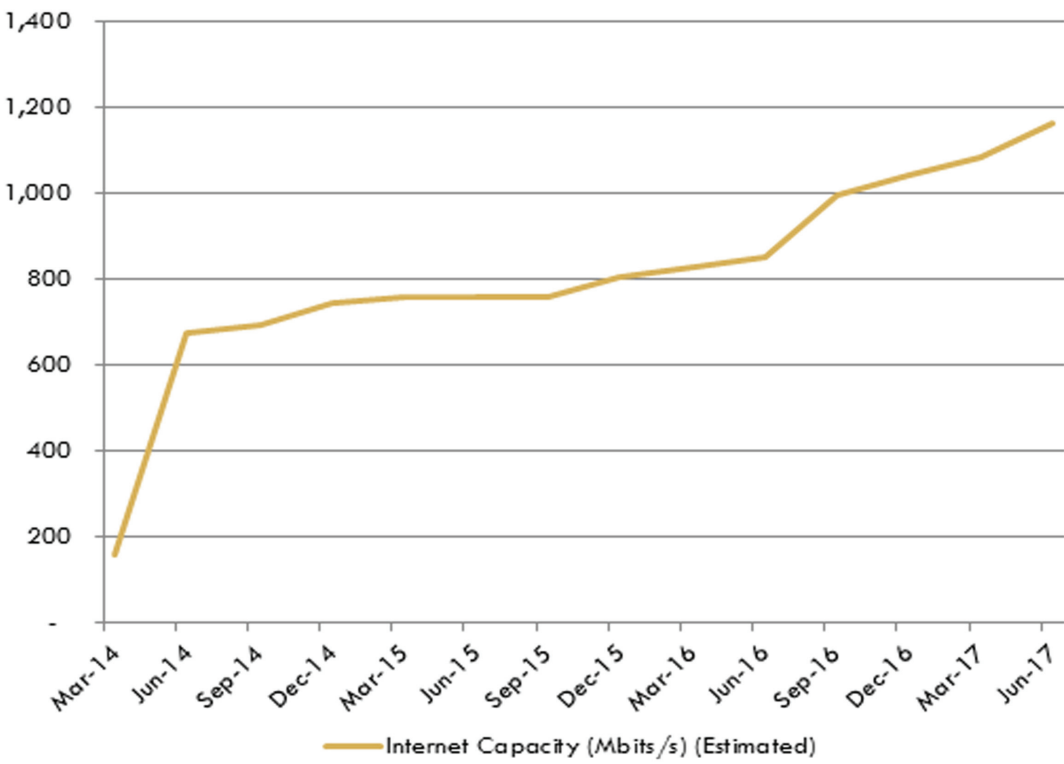


Figure 8 Vanuatu International Internet Bandwidth 2014 - 2016

FIXED INTERNET SERVICES

Historically, prior to liberalisation, internet access was provided by TVL using Digital Subscriber Line (DSL), or dial-up services supplied over fixed copper telephone lines, until the later introduction of wireless WiMax services which allowed for the wireless transmission of internet bandwidth to outdoor antennas located at the customers premises. Today there are a range of fixed internet technologies available in Vanuatu including ADSL, a version of DSL, WiMax, fibre optic cable as well as Wi-Fi and fixed 4G, which operate similarly to WiMax as customers connect wirelessly through an antenna in their premises to a transmitter on a tower in their local area.

TRR collects statistics on fixed internet usage through two indicators: xDSL fixed subscribers, which includes DSL and its different variants and fibre optic cabling, and fixed wireless subscriptions, which includes all fixed wireless access technologies such as WiMax, Wi-Fi or fixed 4G¹⁰.

There were significant changes in the market for fixed internet services with the launching of the submarine cable in quarter 1 of 2014. The market saw an immediate sharp increase in fixed wireless subscribers with the availability of cheaper bandwidth as well as the launching of Wantok’s 4G fixed wireless network, whereas there was a more gradual increase in fixed xDSL subscriptions (See *Figure 9* below).

¹⁰ As opposed to mobile 4G, fixed 4G doesn’t support cell handover so customers can’t move around and maintain their connection.

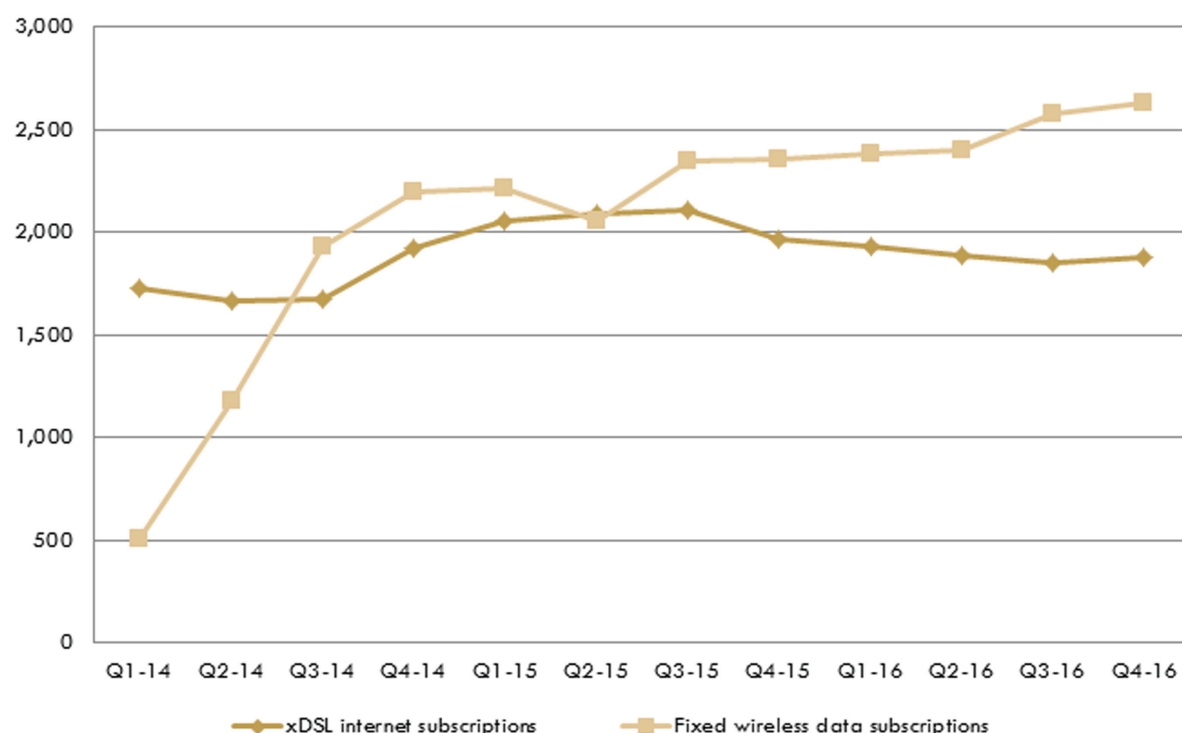


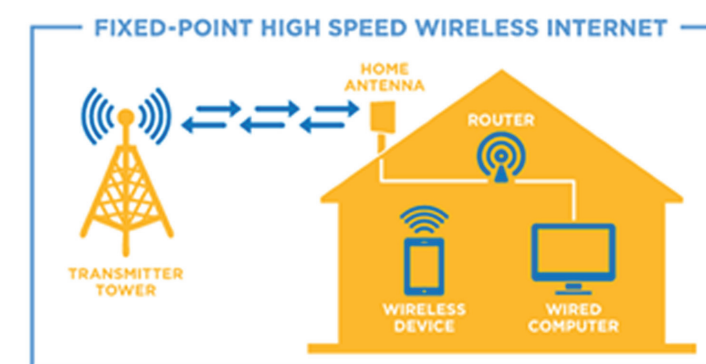
Figure 9 Quarterly Fixed Internet Subscribers

The relative benefits of fixed wireless services over fixed wired transmission technologies, such as fibre, are likely to have been a major influence on the different rates in uptake after the launching of the submarine cable. Fixed wireless technologies can be relatively cheaper and quicker to construct and connect to customer's premises due to there being less fixed infrastructure required to be built for the initial deployment. To provide services to a specific area, a service provider only needs to construct a tower, connect it to their network, and locate their transmission antennas on the tower. Once this infrastructure is in place, then when a customer procures the service the provider needs only to install a small wireless receiver at their premises in order to provide them with services. After the tower is built this leaves only a moderate installation charge as the marginal cost for installing additional services to each new customer.

