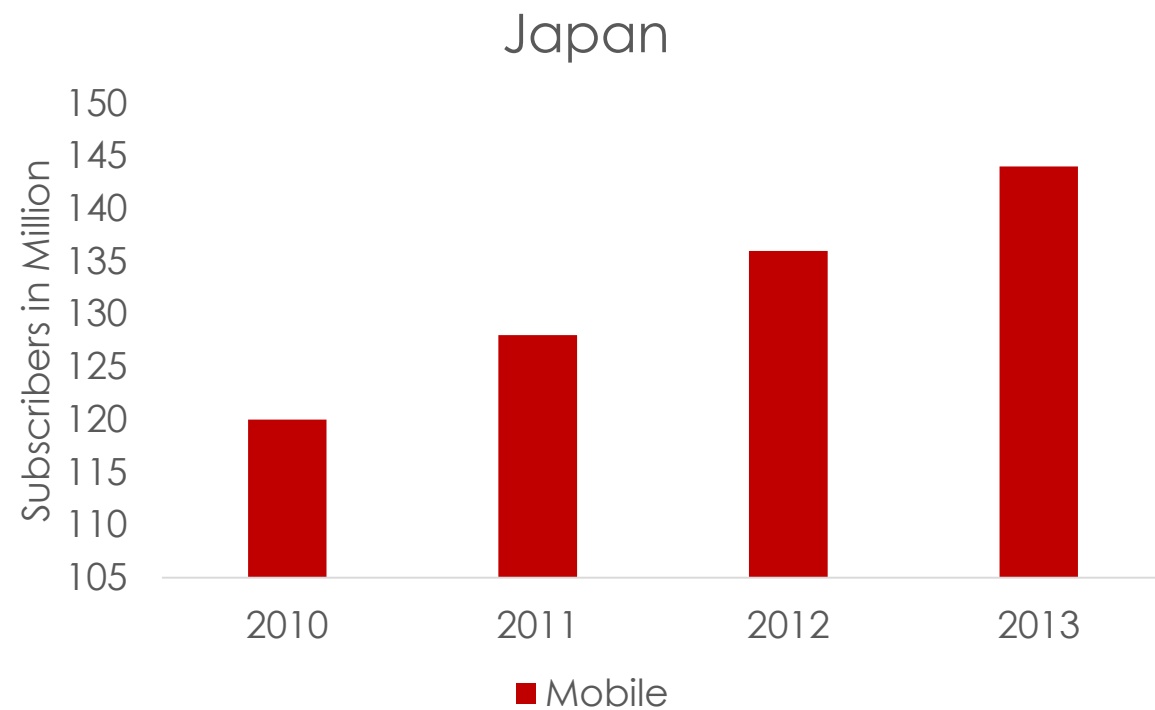


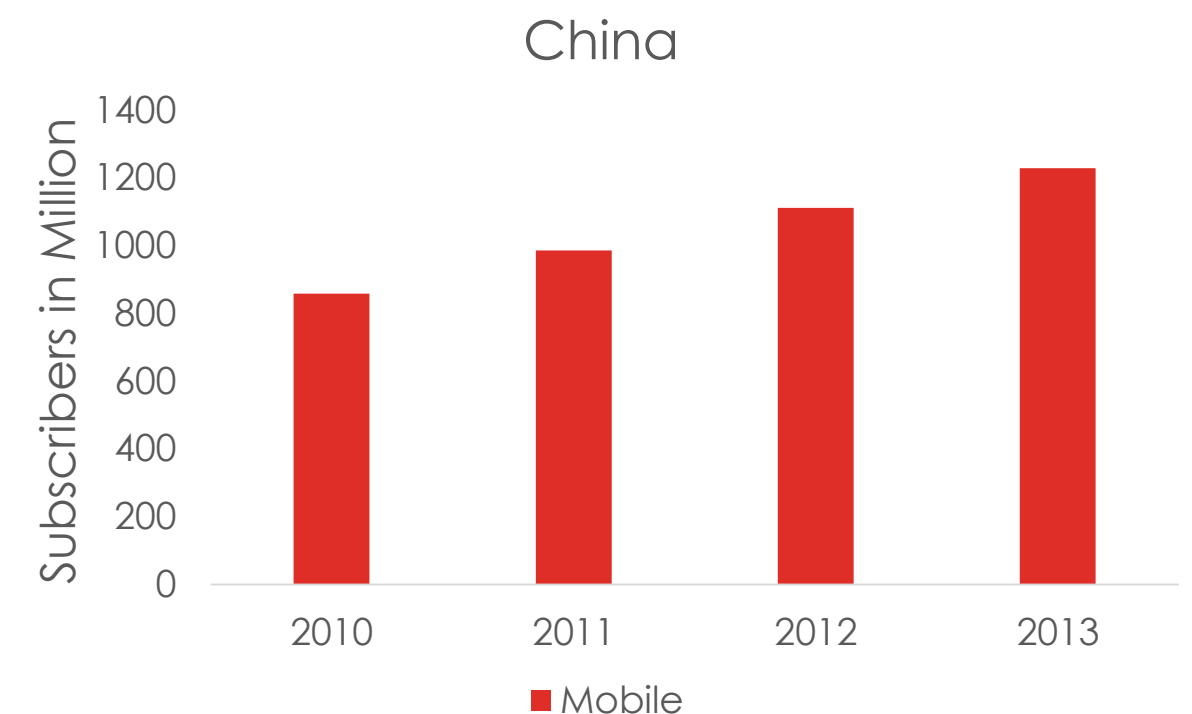
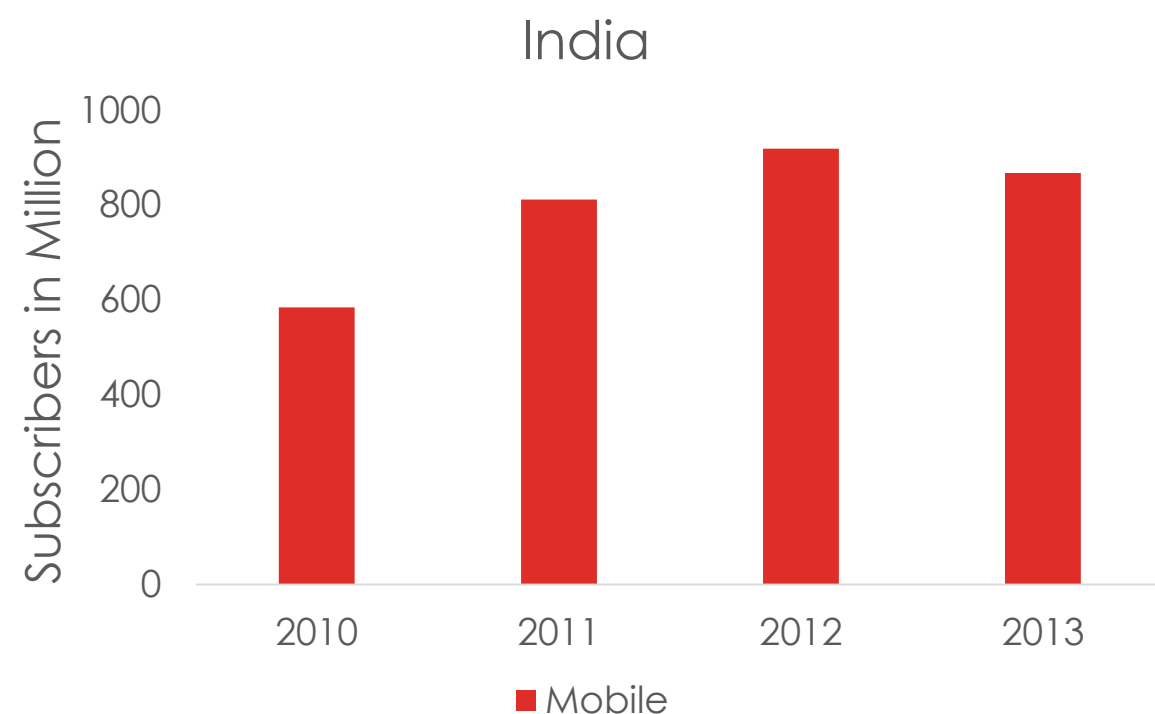
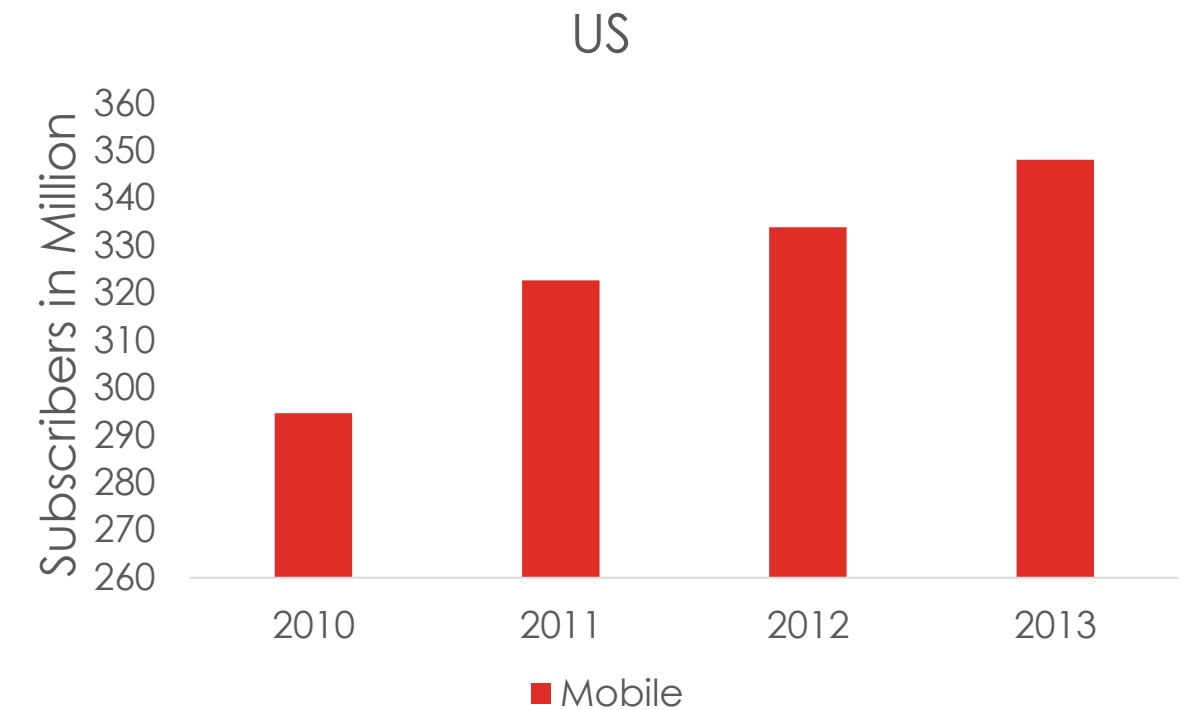
INDIA AND TOP 3 WIRELESS MARKETS