These relative benefits are in contrast to fixed wired services such as fibre optic technologies, which require a significant amount of coordination and planning of civil works in order to install the cabling to reach the customers premises. The telecommunications service provider may have to work with a number of different groups such as local government, town Council or municipality, the roads authority (such as Public Works Department) and any other utilities or service providers that may also have infrastructure that is located close to the planned cabling route, to ensure that any installation works minimise disruption or damage to their infrastructure and to the normal operations of business and traffic in the area where the cabling is being built. These preparatory works can involve a significant amount of time and cost as the service provider seeks all the appropriate approvals and contracts

required to undertake the work. Construction of the network also involves considerable construction costs as contractors may have to dig up roads or walkways to install the cable and protect it from any potential damage.

Due to the relative cost and time involved in rolling out a fixed network, it can take considerable time for the service provider to reach an individual customers premises and, if there is not much demand in their area, then the cost involved in supplying services to their area may greatly outweigh the returns that they could receive from supplying them.



Although there may be a longer lag-time to install fixed services there are certainly a number of benefits to fixed wired as opposed to wireless technologies. Wired technologies can be more reliable as they are not subject to the same risks of interference from weather, obstacles or from other electromagnetic wireless communications. Fixed cabling is better protected from some natural disasters, such as cyclones, which are common in Vanuatu, and it appears that this could be a cause for the sudden drop in fixed wireless subscribers in Quarter 2 of 2015 as this coincided with the aftermath of the devastating Tropical Cyclone Pam in March 2015.

Although we have considered the relative construction costs for fixed wired and wireless internet networks above for ISPs these differences should also translate to cheaper costs for customers. With fixed wired networks, a bigger portion of the cost involves costs such as civil works and labour that do not change much over time, however, with fixed networks, as these costs are lower generally; there is greater room for prices to change if other inputs change.

Due to the substantial decrease in the cost of international bandwidth paid by ISPs with the provision of service from the submarine cable in early 2014, this allowed them to pass on some of these cost savings to end users. This price decline, coupled with the increased competition from Wantoks' entry into the fixed wireless internet market, led to a sharp decline in the price paid by fixed wireless subscribers. This decline is demonstrated in Figure 10 (below), which shows the average revenues per subscriber received by ISPs for each technology type. The average revenue per subscriber is a useful proxy for the price the average user pays for a service ¹¹ and allows TRR to monitor the trend in costs over time. Note, however, that this indicator does not give an indication of the value of the internet services provided as it does not necessarily apply to the same quality of services over time.

¹¹ TRR calculates this value by taking the total monthly revenue value for the industry, for that particular technology type, and divides it by the number of monthly subscribers for the final month of that quarter.

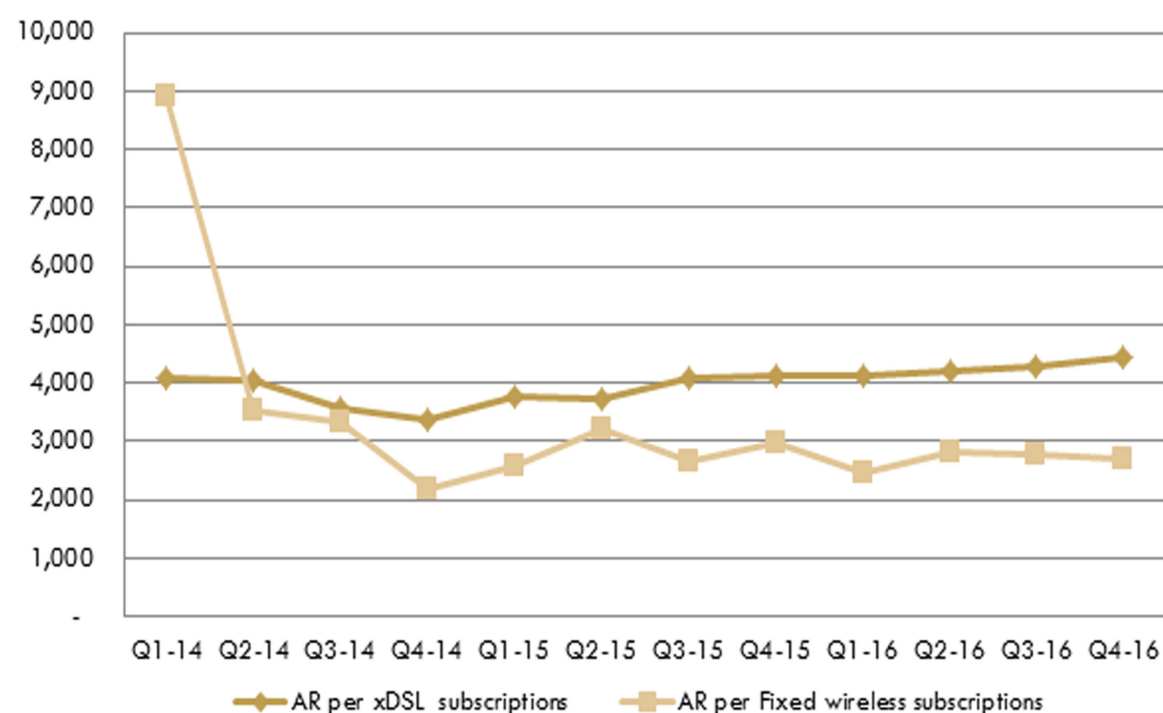


Figure 10 Fixed Internet Average Revenues Per Subscriber

Many ISPs chose to hold the prices of their packages at the same level after the launching of the submarine cable, but chose to dramatically increase the speeds, roughly by a factor of 3. Customers experienced a big improvement on their existing services but were not required to change their package or billing.

As shown in Figure 9, the number of fixed internet subscribers has grown steadily over time and this trend is reflected in the fixed internet revenues accrued by the ISPs. Although revenues have trended upwards it appears from Figure 11 (below) that this has not been constant and has tended to fluctuate throughout the period of the last 3 years.

Fixed wired internet connections have continued to provide greater revenues than wireless, which reflects the higher average revenues earned per subscriber. This likely results from the tendency for large corporate clients to acquire wired connections due to the greater reliability and potential internet speeds provided by technologies such as fibre optic cabling. Such customers may also tend to be willing to allocate greater amounts of resources to ensure a fast and efficient connection as it may be an integral input on which their business relies.