– KEY MBB TRENDS & OFF-LOAD
JAPAN US CHINA INDIA

INDIA AND TOP 3 MARKETS - GROWING WIRELESS SUBSCRIBERS



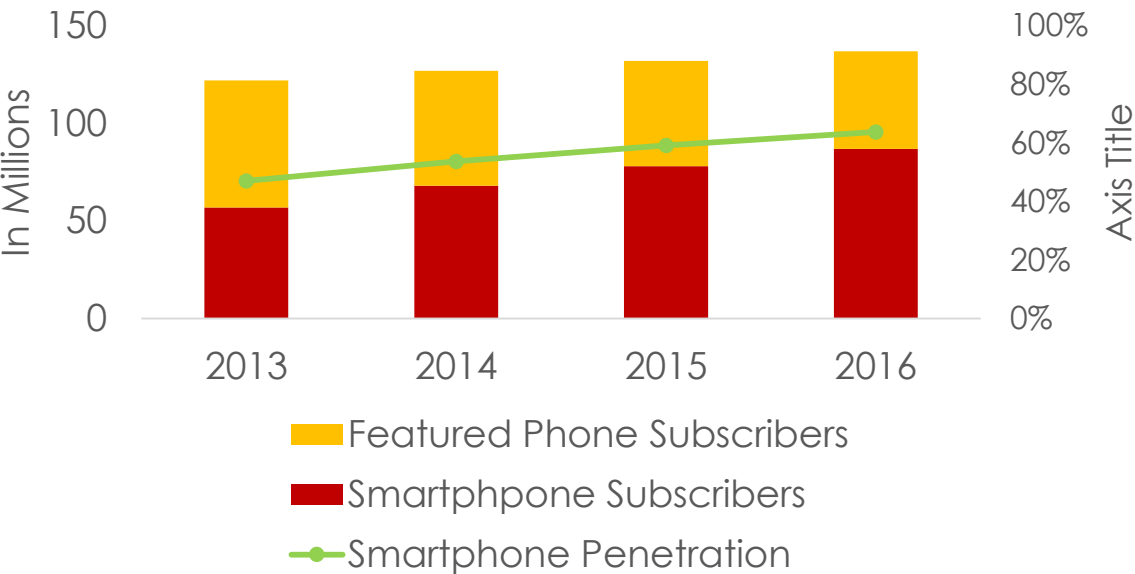
- As more mature mobile markets US and Japan continue to grow, it is an interesting comparison to see how China and India stack up.
- With very high mobile penetration US and Japan markets are now witnessing intense competition for customer retention, more than acquisition – notice large cash-backs to mobile customers at DoCoMo. CAPEX pressures are high in Japan and US as multi-band LTE gear is still peaking
- At 760 mil subscribers China Mobile is still the largest mobile operator and with 190 mil 3G subscribers, presents an interesting case of scaled 3G network operations
- China Mobile 2014 RAN Capex (44% of overall Capex) higher from 2013 (40% of overall Capex). Transmission Capex down from 37% to 28% (of overall capex)
- OTT substitution noticeably high for all markets, voice revenues flat to low growth or drop in most cases, messaging revenues are down.
- Coverage, capacity consumption demands up, revenues challenged by competition, tariff wars for all markets.



Source: Company Reports

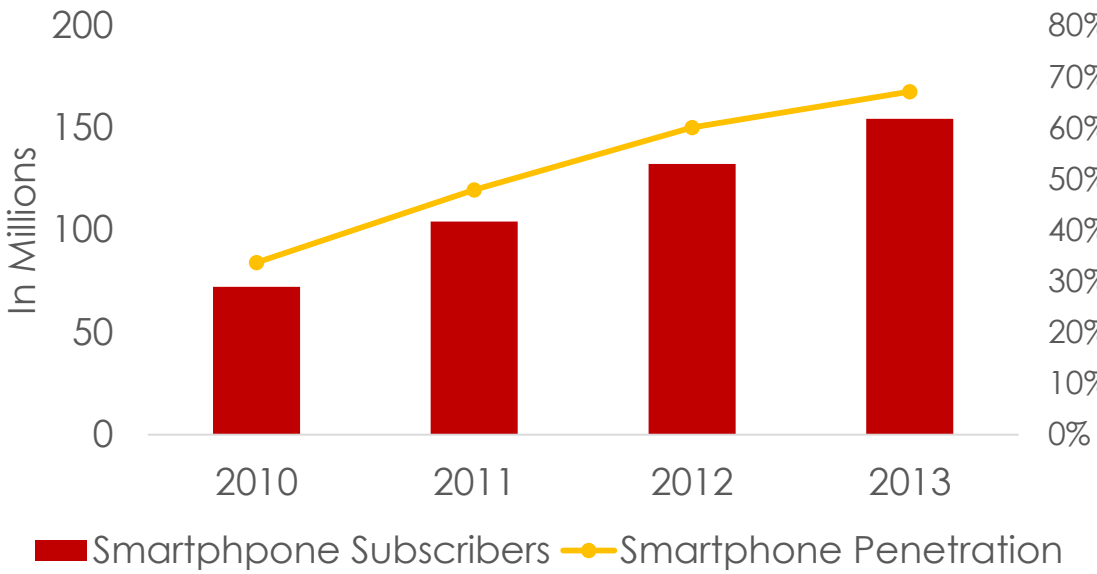
INDIA AND TOP 3 MARKETS -SMARTPHONE PENETRATION

Japan:Estimated Smartphone Penetration

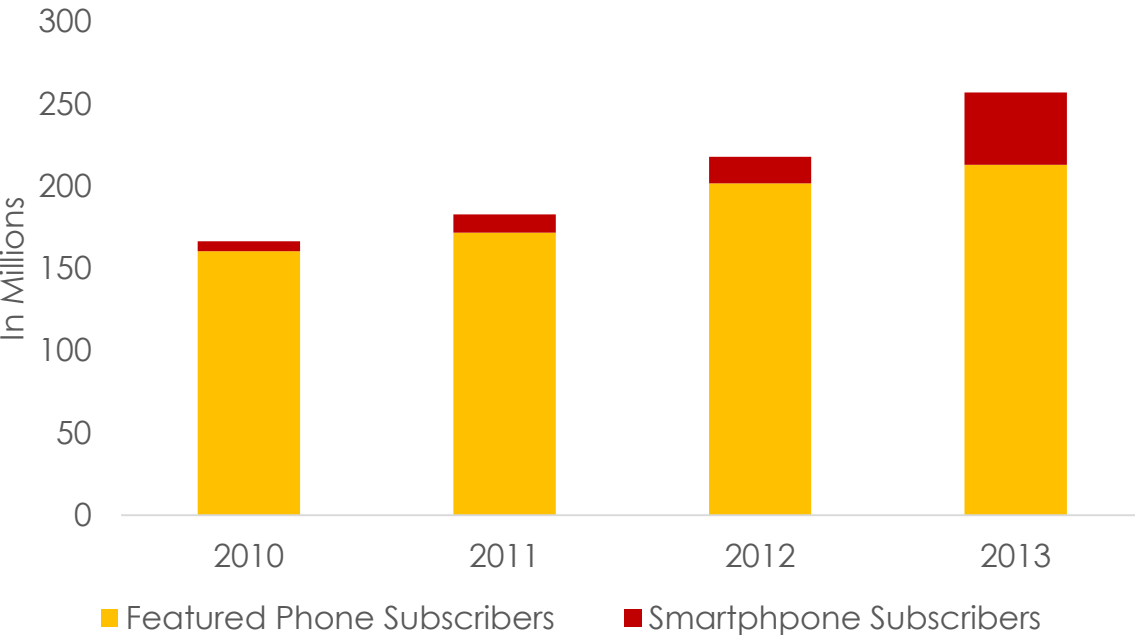


- Japan and US display very high smart phone penetration rates but are still further away from an all smartphone network. However India is showing fairly high growth rates for smart phone consumption but it is still a small fraction compared to global peers.
- US is certainly the iPhone mega market and increasingly more Android devices. Japan has a rich home grown suite of mobile services including gaming which drives fast mobile replacement market.

US:Estimated Smartphone Penetration

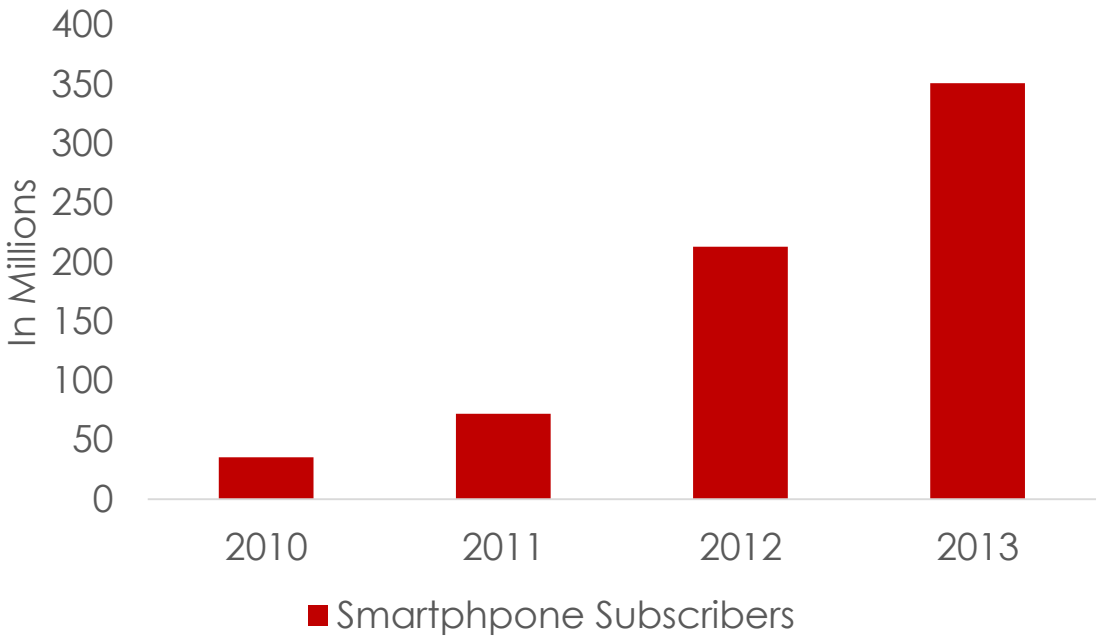


India:Smartphone Penetration



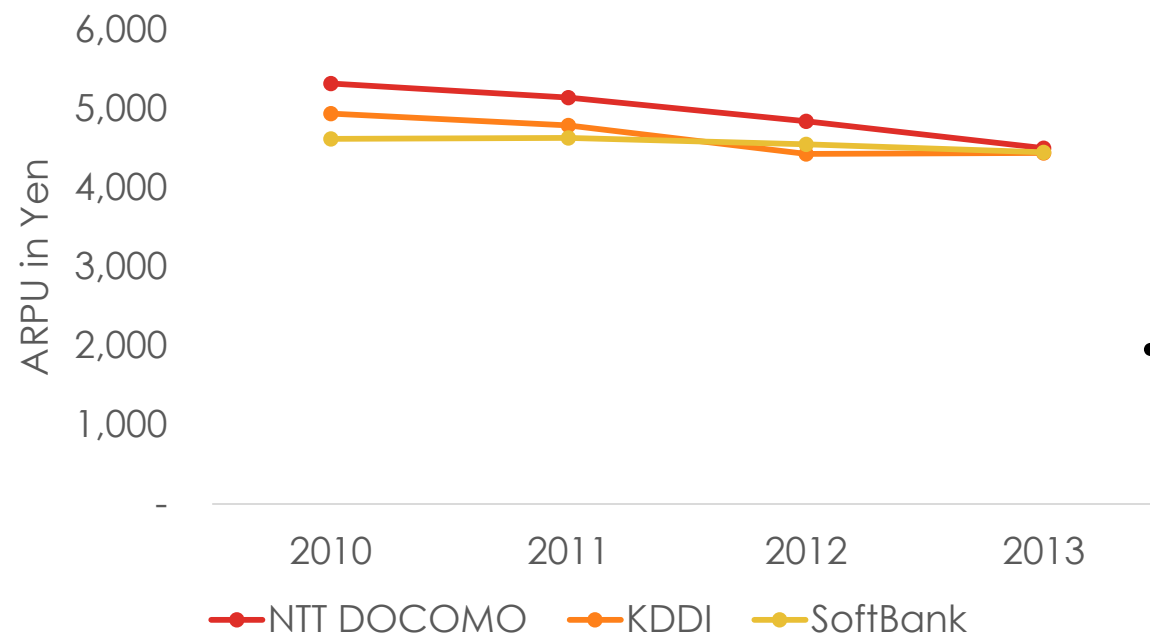
- China mobile device market is split between its own TD SCDMA and LTE push markets. Coupled with rich domestic device vendor eco-system has managed to push back Samsung and Apple to reasonable extent.
- China Mobile sold 150mil TD SCDMA handsets in 2013. Currently has 32 TD LTE device models on sale. Debuted 5 mode, 13 frequency and 5 mode 10 frequency devices in market. Targets to sell 100 mil TD LTE devices in 2014