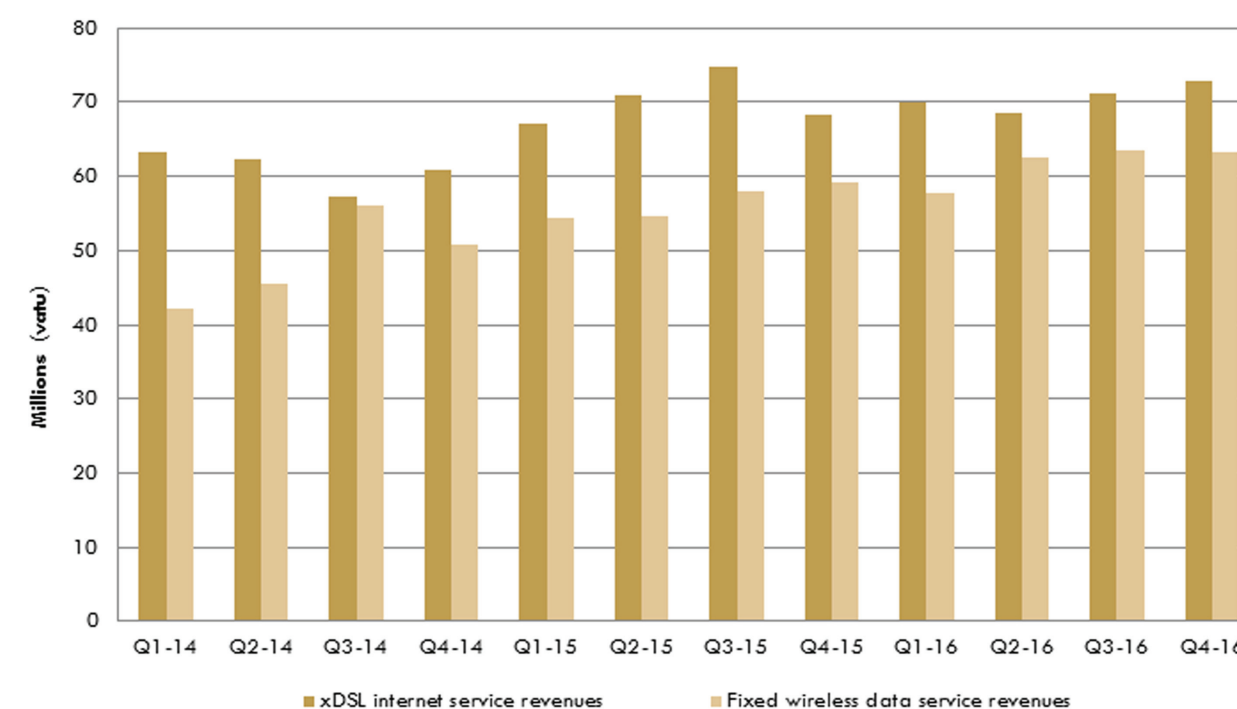


Figure 11 Quarterly Fixed Internet Revenues

MOBILE INTERNET SERVICES

Due to the improving affordability of smartphones and ever increasing speeds that are becoming possible over mobile data technologies, mobile internet services have grown to become the most common method for users to access the internet in Vanuatu.

The large existing coverage by the mobile networks of a significant majority of the Vanuatu population has paved the way for the deployment of mobile data technologies to provide internet access to users in many parts of the country using the existing tower infrastructure.

Leveraging the existing infrastructure has allowed the operators to save costs in network roll-out and cover a much larger area, and as the price of smartphones has decreased and their use has become more widespread, this has provided a ready-made option to offer mobile data services that do not require any additional upfront connection costs to the customer so long as they have a data enabled device and have a prepaid credit balance.

MOBILE BROADBAND SUBSCRIPTIONS

Mobile broadband subscribers refers to the number of subscribers who accessed the internet through mobile data technologies. This can be via mobile technology standards such as 3G or 3G+, or 4G, and also through 2G technologies such as GPRS and EDGE, and be either through their mobile phone, tablet or through a dedicated data-only connection such as a dongle or router which utilises a mobile SIM card to connect to the mobile data networks.

The number of mobile broadband subscribers has seen a significant increase in recent years with the mobile broadband subscribers now estimated¹² to exceed 60,000 subscribers which is a large increase on the estimated 5000 mobile data subscriptions in 2014. Given the ongoing upgrade, by both mobile network operators, of all mobile telecommunications towers across Vanuatu to support 3G (or higher) technologies under the Universal Access Policy (UAP) projects, expected to be completed at the end of 2017, TRR would expect this number to continue to experience strong growth in 2017.

AVERAGE PRICE OF MOBILE DATA USAGE

One underlying reason for the dramatic growth in mobile data subscriptions, and usage generally, is the drop in data pricing. Advertised data bundle prices for both prepaid and postpaid packages have continued to fall with the cheapest available ¹³ average advertised price per megabyte (VT/MB) declining to less than one fifth of original levels between quarter 1 2015 and quarter 4 of 2016. See Figure 12.

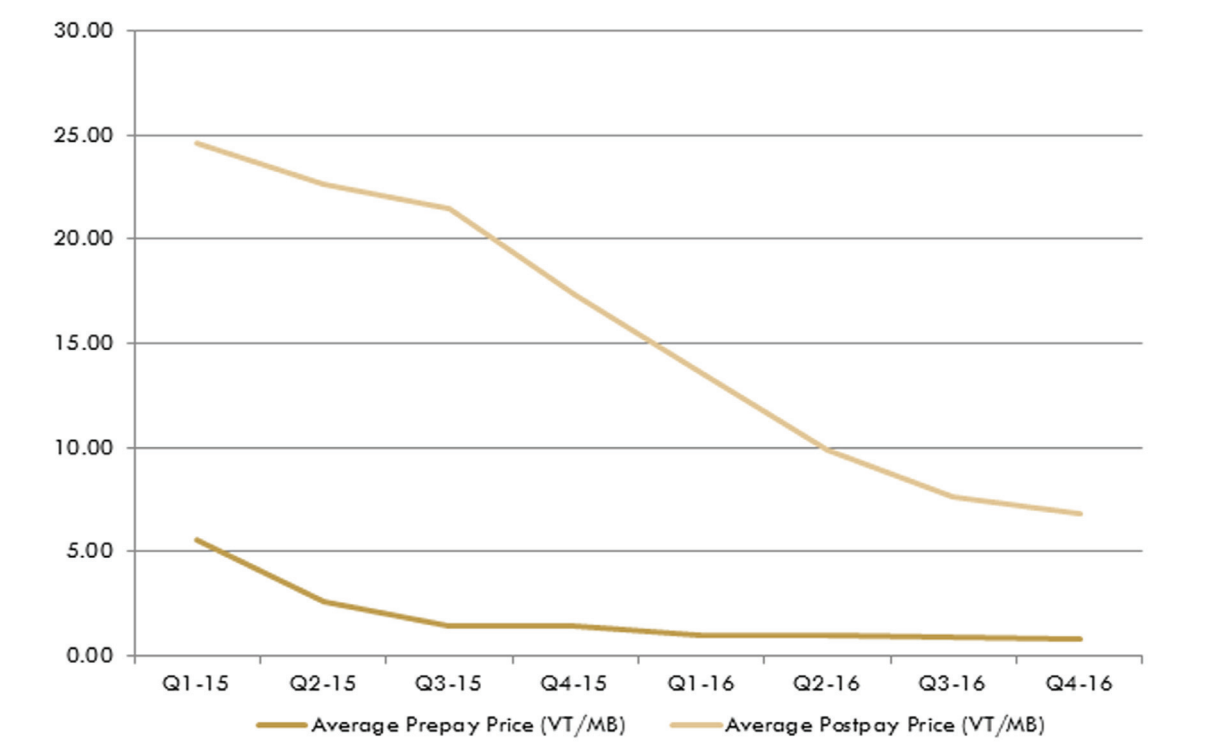


Figure 12 Mobile Data Average Pricing

12 TRR has provided an estimated value for the number of mobile broadband subscriptions due to a number of discrepancies and inconsistencies between the data provided by both mobile service providers. There also appears to be some inconsistencies in how both providers classify particular types of services; particularly those which involve dedicated mobile broadband subscriptions such as SIM based modems or dongles.

13 The cheapest available price refers to the cheapest standard tariff available in the market at that time for that particular bundle category. This information has been sourced from tariff submissions by TVL and Digicel to TRR or, where such information is deficient, from advertisements by these providers on their respective websites, or other media publications.

TRR has analysed mobile data pricing by calculating the per megabyte rate, rather than looking at the total bundle rate, as this allows us to more easily compare pricing across a range of time periods when the bundle sizes may have changed throughout the period.

PREPAID MOBILE DATA

A significant proportion of the growth in mobile data subscribers, and mobile downloads has been in the prepaid segment. The flexibility of prepaid offerings and the ability for service providers to offer very low rates for limited usage bundles has encouraged users to take up these products for the low cost commitment and convenience offered. This subscriber growth has been stimulated by vigorous competition in the market for mobile data plans since the launching of the submarine cable and this has had a positive effect on the packages offered. Although this competition has driven down the unit price to consumers, it has also encouraged innovation in the types of packages and promotions offered.

Mobile data packages also tend to be the most heavily promoted by service providers who regularly offer special rates or provide additional bonus data to data packages in an effort to grow demand. Such promotions typically tend to coincide with important or nationally significant dates such as over Easter and Christmas as well as Mother’s Day and Independence Day celebrations; however, during the last calendar year some promotions have been offered more regularly and repeated as often as every fortnight.

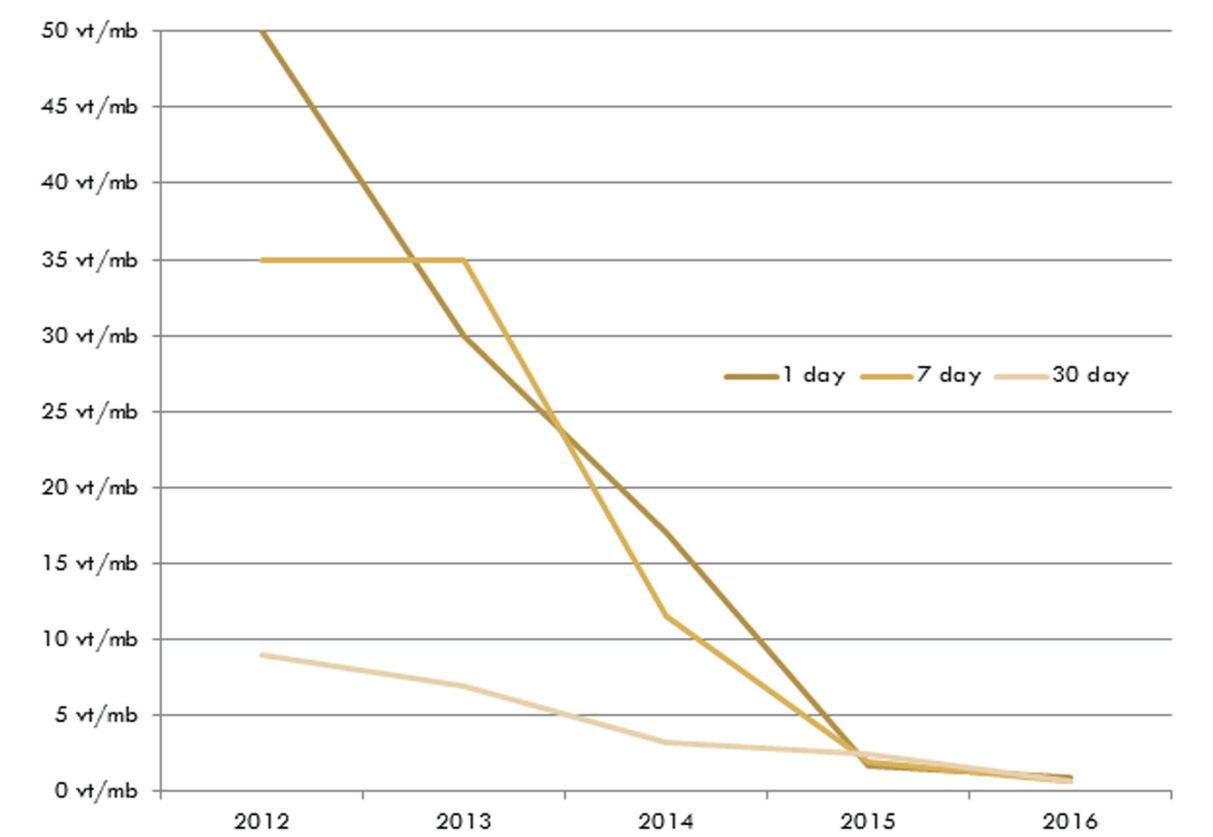


Figure 13 Cheapest Advertised Prepaid Mobile Data Bundle Price By Bundle Length

In *Figure 13* above we have categorised data bundles into three common categories based on the length of time each bundle is valid for as these have remained relatively consistent throughout the period analysed.

The drop in unit pricing has been evidenced most notably in the shorter 1-day data bundles with the average price dropping from as high as 50 VT/MB in 2012 to 1 VT/MB in 2015. However, the realised benefits to customers of this trend have been even greater with most packages from 2015 onwards providing additional bonus data at night and free access to Facebook for the duration of the bundle, on top of the improved bundle rates.

The convergence of unit pricing across the range of prepaid data bundles (demonstrated in *Figure 13* above) appears to indicate that the market has matured to the extent that service providers have a good understanding of consumer preferences and behaviour, and have refined their product offerings to the point that they are having to focus their services to ever more specific customer segments, or time periods, to stimulate additional demand and increase utilisation and efficiency of their networks.

POSTPAID MOBILE DATA

Data pricing on postpaid packages has also experienced a marked decline as well as increased uptake by consumers. However, the effects of this decline have been felt more recently than for the prepaid market. Advertised data rates dropped with the widespread introduction of ‘triple-play’ postpaid plans offered by both TVL and Digicel from around 2015 onwards, offering combined bundles for call minutes, SMS and mobile data as standard in every postpaid mobile plan. Every postpaid customer has effectively been paying for a mobile data service regardless of their usage¹⁴. This change in the packages offered, as well as the bundled nature of most postpaid mobile products, makes it very difficult to objectively compare pricing between different time periods. However, it is clear that the quantity of data available has increased dramatically. A 3,000 VT per month entry level postpaid package included 100 MB of mobile data in 2013. However in 2016, a 3,000 VT plan included 1.5 GB¹⁵. Similarly, a 15,000 VT per month premium postpaid package in 2013 included 1.5 GB of data whereas the same priced package in 2016 included 5.5 GB of mobile data¹⁶. This equates to a 1500% increase in the data included in the entry level package and a 267% increase in data in the premium 15,000 VT package.

Advertised pricing for postpaid data has clearly experienced a dramatic decline, on a per unit basis, due to the significant increase in data included in each plan, but this does not guarantee that customers have taken full advantage of the benefits of these improved prices.

¹⁴ In effect, every customer will have a portion of their monthly bill dedicated towards the cost of mobile data as part of their plan. However this does not mean that they (i) have a phone that is capable of accessing mobile data networks; and/or (ii) even if they have a suitable device, that the customer has actually accessed the mobile data networks.

¹⁵ In 2013, 3000 VT package included 90 minutes (mins) of call time and 100 MB of data, with an SMS bundle at extra charge of 2500 VT for 1000 SMS. In 2016, 3000 VT plan includes 1.5 GB of data, 300 mins of domestic call time, 30 mins of international call time and 500 SMS.