China:Smartphone Penetration



INDIA AND TOP 3 MARKETS – MOBILE ARPU TRENDS

Japan:ARPU



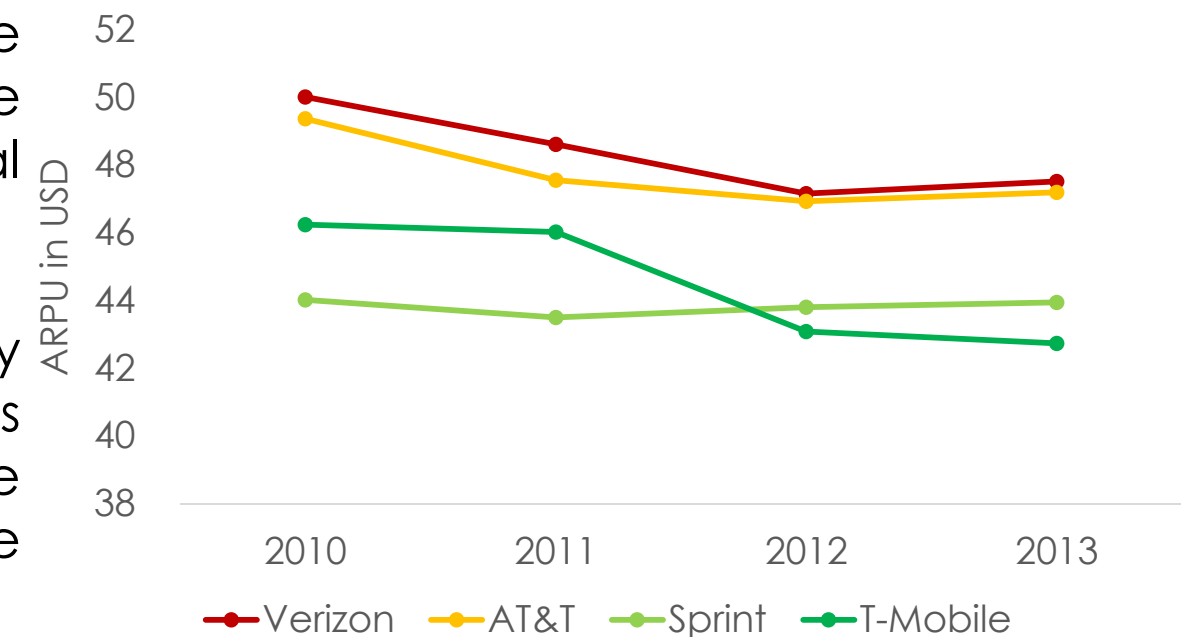
- Japan and US are battling plateauing revenue generation per subscriber after the historic 2010 period. To a large extent the dynamics of a bundled market play into the hands of the operators, creating a natural barrier to churn.

- However while contract subscribers may stay back, they may still drive volumes on OTT as all leading networks show data volume growth (see next slide) but fail to contribute to revenues.

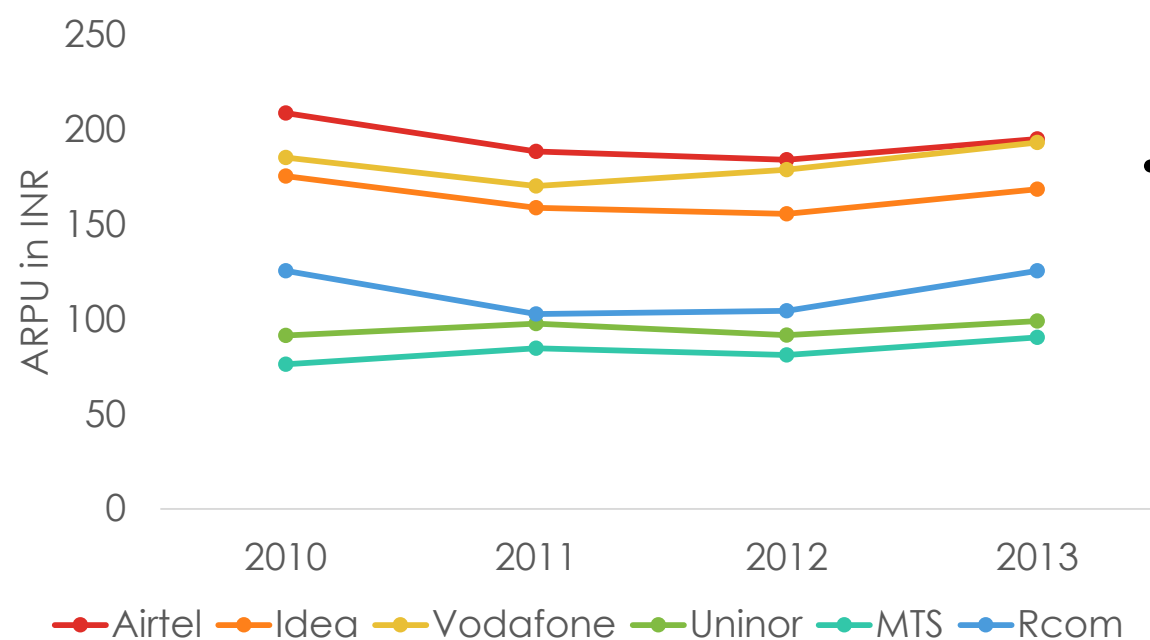
- Competitive pressures are so intense in Japan that SoftBank finds it more valuable to enter US market with a big-ticket Sprint acquisition to grow as saturated Japanese markets may no longer offer growth opportunities.

- After bottoming out, Indian tariffs increased thereby building up ARPU somewhat reversing a downward trend. Yet if you look at the massive investments required for 3G expansion, LTE inception, new spectrum acquisition and relief from current debt levels, it will continue to be an uphill ride for Indian CSPs unless new ARPU growth comes

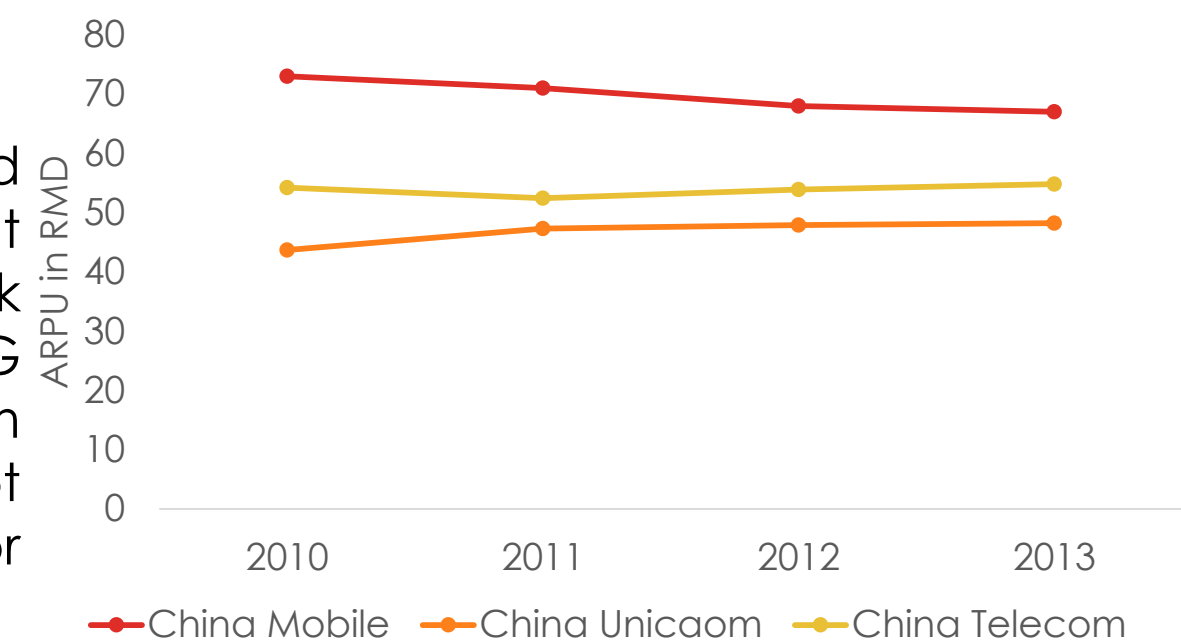
US:ARPU



India:ARPU



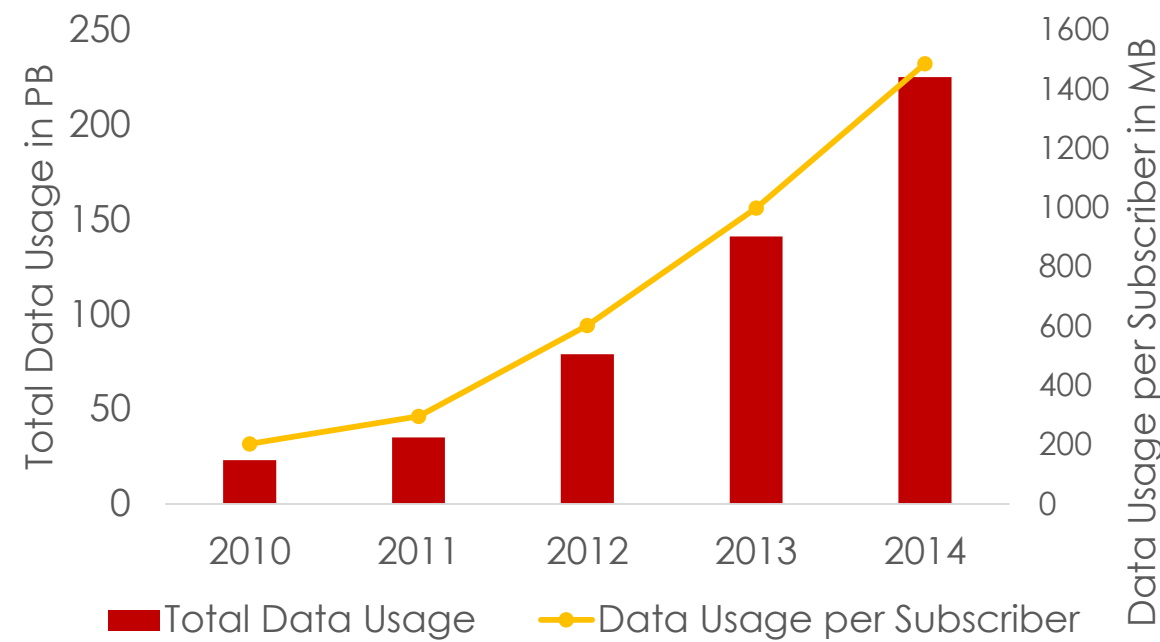
China:ARPU



Source: Company Reports

INDIA AND TOP 3 MARKETS -MOBILE DATA USAGE

Japan: Data Usage



- US mobile data usage is by far the highest compared to other top markets currently. Triggered by Netflix and other video streaming services US consumes more data than projected data consumption all India by end 2016.