¹⁶ 15,000VT per month package included 720 minutes of call time and 1.5 GB of data in 2013, with an SMS bundle at extra charge of 2500 VT for 1000 SMS. 15,000 VT package in 2016 includes 5.5 GB of mobile data as well as 1500 minutes of domestic call time, 120 minutes of international call time and unlimited SMS.

By calculating the average price paid per megabyte downloaded, TRR can determine what the average user is actually paying for their data usage. The average price is a useful way of aggregating all of the different bundles and advertised prices available, in both the prepaid and postpaid data

markets, and is used to analyse the real revenues received by service providers on a per unit basis for the service. It is calculated by taking all of the data revenues received by service providers and dividing this by the total downloads by subscribers. Comparing the trend in the average price paid by consumers to the trends in advertised pricing can give a useful insight of the value that customers are getting out of their purchased services.

The average price paid by postpaid customers for each MB of data used has trended sharply downwards over time. However, this decline has not been as dramatic as the decline in advertised pricing on a per unit basis. This tends to suggest that although postpaid customers have been provided with significant additional data as part of their postpaid plans, they have not immediately experienced the full benefits of this improved pricing. This is likely due to customers gradually getting used to the substantial amount of extra data available in their plans in order to begin making full use of the allocated data.

During 2015 and 2016, prepaid mobile data customers have experienced a similar declining trend in average pricing. However, this drop has started from a much lower level than that for postpaid. This is likely due to prepaid pricing experiencing significant declines in advertised pricing far sooner than postpaid, and tends to indicate that the market for prepaid mobile data subscribers is more competitive than that for postpaid.

From a user perspective, the improved availability and quality of mobile data has allowed for many low-income users to access the internet for the first time. The cheaper data costs and inclusion of free Facebook with some packages has also stimulated the growth in access to social media to communicate and share information over the internet, and also the growth of Vanuatu centric social media groups and discussion platforms. This trend has had a wider influence on how individuals in Vanuatu access and share information including news and other content such as pictures and video.

MOBILE DATA VOLUMES

The growth in the number of citizens accessing the internet as well as the increasing access to data-intensive content such as Facebook and YouTube ¹⁷, facilitated by the increased speeds available, has led to increased data demands on service providers’ networks. The data demand on mobile data networks has increased by over 500% over the last three calendar years and this trend is likely to continue in the coming years due to the growing number of mobile data subscribers and the expansion and investment in the 3G to 3G+ data networks, due in part to the success of the Government’s UAP as well as the introduction of 4G.

¹⁷ Source: TRR Consumer Survey indicating that 89.1% of respondents were Facebook users and 67.3% used YouTube.

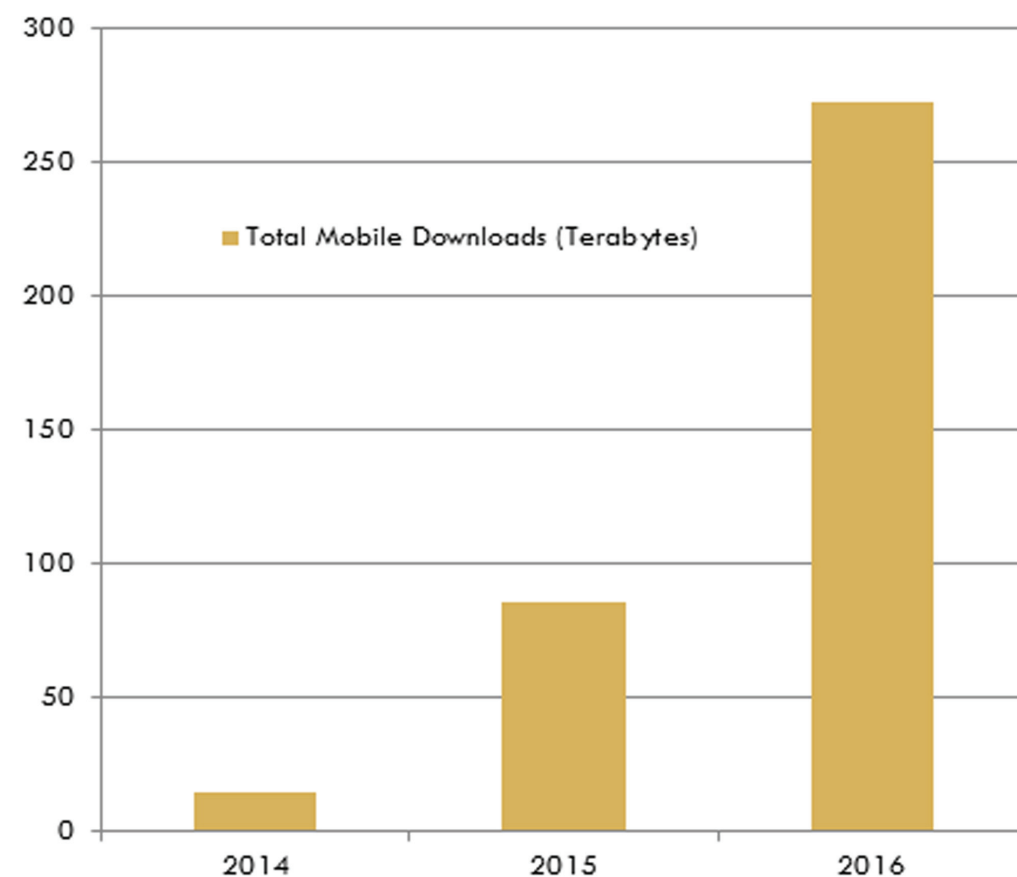


Figure 14 Total Mobile Downloads In Terabytes (TB)¹⁸

Mobile data has effectively opened up a new market to service providers to provide internet services to users in areas outside of Port Vila and Luganville, who may have been restricted previously due to the lack of service availability (i.e. 2G rather than 3G) and the high access costs. The benefits to users can be substantial, and can include access to a wide range of information and content that the internet provides for a wide range of practical applications that may not have been previously available; including new forms of communication, educational or research material, and entertainment.

SMS TEXT MESSAGING

The use of SMS (Short Message Service) text messaging has declined dramatically in Vanuatu in recent years, with the total volume of SMS's sent in 2014 of 190,509,085 dropping down to 93,467,210 sent in 2016; a decrease of 50.9%.

As shown in Figure 15, the decline in SMS usage has predominantly been caused by a large decline in the number of prepaid SMS's sent with postpaid SMS volumes actually growing in 2015 and again in 2016 growing 11.5% from 2,244,806 in 2014 to 2,503,476 SMS sent in 2016 as opposed to prepaid SMS which has experienced significant negative growth during the period from 2014 to 2016.

Interestingly, this trend contrasts starkly with the trend in mobile subscribers as the subscriber base in December 2014 was 129,185 and by the end of 2016 the total number of mobile subscriptions had increased to 192,162 an increase of 48.8%.