- In US, China and India markets mobile data consumption appears to be hitting the hockey stick curve from now onward –which means more n/w capacity, spectrum will be needed

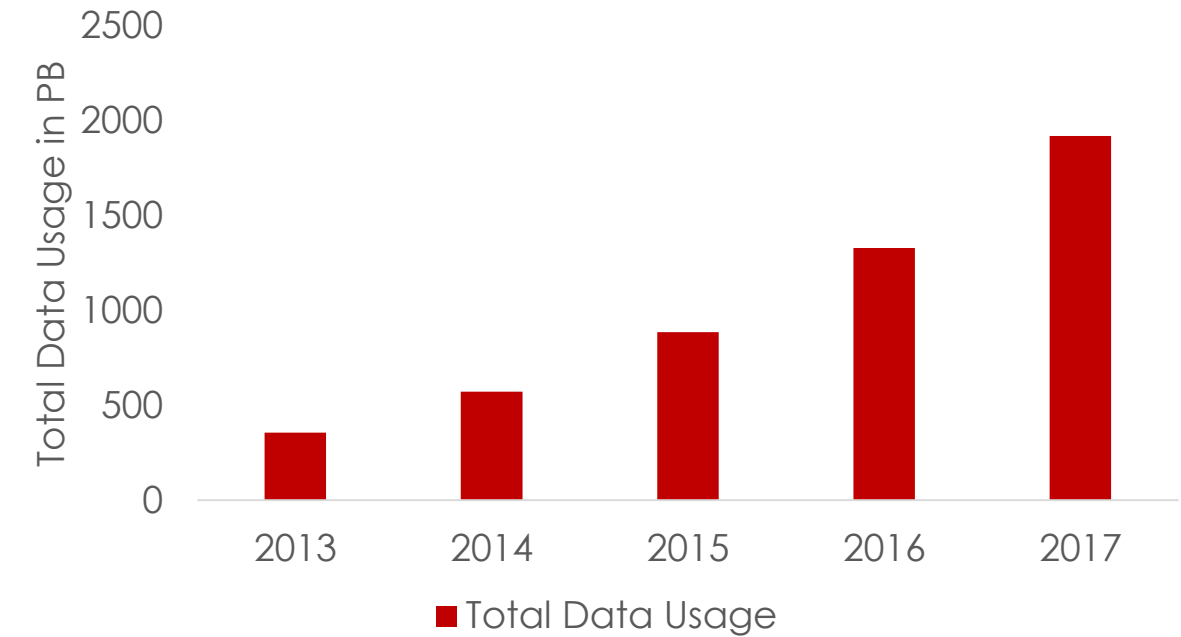
- In India video streaming, Facebook (100mil users) and social media, (Whatsapp ~50mil) image sharing applications are driving bulk of this new demand. India is a big contributor to FB and social media traffic largely triggered on mobile handsets.

- According to Cisco VNI Report, India will generate approximately 770PB of data on mobile broadband – seven times of 2014 in the next 36 months.

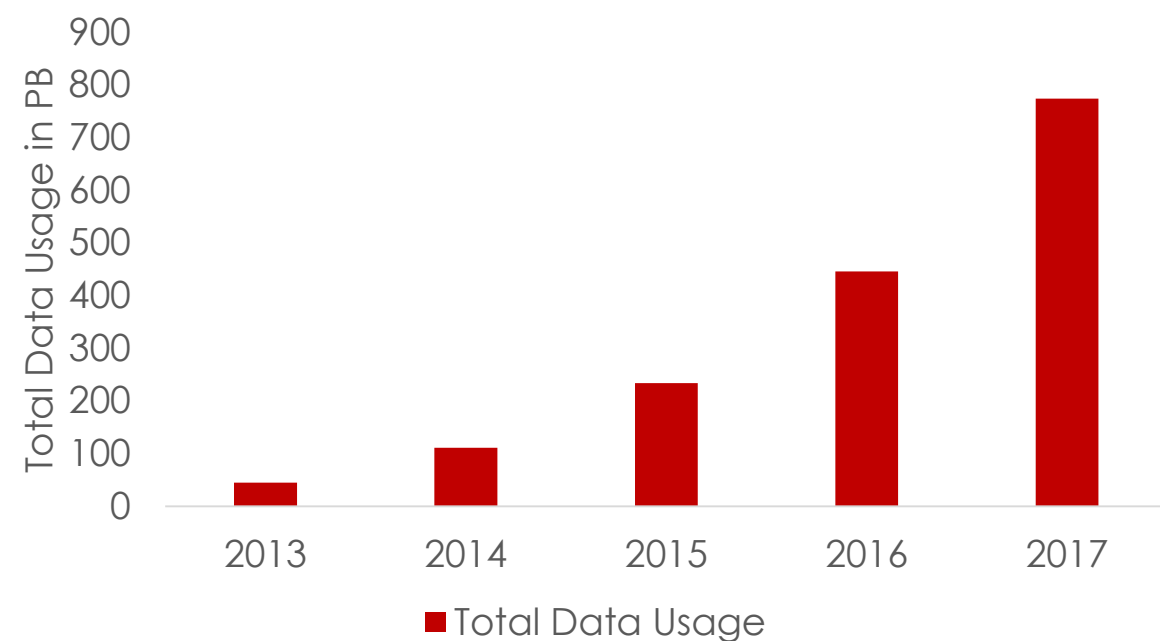
- At 6GB per sub per year, India should be currently generating about 60-70PB per year in beginning of 2014 (Tonse estimates).

- Wi-Fi Offload is increasingly a commonly used strategy as a part of early network planning for 3G/4G MBB networks.

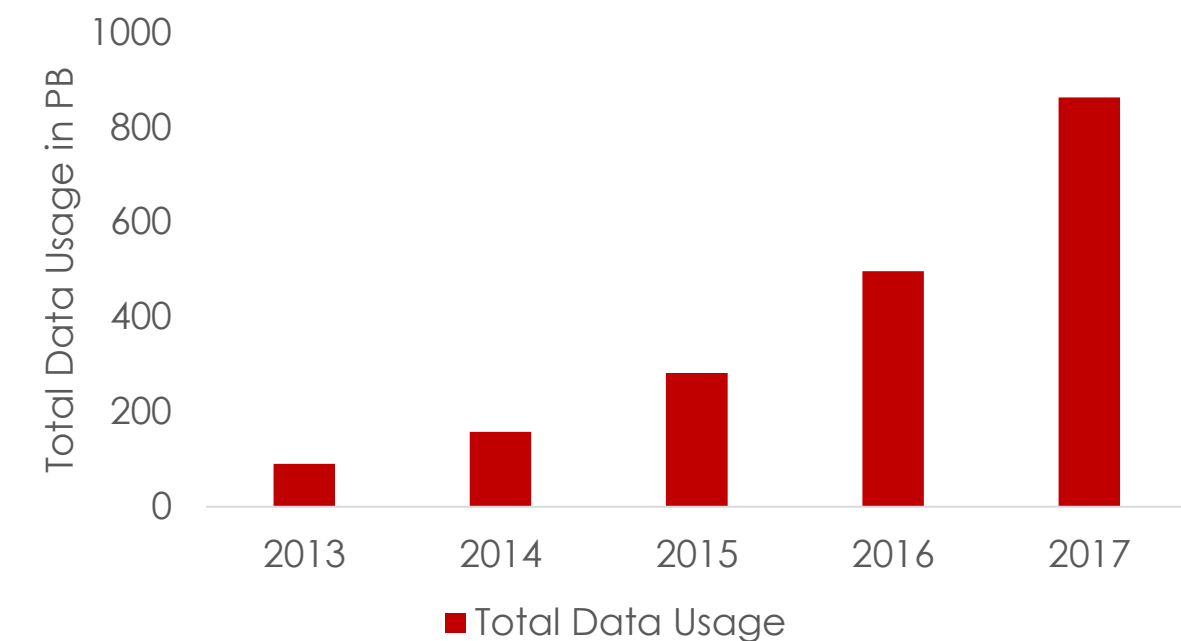
US



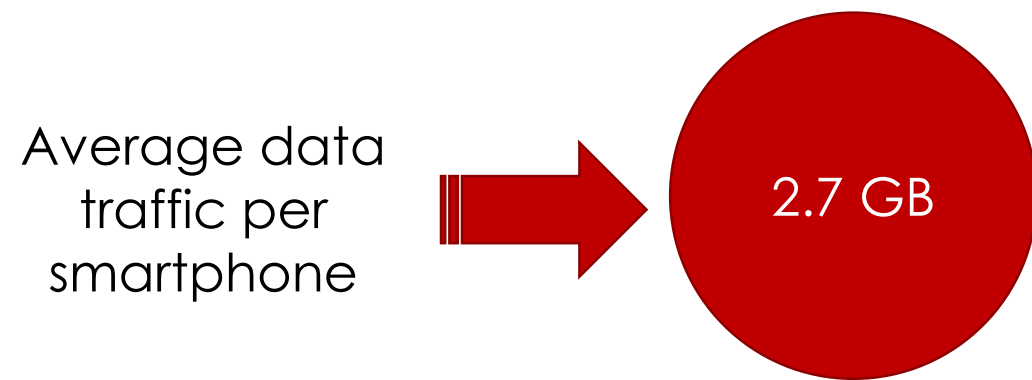
India



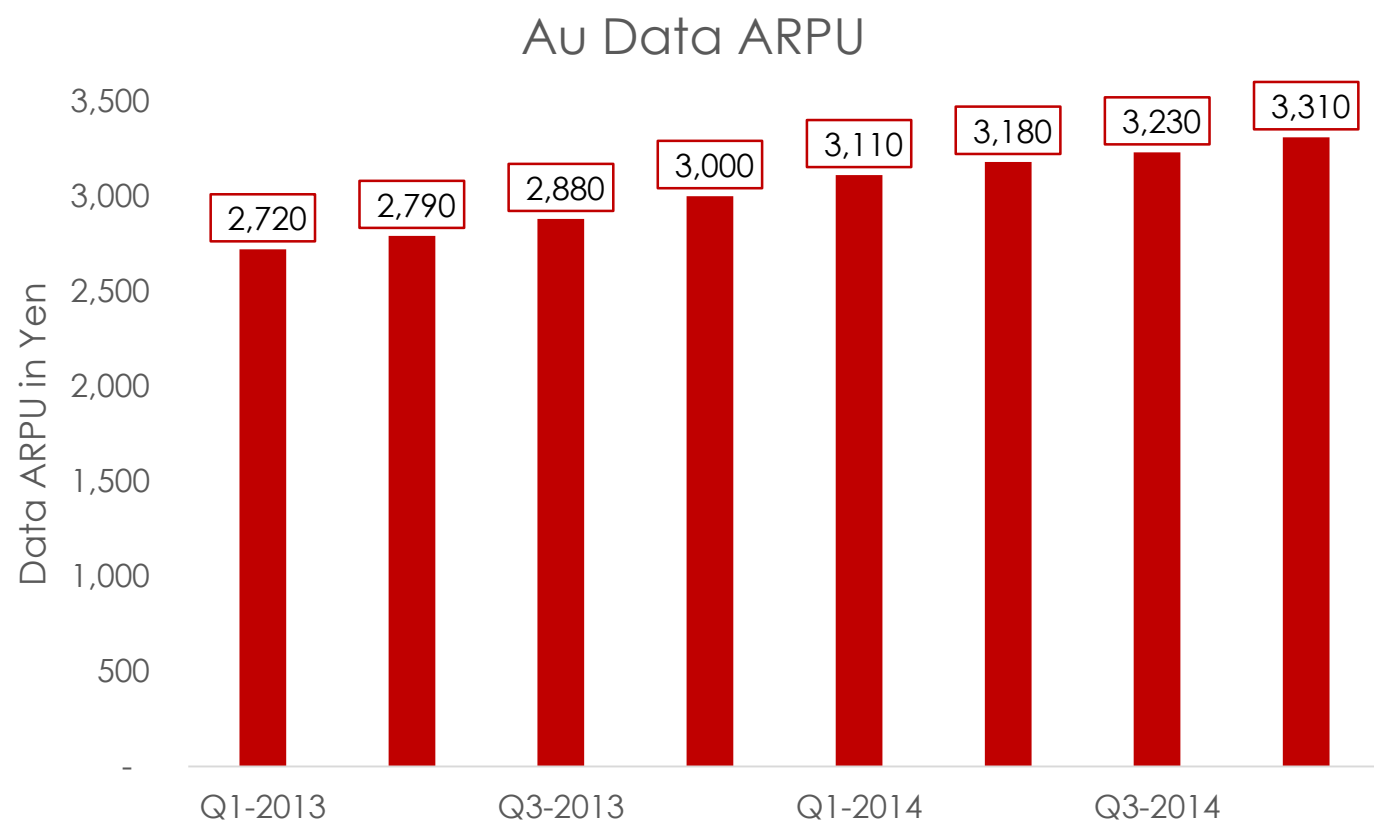
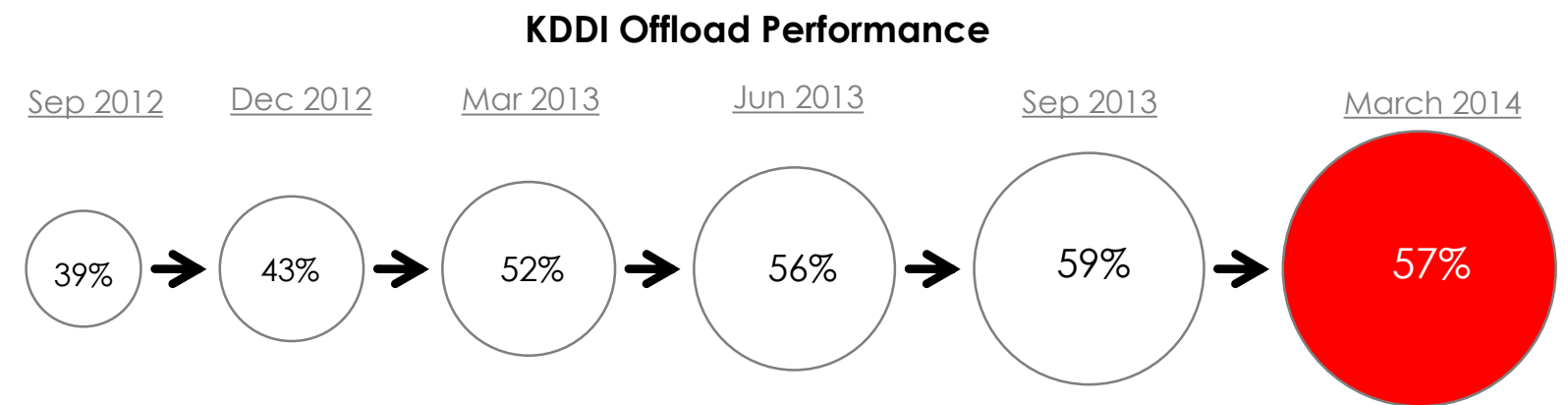
China