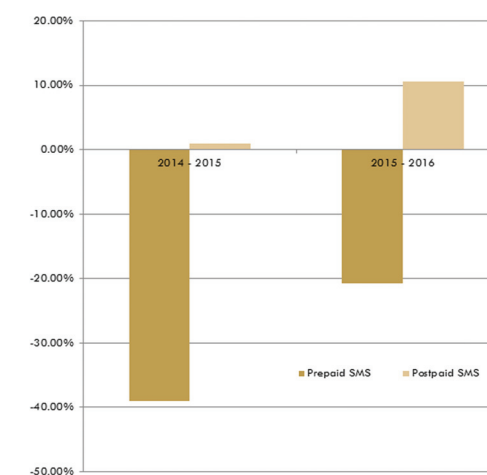


Figure 15 Growth In SMS Volumes By Subscriber Type

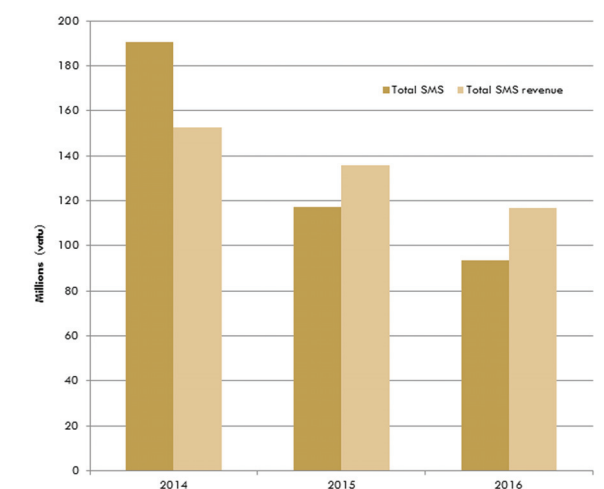


Figure 16 Total SMS Sent & SMS Revenues 2014 - 2016

SMS REVENUES

Total revenue from SMS has also experienced a significant decline with total market revenue dropping 12.8% in 2015 compared to previous year, and again decreasing by 15.5% in 2016. The result of this trend is shown in Figure 16 and demonstrates that although usage has declined operators are able to mitigate this decline and revenues have dropped at a far lower rate.

AVERAGE SMS PRICING

The advertised PAYG SMS price from both service providers has remained at 10 VT per SMS as service providers have sought to compete on the price of bundles and promotions in order to attract customers. Figure 17 shows that Average postpaid pricing has decreased slightly due to increased

¹⁸ Note: Data for 2014 includes estimated amounts for some values due to an anomaly in the data provided.

usage and reduced returns to providers, which was likely caused by the introduction, by both service providers, of new more generous postpaid packages in 2015; which included SMS, call minutes and data as standard. The average prepaid SMS price, however, actually increased significantly during the period under review, up from 0.72 VT to 1.09 VT, and this appears to have been caused by the dramatic drop in prepaid SMS volumes.

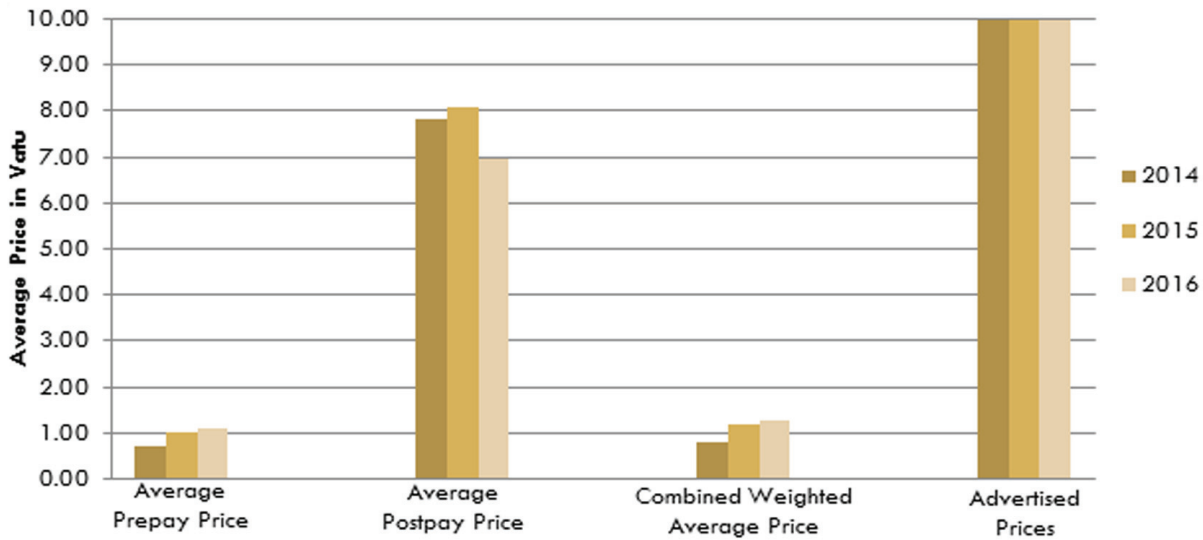


Figure 17 Average Realised SMS Unit Prices and Advertised Unit Rates

ON-NET AND OFF-NET SMS

A major driver in the large reduction in SMS volumes has been the drop in prepaid SMS's sent on-net (on-network) with this decreasing from a high of 183,255,264 total SMS in 2014 down to 85,757,394 in 2016. However, the volume of SMS sent to off-net (off-network) number has changed very little and has, in fact, increased from 5,009,015 SMS in 2014 to 5,206,340 total SMS in 2016. Additionally, SMS volumes from postpaid plans for both on-net and off-net SMS have grown between 2014 and 2016.

Given that competition on bundles and promotions between the two mobile service providers tends to focus predominantly on on-network traffic, resulting in cheaper on-net pricing than off-net, the differing traffic trends between on-net and off-net SMS is surprising and may appear counter-intuitive. It also seems particularly unusual when compared to the contrasting trends in the domestic mobile call market where the volume of on-network traffic is continuing to grow while off-network traffic is declining, when mobile voice calls also experience similar differences in on and off net average pricing.

It is difficult to be certain but a major factor in this decline is likely to be the huge growth in the use of mobile data in Vanuatu and, particularly, the increased use in Over-The-Top (OTT) social media platforms such as Facebook, WhatsApp, Messenger and Viber.

These OTT services are similar to traditional SMS however they also provide a range of additional features and functionality to users to allow them to send and share other content such as pictures, videos and other media making them a perfect substitute to consumers.

Social media platforms can be attractive to users for the many benefits they have over SMS but they also provide significant potential cost savings to users on current SMS pricing. A 1-day SMS bundle is around 100 VT and can provide as many as 500 SMS and a 7-day bundle can be around 500 VT and although these give a very low unit cost they still do not compare favourably to mobile data packages at 50 VT per day, or 200 VT per week which can provide for significantly more messages to be sent, as well as permit the sharing of other media and access to browse the internet. This comparison also does not consider that a number of prepaid data bundles now also come with free Facebook access for the period of the bundle or even some with additional data allowance between midnight to 6am, making them ever more attractive to value seeking prepaid users which would previously have purchased SMS bundles.

Although prepaid on-net SMS volumes have decreased, SMS volumes for off-net traffic and for postpaid have tended to increase which indicate a natural latent demand from subscribers. This may be users who are unable or unwilling to substitute SMS for OTT services, such as those outside of mobile data coverage, those without data enabled handsets, or those taking advantage of the fact that SMS, as a service charged only to the sending party (as opposed to mobile data which requires both the sender and recipient to have paid to maintain an active data connection), is still an easier way to contact an individual who may not have credit, in order to connect to mobile data, at the time.

PER USER AVERAGES

Figure 18 below depicts the average SMS sent and SMS revenue generated per subscriber during the year and includes both postpaid and prepaid subscribers. It clearly indicates the significant decline in both traffic and revenues on a per user basis during 2015 and 2016.