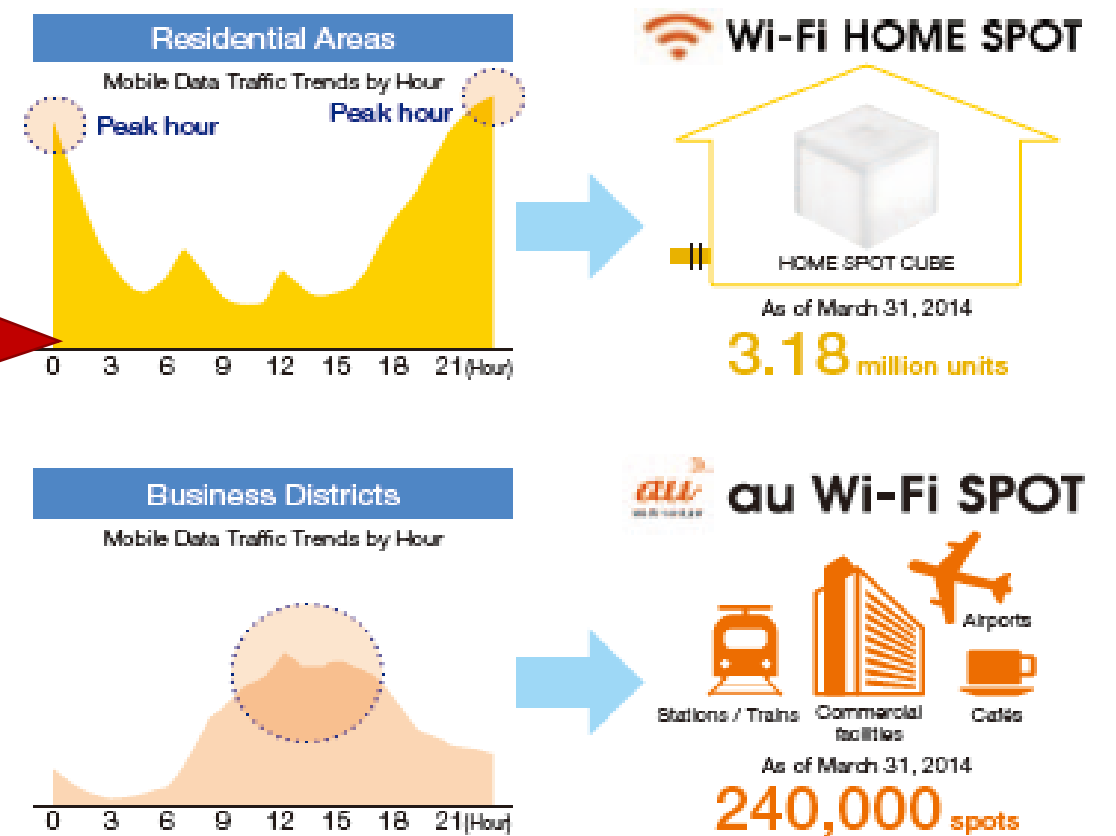
WI-FI DATA OFF-LOAD AT KDDI



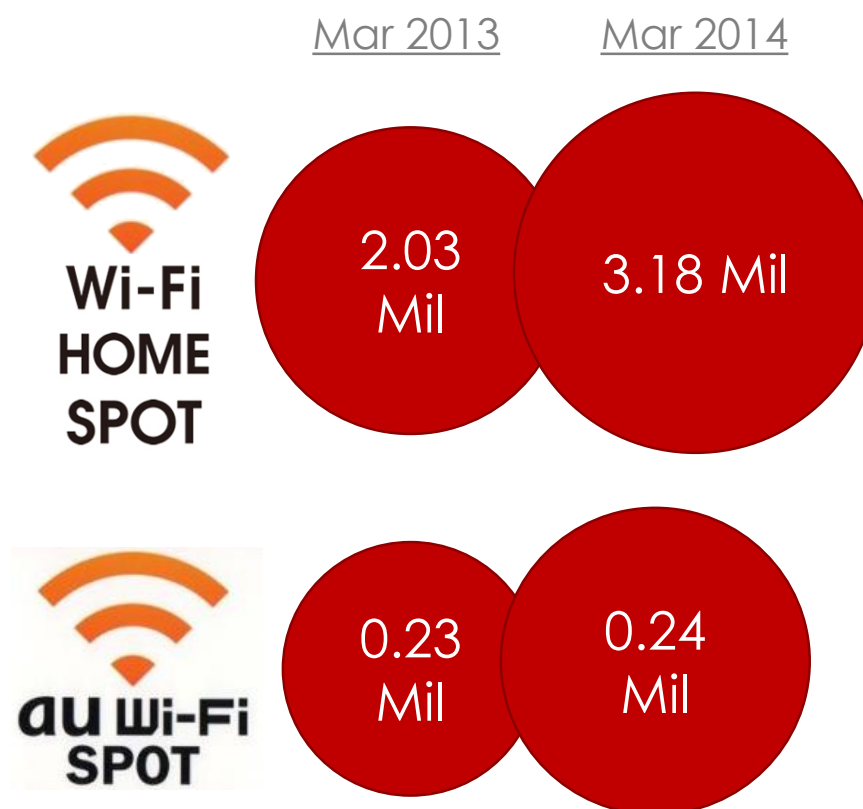
To vanquish bottleneck of spectrum and increasing data usage KDDI is promoting data offload to Wi-Fi network



Data traffic in residential areas tend to peak during night and are highest in business areas during lunch time.

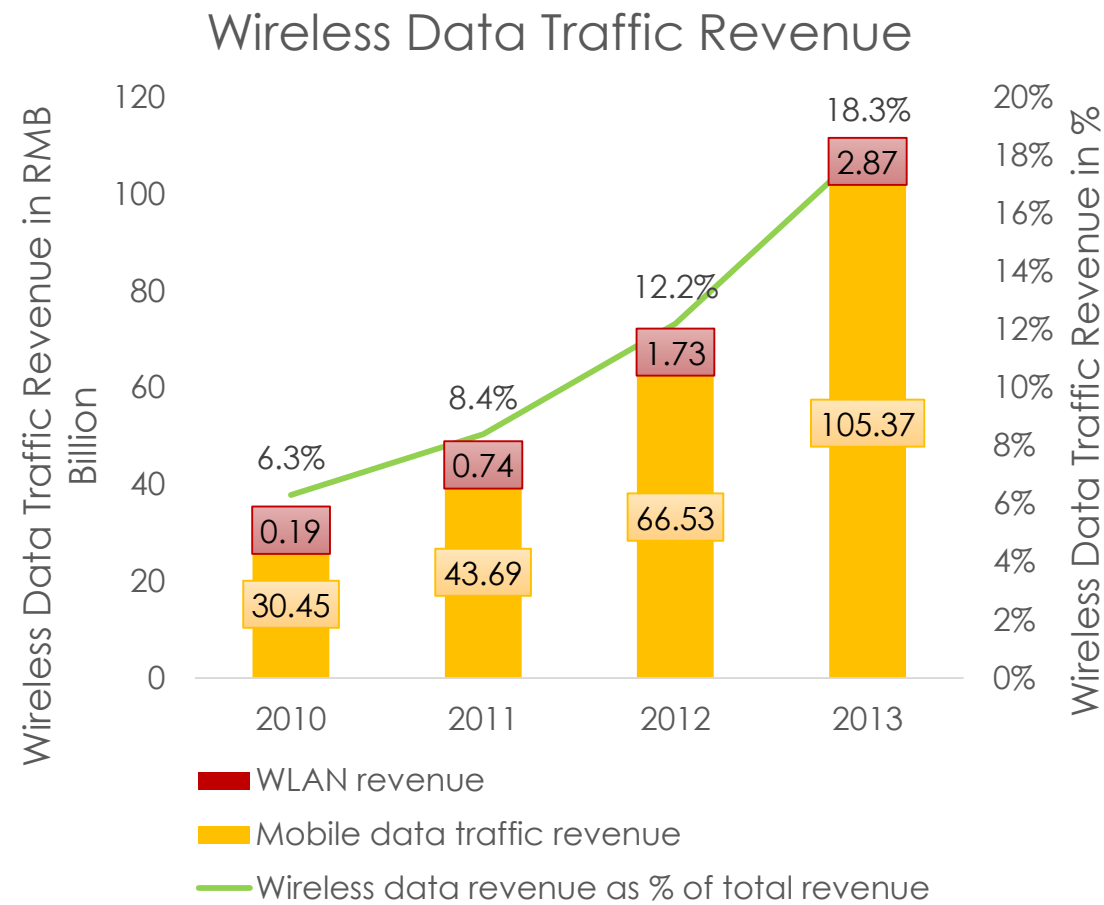


- Data ARPU was up by 10.33 % to reach ¥ 3,310 in QE-Dec-14 from ¥3,000 in QE-Dec-13
- Increase in data ARPU was due to increase in smartphone subscription which lead to increase in data traffic