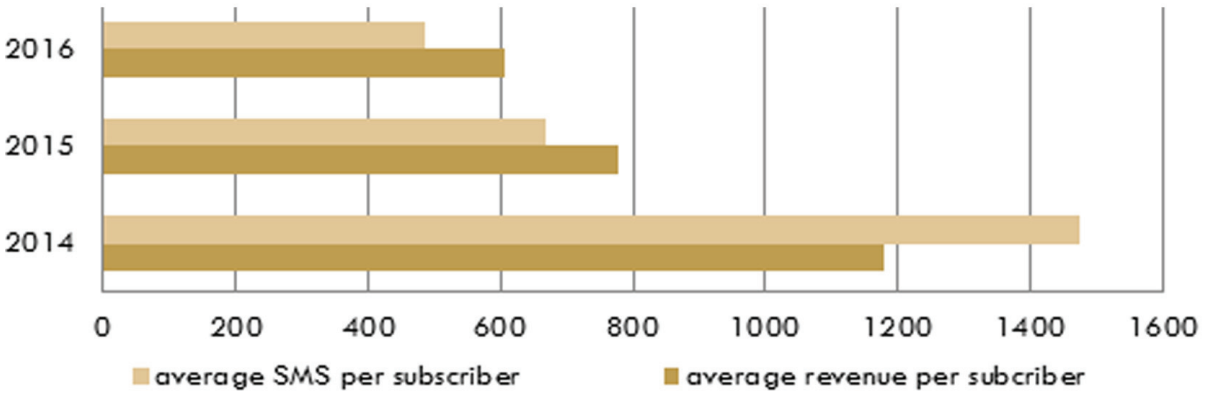


Figure 18 Per Subscriber Average SMS Volumes & Revenues

FIXED TELEPHONY

Reaching its peak of 10,400 subscribers in 2008 with a penetration rate of 4.6%, fixed telephone line subscribers have continued to decline between 2009 and 2012 as consumers found it more efficient, easier, more affordable and user friendly to use mobile services in substitution of fixed services.

The years 2013/14 had seen a slight increase in the number of fixed services subscribers with penetration rates increasing from 1.9% to 2.1%. The increase in subscribers was due to Digicel starting to compete in the fixed retail services market, as well as other promotions being put in the market to encourage the uptake of fixed telephone services.

The overall number of fixed telephone subscribers continues to fall each year, however, and this trend may continue as many domestic customers switch to the convenience and cheaper cost of mobile services; following a trend that has been experienced globally. *Figure 19* below illustrates the trend of the fix services in the 10 years.

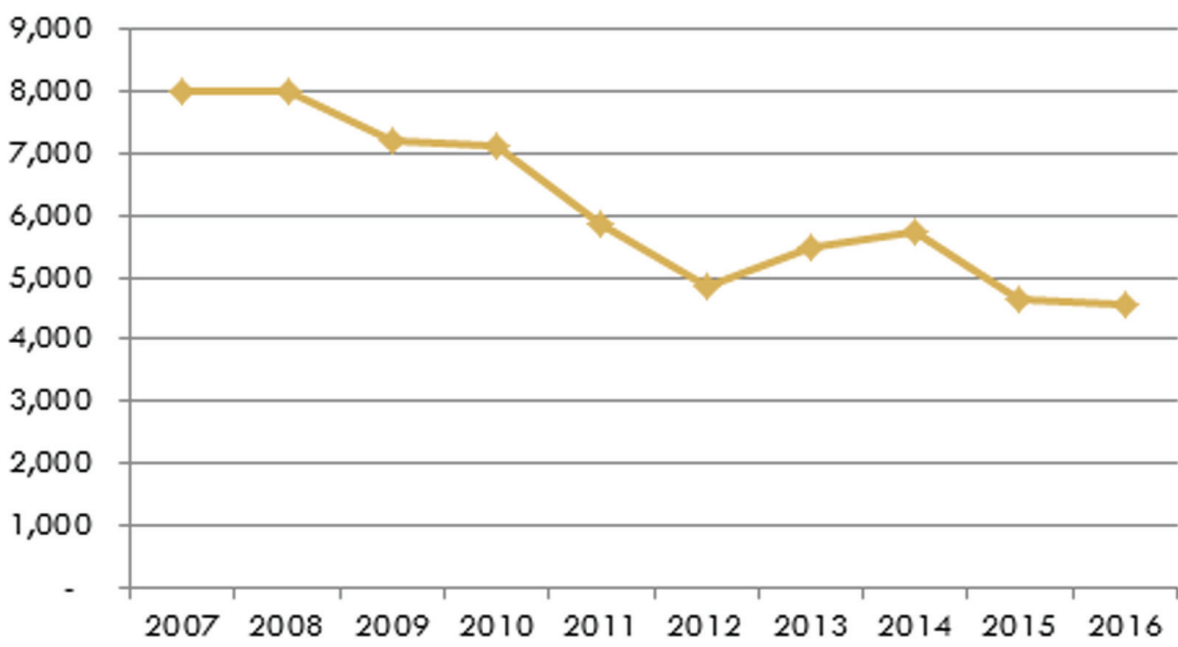


Figure 19 Fixed-Line Telephone Subscriptions

Ultimately, the majority of home users can be expected to go without land line telephony. However, land line telephony is likely to remain relevant to businesses, as many already have existing infrastructure in place and it provides a consistent point of contact to their organisation.

Another factor that is likely to assist in preventing the disappearance of fixed telephony altogether is the demand for fixed broadband subscriptions. As data demands grow and the speeds expected by consumers for their internet plans increases, there will be greater demand for fixed fibre broadband connections to customers’ premises. If a customer elects to install a fibre broadband connection to their premises then it is relatively easy to also provide a fixed telephone service at the same time. Service providers have already taken account of this, and it is now possible to purchase a fixed broadband connection with additional bundled or unlimited calls included. Such developments are likely to encourage the continued use of fixed telephony services for some years to come.

FIXED CALL REVENUES

Even though fixed telephone subscriber numbers have trended downward over time, the revenue collected by service providers have remained relatively flat over the period from 2014 - 2016, but have actually grown slightly from 305,257,484 VT in 2014 to 308,300,137 VT in 2016.

This result may support the hypothesis that although many users, such as domestic customers, are moving to replace their fixed lines with the convenience of mobiles, those remaining customers, which still rely on fixed lines, tend to be larger, more valuable, customers like businesses, which still continue to maintain their fixed line connections.

Interestingly, the greatest movement in fixed call revenues appears to be during each annual period, with the second half of each year tending to generate significantly more revenues than the first half, as you can see from *Figure 20* below.

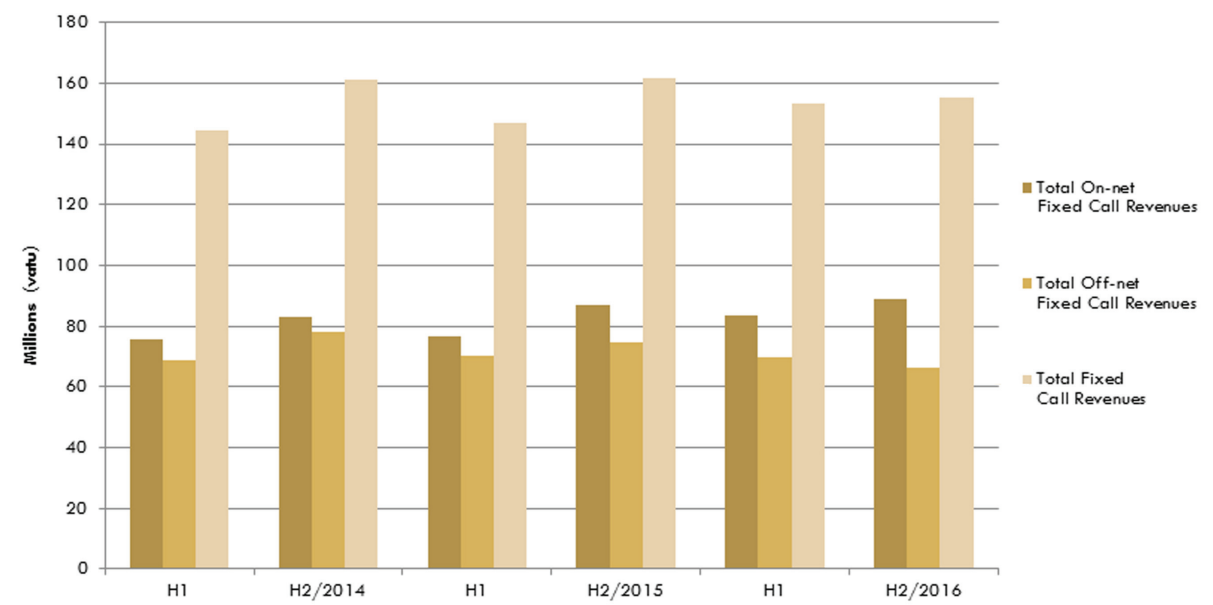


Figure 20 Fixed Call Revenues By Call Destination 2014- 2016

INTERNATIONAL CALLING

Under Order 1 of 2015, TRR collects information on the number of outbound international calls - this refers to calls made by subscribers in Vanuatu to numbers outside of Vanuatu.