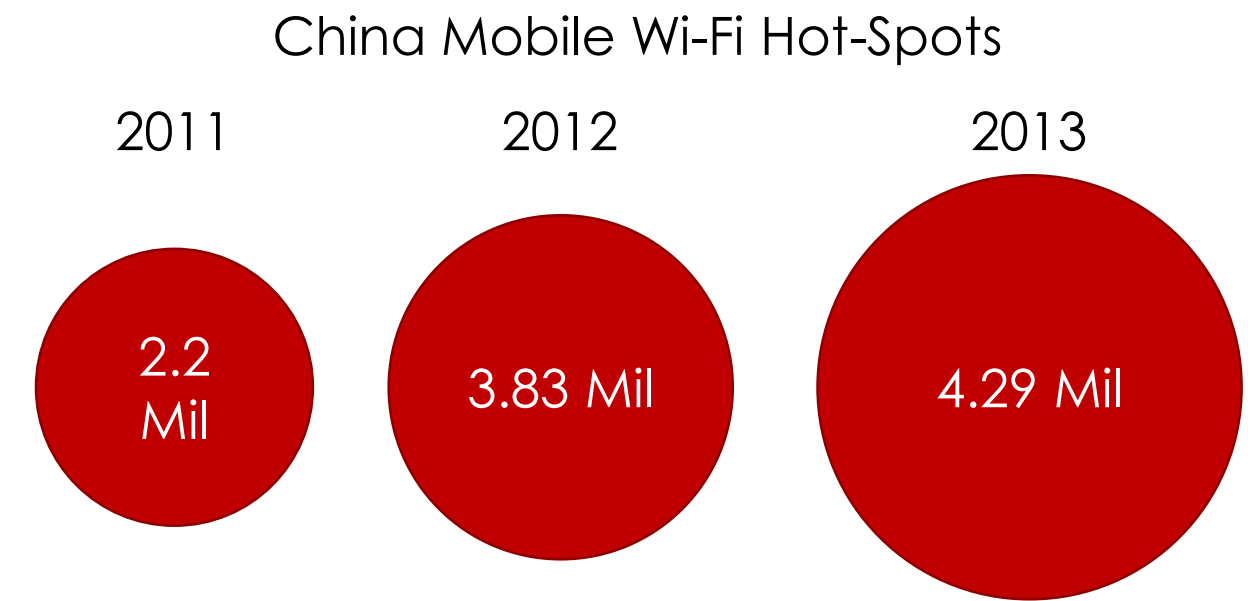


- To pursue Wi-Fi offload initiative KDDI provides free "Wi-Fi HOME SPOT" router to smartphone users in residential areas who have fixed broadband connection.
- Also provides "au Wi-Fi SPOT" routers in densely populated business areas thereby off loading data to Wi-Fi network and handle data traffic efficiently.

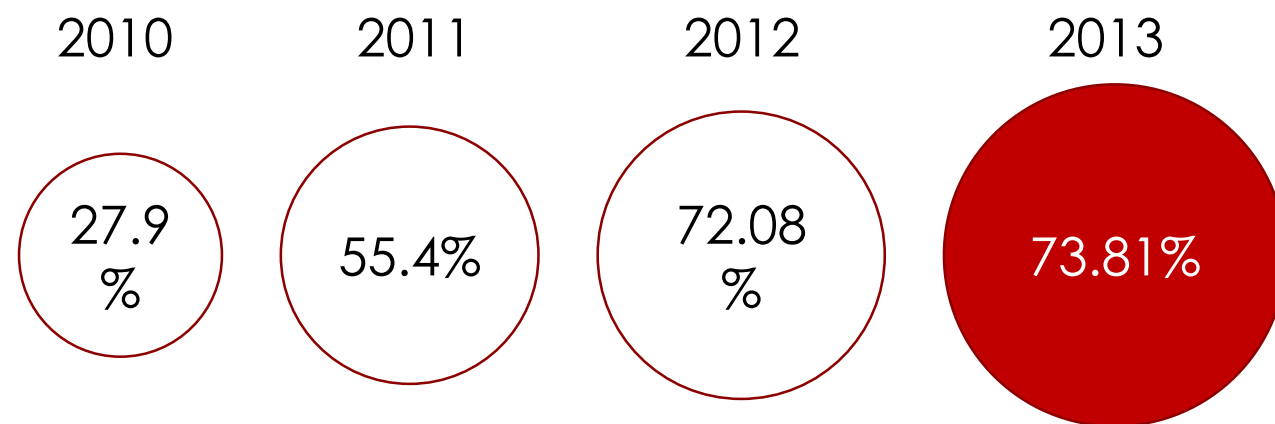
WI-FI DATA OFF-LOAD AT CHINA MOBILE



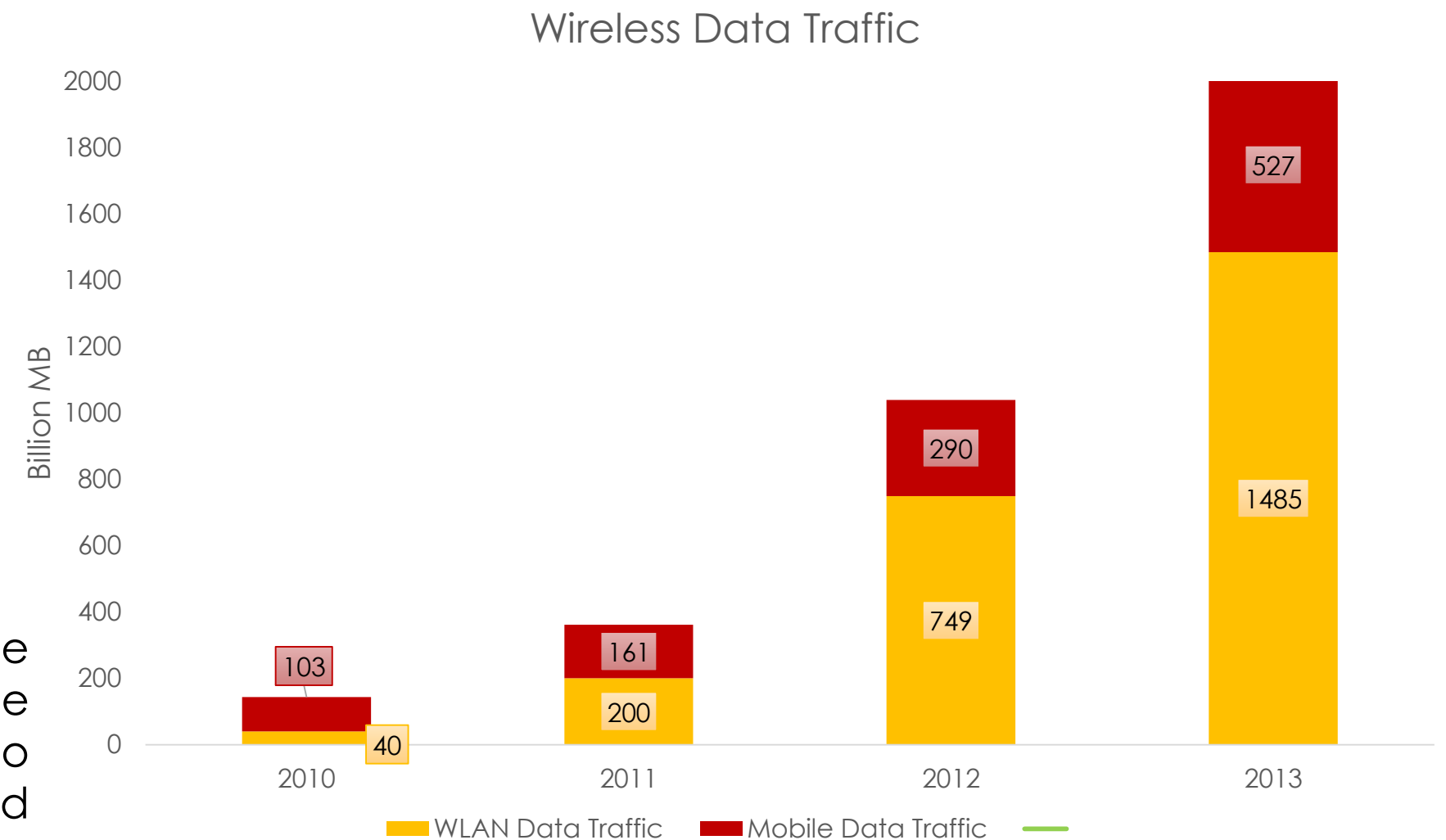
- Wireless data traffic revenue increased by about 58.57% to reach RMB 108.24 Billion in March-13 from RMB 68.26 Billion in March-12
- Wireless data traffic witnessed a rise of 93.6% to reach 2011.8 Billion MB in March-14 from 1039.2 Billion MB in March-14
- Out of total wireless data traffic 73.81% was off loaded to Wi-Fi network



Percentage of data offloaded to Wi-Fi network



- **What Next:** Wi-Fi Offload may hit a logical dead-end and may not be endlessly scalable. Beyond X% of data, incremental off load may be minimal compared to the overall data growth which doesn't seem to stall anytime soon. Combination of small cells, CA, cloud RAN and other solutions may help in resolving this further.



Source: Company Reports, Tonse Analysis

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