Over the 2014-2016 period, there has been a significant decline in the quantity of outbound international call minutes, with a decline of 20% from the 2014 total of 4,320,780 minutes to a total of 3,453,917 minutes for 2016.

As can be seen in *Figure 21* this decline has been predominantly due to the significant declines in prepaid mobile call minutes and fixed-line minutes with these experiencing a 25% and 23% decline respectively since 2014.

The large drop in outbound international calls has likely been caused by a shift in demand towards OTT providers such as Skype, Facetime and other internet based communication services. These applications tend to offer free or very cheap rates to call other users, so long as they are connected to the internet. With the increase in internet speeds brought on by the launching of the submarine cable in Vanuatu, the quality of internet packages has improved sufficiently to support the use of these applications to make voice or video calls overseas.

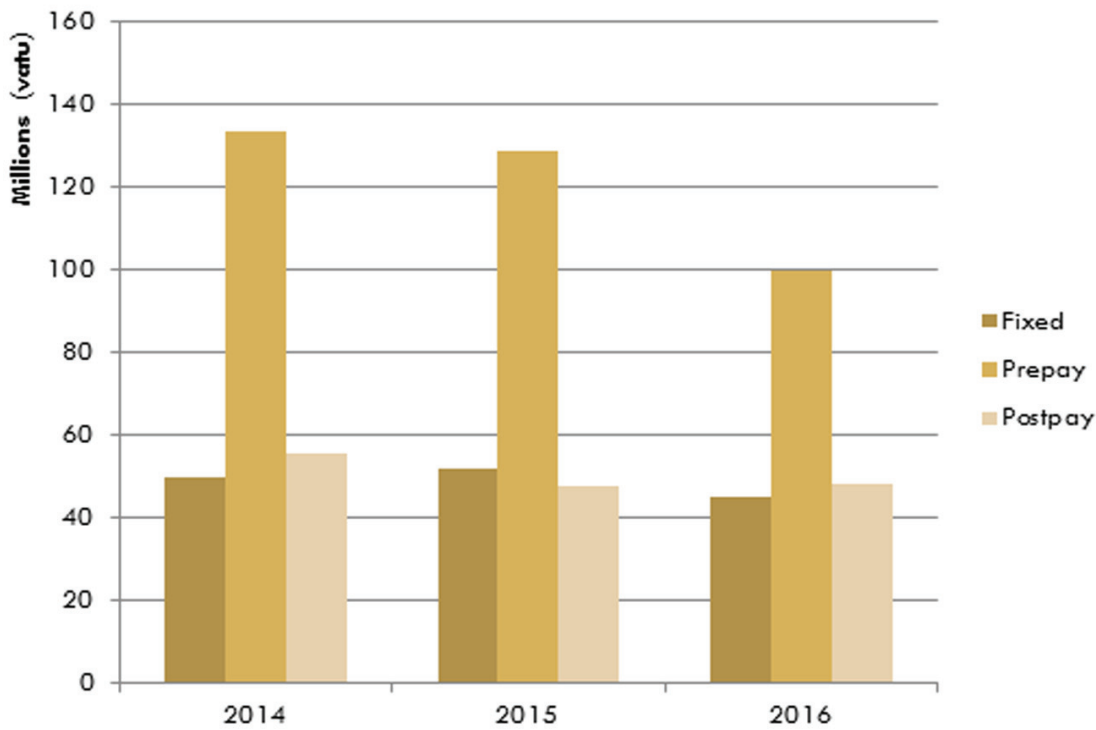


Figure 21 Outbound International Call Revenues By Call Type

The sharp decline in outbound international call minutes has resulted in a substantial drop in outbound international call revenues with a decline of 19.3% over the period, down from 238,616,813 VT in 2014 to 192,524,952 VT in 2016.

The decline in revenues has not been experienced uniformly by service providers across all service types. However, with postpaid mobile revenues there has been a marginal increase in 2016 from 2015. This may be due to a shift in approach from both service providers to include a quantity of postpaid international call minutes, to a select group of countries, as standard as part of their packages. This may also provide some explanation for how postpaid mobile outbound minutes experienced a much lower drop in traffic when compared to prepaid mobile or fixed.

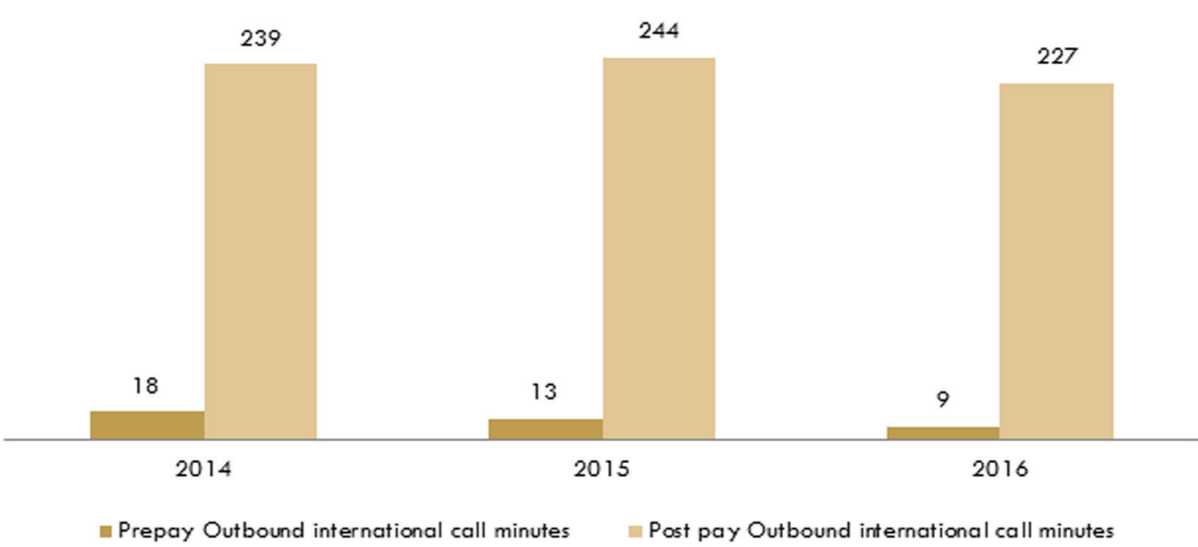


Figure 22 Outbound Average International Call Minutes Per Mobile Subscriber

Figure 22 above shows the real impact, on a per subscriber basis, of the decline in outbound international calls from mobile subscribers. Given the significant growth in prepaid subscribers, per user call minutes have effectively halved in since 2014, whereas the decrease has not been experienced similarly for postpaid users.



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